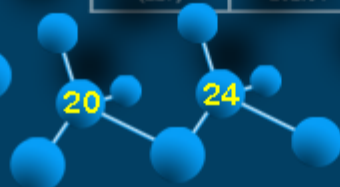
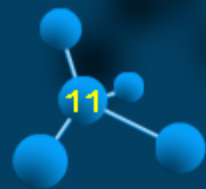
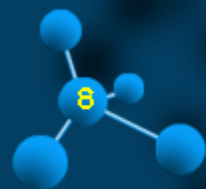
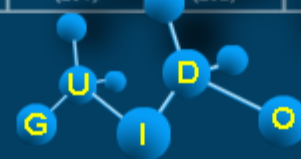


| | | | | | | | | | | | | | | | | | |
|--|--------------------------------|------------------------|---|------------------------|---------------------------|--------------------------|------------------------------|-------------------------------|---|----------------------------|----------------------------|-------------------------------|-------------------------------|--------------------------------|-----------------------------|-------------------------------|----------------------------|
| IA | | | | | | | | | | | | VIIIA | | | | | |
| 1 H Hydrogen 1.01 | IIA | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | | | | | | | | | | | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | IIIB | IVB | VB | VIB | VIIB | VIIIB | VIIIB | VIIIB | IB | IIB | | | | | | |
| <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">15 P</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">69 E</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">37 R</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">53 I</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">8 O</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">105 D</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">53 I</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">69 E</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">19 K</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">28 Ni Nickel 58.69</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">29 Cu Copper 63.55</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">16 S</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">39 Y</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">16 S</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">22 T</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">69 E</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">69 E</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">12 M</div> </div> | | | | | | | | | | | | | | | | | |
| Rb Rubidium 85.47 | Sr Strontium 87.62 | Y Yttrium 88.91 | Zr Zirconium 91.22 | Nb Niobium 92.91 | Mo Molybdenum 95.95 | Tc Technetium (98) | Ru Ruthenium 101.07 | Rh Rhodium 102.91 | Pd Palladium 106.42 | Ag Silver 107.87 | Cd Cadmium 112.41 | In Indium 114.82 | Sn Tin 118.71 | Sb Antimony 121.76 | Te Tellurium 127.60 | I Iodine 126.90 | Xe Xenon 131.29 |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Lanthanides | <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">119 V</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">8 O</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">8 O</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">37 R</div> </div> | | | | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">13 A</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">12 M</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">13 A</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">52 T</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">69 E</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">92 U</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">37 R</div> </div> | | | | 85 At Astatine (210) | 86 Rn Radon (222) | | | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actinides | Rf Rutherfordium (265) | Db Dubnium (268) | Sg Seaborgium (271) | Bh Bohrium (270) | Hs Hassium (277) | Mt Meitnerium (276) | Ds Darmstadtium (281) | Rg Roentgenium (280) | Cn Copernicium (285) | Nh Nihonium (284) | Fl Flerovium 289 | Mc Moscovium (288) | Lv Livermorium (293) | Ts Tennessine (294) | Og Oganesson (294) |



| | | | | | | | | | | | | | | |
|---------------------------------|--|------------------------------|------------------------|--------------------------|--------------------------|--------------------------|-----------------------|--------------------------|----------------------------|----------------------------|------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">13 A</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">16 S</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">52 T</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">37 R</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">8 O</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">10 N</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">8 O</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">12 M</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">69 E</div> <div style="background-color: #0070C0; color: white; padding: 5px; border: 1px solid white;">10 N</div> </div> | | | | | | | | | | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | Th Thorium 232.04 | Pa Protactinium 231.04 | U Uranium 238.03 | Np Neptunium (237) | Pu Plutonium (244) | Am Americium (243) | Cm Curium (247) | Bk Berkelium (247) | Cf Californium (251) | Es Einsteinium (252) | Fm Fermium (257) | 101 Md Mendelevium (259) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



Dramatis personae

April 1975: astronomie, boeken bibliotheek

1 April 1981: start astronomische waarnemingen

Februari 1982: oprichting Triangulum Tessenderlo

1984: hulp bij oprichting Werkgroep kometen

29 oktober 1994: organisatie eerste Belgische starparty, STARPAW

1997 - 2000: werkgroepleider zonsverduisteringen

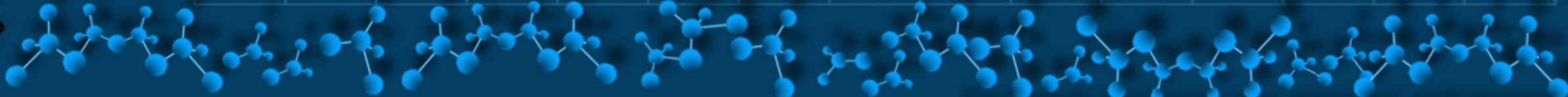
2004 – 2019: educatief medewerker Planetarium

2015 – 2022: Voorzitter, penningmeester, secretaris Helios Averbode

2017 - - : Redactie Helios gazet

2010 - - : Grafische ontwerpen ASH Polaris, Helios, VVS werkgroep Zon

Actieve waarnemer bij werkgroepen Zon, deepsky, variabele sterren, kometen, bedekkingen, planeten, zonsverduisteringen,...



Astronomie

Visueel waarnemen en tekenen van objecten

Schets aan telescoop

Afgewerkte tekening nadien

27 november 1997: afwerking tekeningen digitaal

CorelDraw, vanaf 2005 photoshop

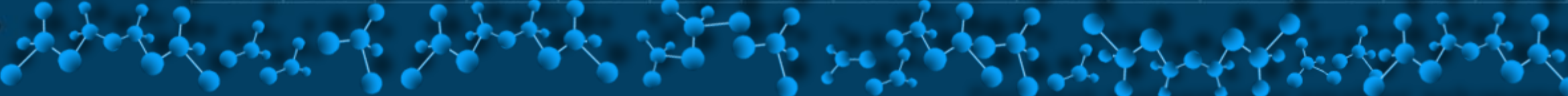
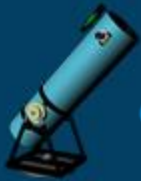
Popularisatie sterrenkunde

Sterrenkijkdagen, voordrachten, workshops, artikelen,...

2015 – 2022: Voorzitter, penningmeester, secretaris Helios Averbode

| | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------------|-------------------------------|--------------------------------|-------------------------------------|---------------------------------|----------------------------------|---------------------------------|-------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|---------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------|------------------------------|--------------------------------|----------------------------|-------------------------------|----------------------------|
| 1 H Hydrogen 1.01 | | | | | | | | | | | | | | | | | 2 He Helium 4.00 | | | | | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | | | | | | | | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | | | | | | | | | | | | | | | | | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 |
| 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | 22 Ti Titanium 47.87 | 23 V Vanadium 50.94 | 24 Cr Chromium 52.00 | 25 Mn Manganese 54.94 | 26 Fe Iron 55.85 | 27 Co Cobalt 58.93 | 28 Ni Nickel 58.69 | 29 Cu Copper 63.55 | 30 Zn Zinc 65.38 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.63 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | | | | | | |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirconium 91.22 | 41 Nb Niobium 92.91 | 42 Mo Molybdenum 95.95 | 43 Tc Technetium (98) | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.87 | 48 Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | | | | | | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Lanthanides | | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Tungsten 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.97 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.38 | 82 Pb Lead 207.20 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | | | | | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actinides | | 104 Rf Rutherfordium (261) | 105 Db Dubnium (268) | 106 Sg Seaborgium (266) | 107 Bh Bohrium (264) | 108 Hs Hassium (265) | 109 Mt Meitnerium (268) | 110 Ds Darmstadtium (271) | 111 Rg Roentgenium (272) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium (289) | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) | | | | | |

| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



| | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------------|--------------------------------|-------------------------------|-------------------------------------|--------------------------------|----------------------------------|--------------------------------|---------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|--------------------------------|---------------------------------|-----------------------------------|----------------------------------|------------------------------------|--------------------------|---------------------------|-----------------------------|---------------------------|-----------------------------|---------------------------|
| IA 1 H Hydrogen 1.01 | IIA | | | | | | | | | | | | | | | | VIIIA 2 He Helium 4.00 | | | | | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | | | | | | | | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | IIIB | IVB | VB | VIB | VII | VIII | IX | X | XI IB | XII IIB | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | | | | | | |
| 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | 22 Ti Titanium 47.87 | 23 V Vanadium 50.94 | 24 Cr Chromium 52.00 | 25 Mn Manganese 54.94 | 26 Fe Iron 55.85 | 27 Co Cobalt 58.93 | 28 Ni Nickel 58.71 | 29 Cu Copper 63.55 | 30 Zn Zinc 65.38 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.63 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | | | | | | |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirconium 91.22 | 41 Nb Niobium 92.91 | 42 Mo Molybdenum 95.94 | 43 Tc Technetium 98 | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.87 | 48 Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | | | | | | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57-71 Lanthanides | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Tungsten 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.97 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.38 | 82 Pb Lead 207.20 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | | | | | | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89-103 Actinides | 104 Rf Rutherfordium (261) | 105 Db Dubnium (262) | 106 Sg Seaborgium (263) | 107 Bh Bohrium (264) | 108 Hs Hassium (265) | 109 Mt Meitnerium (266) | 110 Ds Darmstadtium (267) | 111 Rg Roentgenium (268) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium 289 | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) | | | | | | |

Oktober 2024

**1 700 verschillende objecten waargenomen
(238 variabelen)**



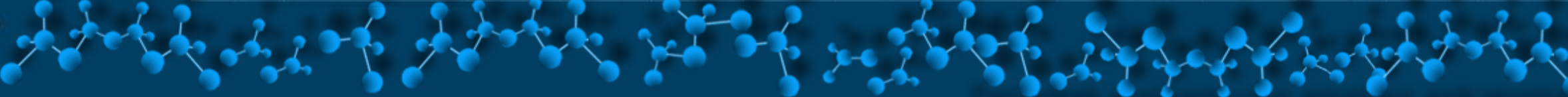
3 600 tekeningen

**Maan, planeten, zon, meteoren, kometen, deepsky,
Optische effecten,...**



16 000 astrofoto's

**Sterrenbeelden, deepsky, natuurverschijnselen,
zon, maan,...**



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------------|-----------------------------|--------------------------------|------------------------------|---------------------------------|--------------------------------|---------------------------------|-------------------------------|---------------------------------|------------------------------|-------------------------------|-------------------------------------|--------------------------------|----------------------------------|---------------------------------|-------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|-------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|--|--|--|----|------|--|--|--|--|--|--|--|--|-----|-------|--|--|--|--|--|--|--|--|------|--------|--|--|--|--|--|--|--|--|--------|------|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|-------|--|--|--|--|--|--|--|--|--|-------------------------------|------------------------------|--------------------------------|----------------------------|-------------------------------|----------------------------|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|-------|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|-------|--|--|--|--|--|--|--|--|--|-------------------------------|------------------------------|------------------------------|
| IA | | | | | | | | | | VIII A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 H Hydrogen 1.01 | IIA | | | | | | | | | | IIIA | | | | | | | | | | IVA | | | | | | | | | | VA | | | | | | | | | | VIA | | | | | | | | | | VIIA | | | | | | | | | | VIII A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | III B | | | | | | | | | | IV B | | | | | | | | | | V B | | | | | | | | | | VI B | | | | | | | | | | VII B | | | | | | | | | | VIII B | | | | | | | | | | IX B | | | | | | | | | | X B | | | | | | | | | | XI B | | | | | | | | | | XII B | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | III B | | | | | | | | | | IV B | | | | | | | | | | V B | | | | | | | | | | VI B | | | | | | | | | | VII B | | | | | | | | | | VIII B | | | | | | | | | | IX B | | | | | | | | | | X B | | | | | | | | | | XI B | | | | | | | | | | XII B | | | | | | | | | | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | III B | | | | | | | | | | IV B | | | | | | | | | | V B | | | | | | | | | | VI B | | | | | | | | | | VII B | | | | | | | | | | VIII B | | | | | | | | | | IX B | | | | | | | | | | X B | | | | | | | | | | XI B | | | | | | | | | | XII B | | | | | | | | | | 29 Cu Copper 65.55 | 30 Zn Zinc 65.38 | III B | | | | | | | | | | IV B | | | | | | | | | | V B | | | | | | | | | | VI B | | | | | | | | | | VII B | | | | | | | | | | VIII B | | | | | | | | | | IX B | | | | | | | | | | X B | | | | | | | | | | XI B | | | | | | | | | | XII B | | | | | | | | | | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirconium 91.22 | 41 Nb Niobium 92.91 | 42 Mo Molybdenum 95.95 | 43 Tc Technetium (98) | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.87 | 48 Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | Lanthanides | | | | | | | | | | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Tungsten 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.97 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.38 | 82 Pb Lead 207.2 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | Actinides | | | | | | | | | | 101 Rf Rutherfordium (261) | 102 Db Dubnium (268) | 103 Sg Seaborgium (271) | 104 Bh Bohrium (270) | 105 Hs Hassium (277) | 106 Mt Meitnerium (276) | 107 Ds Darmstadtium (281) | 108 Rg Roentgenium (290) | 109 Cn Copernicium (285) | 110 Nh Nihonium (284) | 111 Fl Flerovium 289 | 112 Mc Moscovium (288) | 113 Lv Livermorium (293) | 114 Ts Tennessine (294) | 115 Og Oganesson (294) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



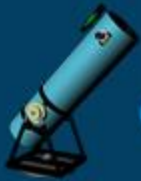
31 G 69 E 5 B 8 O 8 O 37 R 52 T 69 E

119 V 13 A 10 N

69 E 69 E 10 N

15 P 37 R 8 O 120 J 69 E 6 C 52 T

| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |





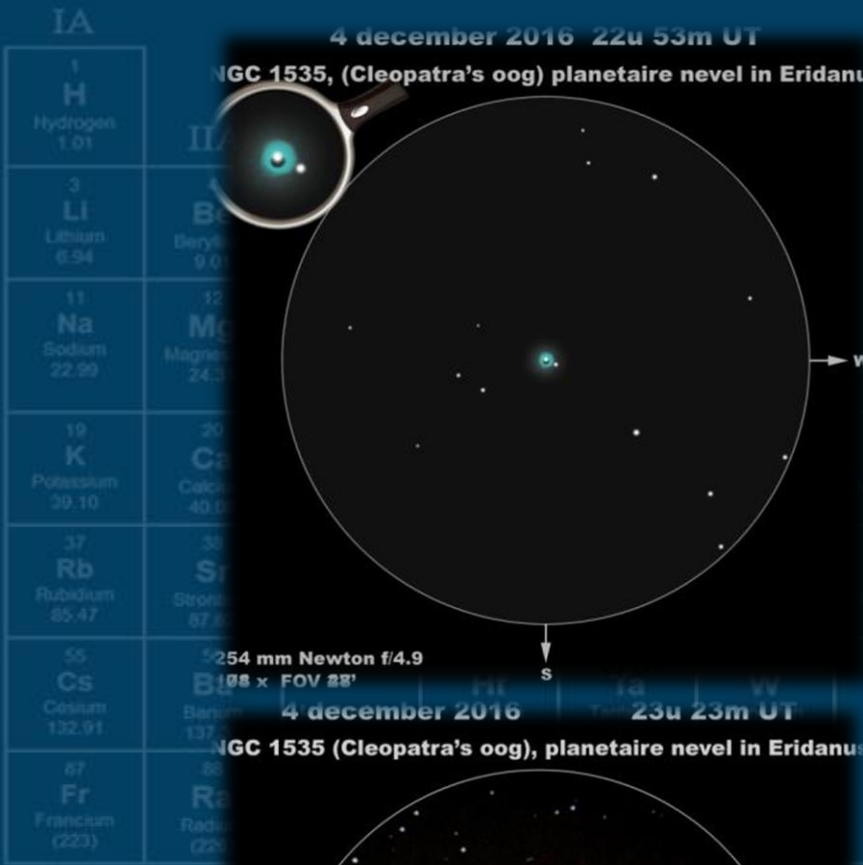
2013

Eerste poging astrofotografie

Altair

Experimenteren met belichtingen

| | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------|---------------------------|-----------------------------|-----------------------------|-----------------------------|---------------------------|------------------------------|--------------------------------|------------------------------|-------------------------------|---------------------------------|---------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|----------------------------------|----------------------------------|---------------------------------|-----------------------------------|----------------------------------|----------------------------------|
| IA | | | | | | | | | | VIIIA | | | | | | | | | | | |
| IIA | | | | | | | | | | III A | IV A | VA | VIA | VII A | VIII A | | | | | | |
| 1 H Hydrogen 1.01 | | | | | | | | | | 2 He Helium 4.00 | | | | | | | | | | | |
| | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | | | | | | |
| | | | | | | | | | | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | | | | | | |
| VIIB | | VIIIB | | VIIIB | | VIIIB | | I B | | IIB | | | | | | | | | | | |
| 25 Mn Manganese 54.94 | 26 Fe Iron 55.85 | 27 Co Cobalt 58.93 | 28 Ni Nickel 58.69 | 29 Cu Copper 63.55 | 30 Zn Zinc 65.38 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.63 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | | | | | | | | | | |
| | | | | | | | | | | 43 Tc Technetium (98) | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.87 | 48 Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 |
| | | | | | | | | | | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.97 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.38 | 82 Pb Lead 207.20 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) |
| | | | | | | | | | | 107 Bh Bohrium (270) | 108 Hs Hassium (277) | 109 Mt Meitnerium (276) | 110 Ds Darmstadtium (281) | 111 Rg Roentgenium (290) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium 289 | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) |
| | | | | | | | | | | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| | | | | | | | | | | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |

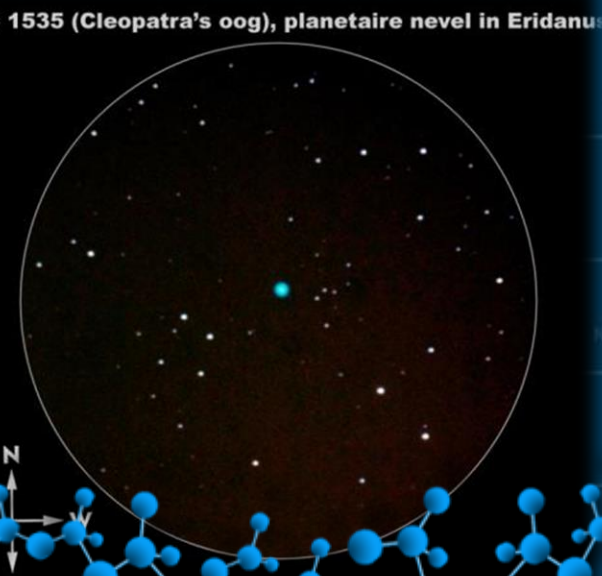


Waarnemen

Visueel ingesteld
Tekeningen

| | | | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------------|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|--------------------------------|-----------------------------------|----------------------------------|----------------------------------|------------------------------|
| IA | | | | | | | | | | VIIIA | | | | | | | |
| 1 H Hydrogen 1.01 | | | | | | | | | | 2 He Helium 4.00 | | | | | | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | | | | |
| 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 | | | | | | | 13 Al Aluminium 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chloor 35.45 | 18 Ar Argon 39.95 | | | | |
| 19 K Kalium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | 22 Ti Titanium 47.88 | 23 V Vanadium 50.94 | 24 Cr Chromium 52.00 | 25 Mn Manganees 54.94 | 26 Fe Ijzer 55.85 | 27 Co Cobalt 58.93 | 28 Ni Nikkel 58.69 | 29 Cu Koper 63.55 | 30 Zn Zink 65.38 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.63 | 33 As Arsenic 74.92 | 34 Se Seleneem 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirkon 91.22 | 41 Nb Niobium 92.91 | 42 Mo Molibdeen 95.94 | 43 Tc Technetium (98) | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Zilver 107.87 | 48 Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimoon 121.76 | 52 Te Telluurium 127.60 | 53 I Jodium 126.90 | 54 Xe Xenon 131.29 |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 Ac Actinium (227) | 90 Th Thorium (232) | 91 Pa Protactinium (231) | 92 U Uranium (238.03) | 93 Np Neptunium (237) | 94 Pu Plutoonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) | |
| VIIIB | | | | | | | | | | | | | | | | | |
| VIII | | | | | | | | | | | | | | | | | |
| IIB | | | | | | | | | | | | | | | | | |

254 mm Newton f/4.9
105 x FOV 28'
4 december 2016 23u 23m UT



Astrofotografie

Zo dicht mogelijk bij visueel beeld

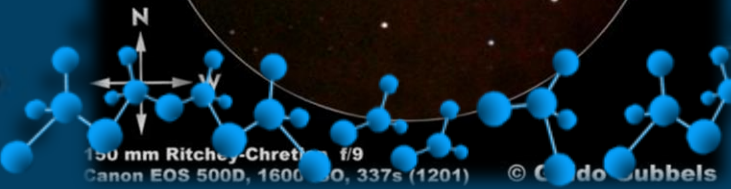
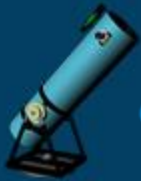
POC objecten

Objecten Millenium atlas

= Kleine + grote telescopen

2016: fotografie + tekenen

| | | | | | | | | | | | |
|---------------------------------|---------------------------------|---------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutoonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



| | | | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------------|-------------------------------|-------------------------------------|--------------------------------|----------------------------------|--------------------------------|---------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|--------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------|
| IA | | | | | | | | | | | VIII A | | | | | | |
| 1 H Hydrogen 1.01 | IIA | | | | | | | | | | 2 He Helium 4.00 | | | | | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | | | | | | | | | | | 10 Ne Neon 20.18 | | | | | |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | | | | | | | | | | | 18 Ar Argon 39.95 | | | | | |
| 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | 22 Ti Titanium 47.87 | 23 V Vanadium 50.94 | 24 Cr Chromium 52.00 | 25 Mn Manganese 54.94 | 26 Fe Iron 55.85 | 27 Co Cobalt 58.93 | 28 Ni Nickel 58.69 | 29 Cu Copper 63.55 | 30 Zn Zinc 65.38 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.63 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirconium 91.22 | 41 Nb Niobium 92.91 | 42 Mo Molybdenum 95.95 | 43 Tc Technetium (98) | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.87 | 48 Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Lanthanides | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Tungsten 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.97 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.38 | 82 Pb Lead 207.20 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actinides | 104 Rf Rutherfordium (261) | 105 Db Dubnium (268) | 106 Sg Seaborgium (271) | 107 Bh Bohrium (270) | 108 Hs Hassium (277) | 109 Mt Meitnerium (276) | 110 Ds Darmstadtium (281) | 111 Rg Roentgenium (290) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium 289 | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) |

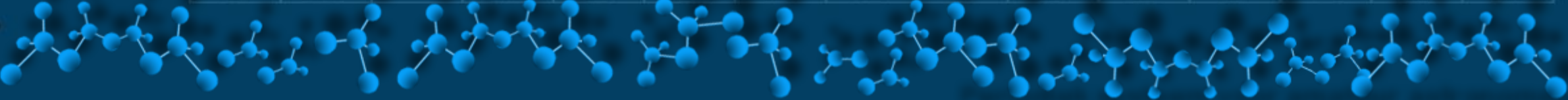
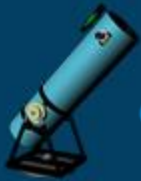


Deepsky
Messier: 98 verschillende
Mei = 100
Hoe visueel presenteren?

Inspiratie zoeken

‘t internet’

| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 88 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



IA

1
H
Hydrogen
1.01

11
Na
Natrium
22.99

19
K
Kalium
39.10

37
Rb
Rubidium
85.47

55
Cs
Cesium
132.91

87
Fr
Francium
(223)

VIIIA

2
He
Helium
4.00

10
Ne
Neon
20.18

18
Ar
Argon
39.95

36
Kr
Krypton
83.80

54
Xe
Xenon
131.29

86
Rn
Radon
(222)

118
Og
Oganesson
(294)

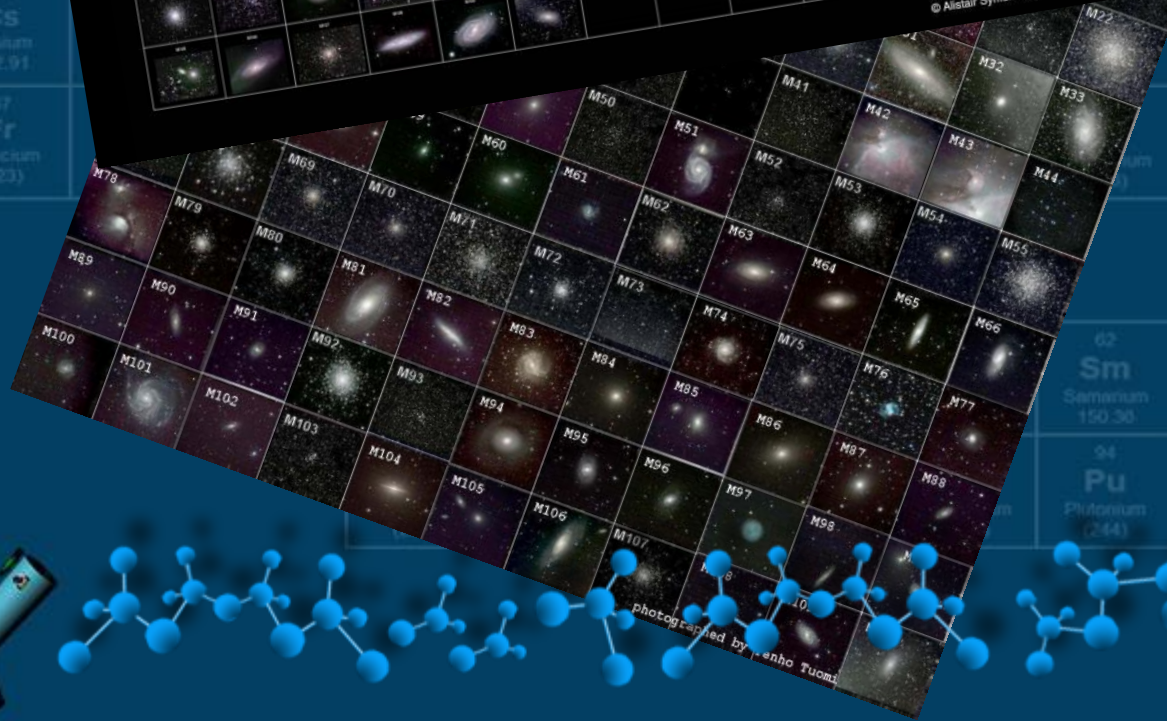
71
Lu
Lutetium
174.97

103
Lr
Lawrencium
(262)

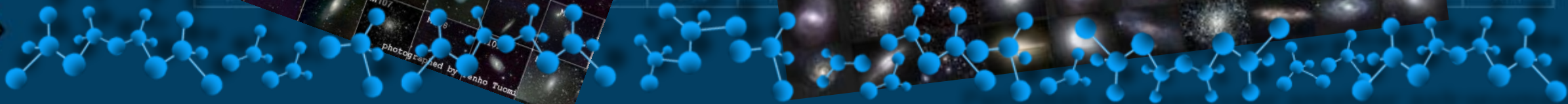
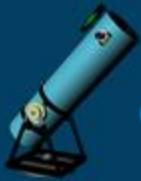
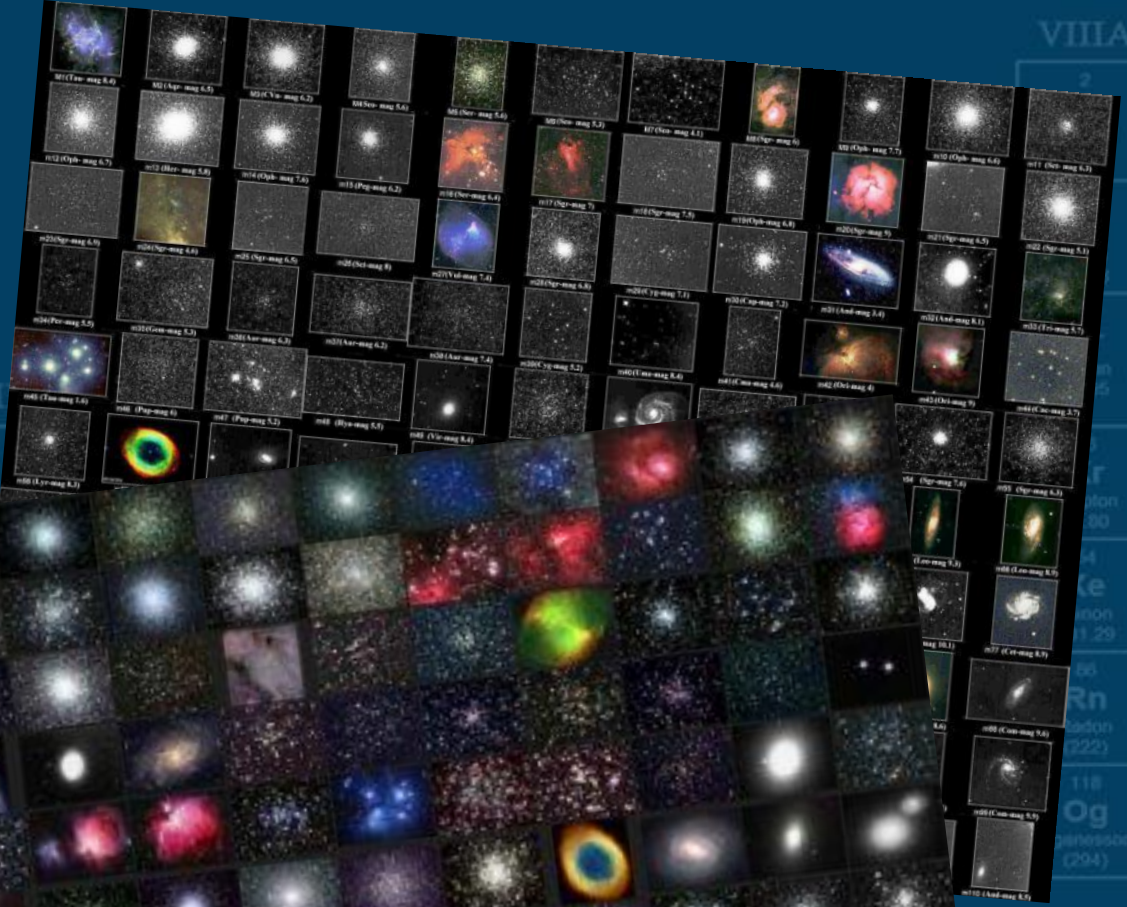
The Messier Objects



© Alistair Symon 2005-2009



photographed by Jarmo Tuomi



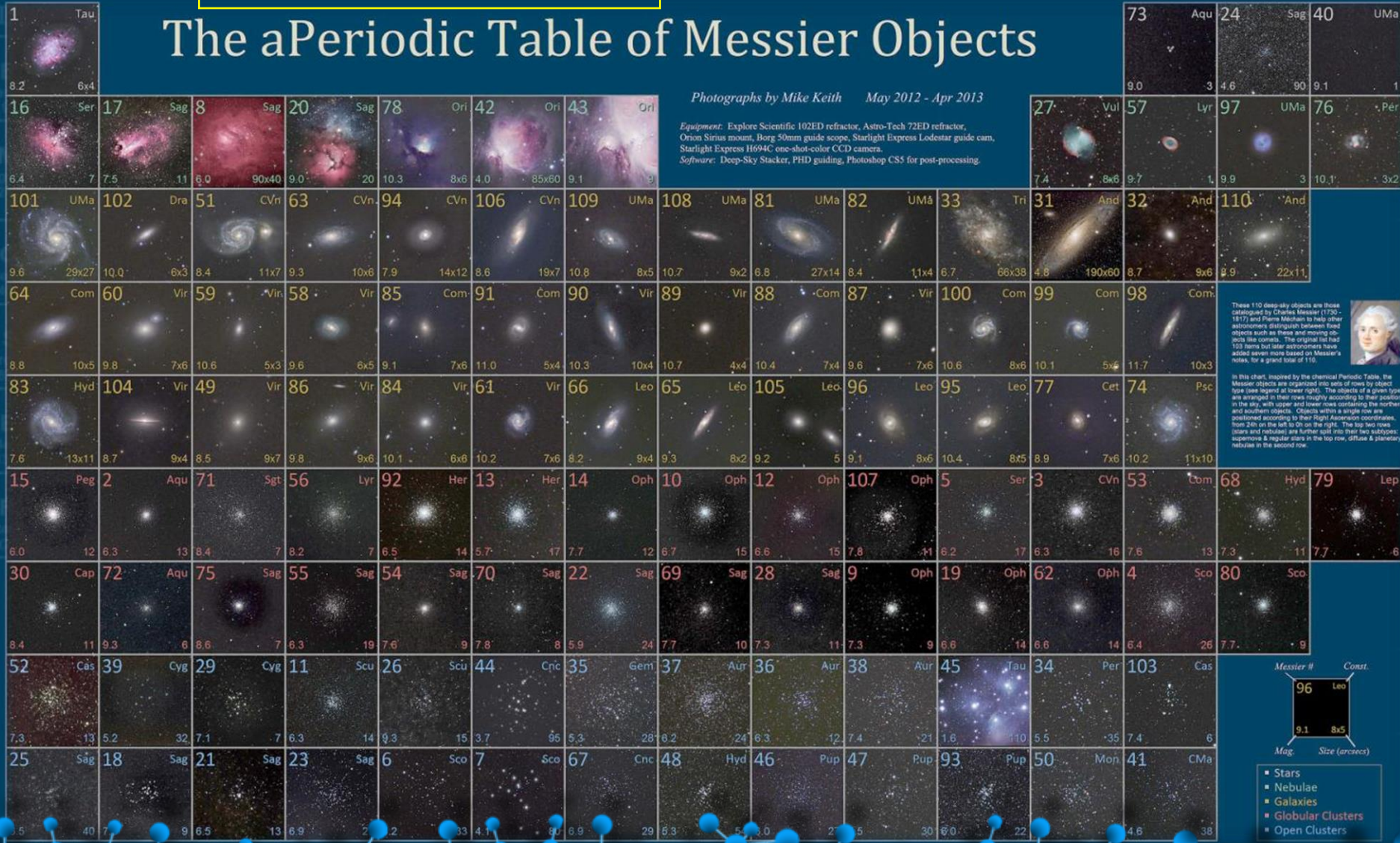
Periodiek systeem voor amateur astronomen

Volgorde heel vreemd



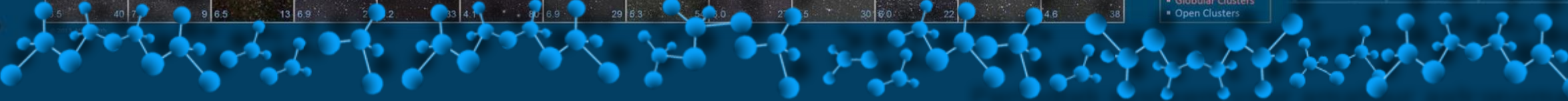
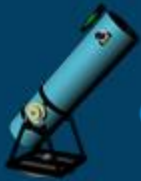
Dat kan ik beter

The aPeriodic Table of Messier Objects



| | | |
|-----------------------------------|----------------------------------|---------------------------------|
| VIA | VIIA | VIIIA |
| 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 |
| 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 |
| 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 |
| 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 |
| 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) |
| 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) |

| | | |
|-----------------------------------|---------------------------------|----------------------------------|
| 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



Volgorde heel vreemd

Dat kan ik beter

Periodic Table of the Elements

| | | | | | | | | | | | | | | | | | | |
|------------------------------------|----------------------------------|----------------------------------|-------------------------------------|----------------------------------|---------------------------------------|-----------------------------------|--------------------------------------|-----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|-------------------------------------|------------------------------------|--------------------------------------|------------------------------------|--------------------------------------|-------------------------------------|------------------------------|
| 1 11A 11A | 2 IIA 2A | | | | | | | | | | | 13 IIIA 3A | 14 IVA 4A | 15 VA 5A | 16 VIA 6A | 17 VIIA 7A | 18 VIIIA 8A | |
| 1 H Hydrogen 1.0079 | | | | | | | | | | | | | | | | | | 2 He Helium 4.00260 |
| 3 Li Lithium 6.941 | 4 Be Beryllium 9.01218 | | | | | | | | | | | 5 B Boron 10.811 | 6 C Carbon 12.011 | 7 N Nitrogen 14.00674 | 8 O Oxygen 15.9994 | 9 F Fluorine 18.998403 | 10 Ne Neon 20.1797 | |
| 11 Na Sodium 22.989768 | 12 Mg Magnesium 24.305 | 3 IIIB 3B | 4 IVB 4B | 5 VB 5B | 6 VIB 6B | 7 VIIB 7B | 8 VIII 8 | 9 VIII 8 | 10 VIII 8 | 11 IB 1B | 12 IIB 2B | 13 Al Aluminum 26.981539 | 14 Si Silicon 28.0855 | 15 P Phosphorus 30.973762 | 16 S Sulfur 32.066 | 17 Cl Chlorine 35.4527 | 18 Ar Argon 39.948 | |
| 19 K Potassium 39.0983 | 20 Ca Calcium 40.078 | 21 Sc Scandium 44.95591 | 22 Ti Titanium 47.88 | 23 V Vanadium 50.9415 | 24 Cr Chromium 51.9961 | 25 Mn Manganese 54.938 | 26 Fe Iron 55.847 | 27 Co Cobalt 58.9332 | 28 Ni Nickel 58.6934 | 29 Cu Copper 63.546 | 30 Zn Zinc 65.39 | 31 Ga Gallium 69.723 | 32 Ge Germanium 72.64 | 33 As Arsenic 74.92159 | 34 Se Selenium 78.96 | 35 Br Bromine 79.904 | 36 Kr Krypton 83.80 | |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.90585 | 40 Zr Zirconium 91.224 | 41 Nb Niobium 92.90638 | 42 Mo Molybdenum 95.94 | 43 Tc Technetium 98.9072 | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.9055 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.8682 | 48 Cd Cadmium 112.411 | 49 In Indium 114.818 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.760 | 52 Te Tellurium 127.6 | 53 I Iodine 126.90447 | 54 Xe Xenon 131.29 | |
| 55 Cs Cesium 132.90543 | 56 Ba Barium 137.327 | 57-71 Lanthanide Series | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.9479 | 74 W Tungsten 183.85 | 75 Re Rhenium 186.207 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.9665 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.3833 | 82 Pb Lead 207.2 | 83 Bi Bismuth 208.98037 | 84 Po Polonium [208.9824] | 85 At Astatine [209.9871] | 86 Rn Radon [222.0176] | |
| 87 Fr Francium [223.0197] | 88 Ra Radium [226.0254] | 89-103 Actinide Series | 104 Rf Rutherfordium [261] | 105 Db Dubnium [262] | 106 Sg Seaborgium [266] | 107 Bh Bohrium [264] | 108 Hs Hassium [269] | 109 Mt Meitnerium [268] | 110 Ds Darmstadtium [269] | 111 Rg Roentgenium [272] | 112 Cn Copernicium [277] | 113 Uut Ununtrium unknown | 114 Uuq Ununquadium [289] | 115 Uup Ununpentium unknown | 116 Uuh Ununhexium [288] | 117 Uus Ununseptium unknown | 118 Uuo Ununoctium unknown | |
| | | | 57 La Lanthanum 138.9055 | 58 Ce Cerium 140.115 | 59 Pr Praseodymium 140.90765 | 60 Nd Neodymium 144.24 | 61 Pm Promethium [144.9127] | 62 Sm Samarium 150.36 | 63 Eu Europium 151.9655 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.92534 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93032 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93421 | 70 Yb Ytterbium 173.04 | 71 Lu Lutetium 174.967 | |
| | | | 89 Ac Actinium [227.0278] | 90 Th Thorium 232.0381 | 91 Pa Protactinium 231.03588 | 92 U Uranium 238.0289 | 93 Np Neptunium 237.0482 | 94 Pu Plutonium 244.0842 | 95 Am Americium 243.0614 | 96 Cm Curium 247.0703 | 97 Bk Berkelium 247.0703 | 98 Cf Californium 251.0796 | 99 Es Einsteinium [254] | 100 Fm Fermium 257.0951 | 101 Md Mendelevium 258.1 | 102 No Nobelium 259.1009 | 103 Lr Lawrencium [262] | |

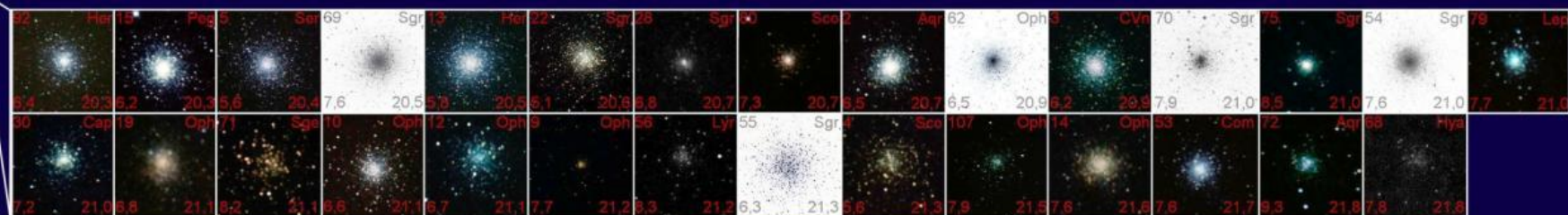
Alkali Metal Alkaline Earth Transition Metal Base Metal Semimetals Nonmetals Halogens Noble Gas Lanthanides Actinides

Periodiek stelsel van Messier objecten

Guido Gubbels, december 2016

De objecten zijn verdeeld per categorie waarbij de rangschikking volgens de oppervlaktehelderheid werd opgesteld. Per categorie neemt de oppervlaktehelderheid af van links naar rechts en van boven naar onder. De sterrenstelsels zijn verdeeld volgens type. Bij het begin staan de dwerg elliptische sterrenstelsels gevolgd door de normale elliptische exemplaren, dan de 'lenticulars', de balkspiraalen, normale spiralen en tot slot het enige onregelmatig sterrenstelsel van de lijst.

De negatieve beelden komen van het internet en worden voorlopig gebruikt tot en eigen foto beschikbaar is. De hieronder aangegeven conventies hebben enkel betrekking op de andere foto's. Bij alle foto's bevindt het noorden zich bovenaan en het oosten links. De objecten die groter zijn dan het standaardvak zijn aangepast zodat deze in het vak passen. Voor de andere objecten, uitgezonderd M 43, is de schaal niet aangepast. M43 werd groter gemaakt om dit object van M42 te onderscheiden. De foto's werden vervaardigd met een 150 cm f/9 Richey Chretien en een Canon EOS 500D. Uitzonderingen zijn M 31, M44 en M45, deze werden met een 30 cm telescoop gemaakt.




MESSIER # BEELD

103 Cas

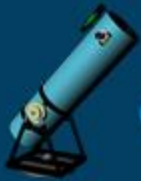
7,4 19,9

- Sterren
- Planetaire nevels/ supernova rest
- Diffuse nevel
- Open sterrenhoop
- Sterrenstelsel
- Galaxie

In deze moderne versie van de Messier lijst zijn 110 objecten opgenomen. De lijst bevat volgende soorten van objecten, verdeeld per categorie in de tabel:
 3 Sterren, 1 asteroïde, 1 dubbelster, 1 melkweg gebied, 7 diffuse nevels: in kleine instrumenten is bij M16 enkele de sterrenhoop zichtbaar, maar aangezien de nevel fysiek bij het object hoort werd deze bij de nevels opgenomen. 4 sterrenstelsels, 2 dwerg elliptische, 4 lenticulars, 4 balkspiraal, 23 gewone spiralen en 1 onregelmatig sterrenstelsel.
 29 onregelmatige sterrenhoopen, 29 bolvormige sterrenhoopen.

| | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------------|---|-------------------------------|------------------------------|-------------------------------------|------------------------------|---------------------------|------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|------------------------------------|--------------------------------|-----------------------------|-------------------------------|------------------------------|------------------------------|---------------------------------|-------------------------------|---------------------------|---------------------------------|---------------------------------|------------------------------|
| IA | | | | | | | | | | VIIIA | | | | | | | | | | | | | | |
| 1 H Hydrogen 1.01 | IIA | | | | | | | | | | III A | | IVA | VA | VIA | VIIA | 2 He Helium 4.00 | | | | | | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |  | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | | | | | | | |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | III B | IV B | VB | VIB | VII B | VIII B | VIII B | VIII B | IB | IIB | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | | | | | | | |
| 19 K Potassium 39.10 | 119 V Vanadium 50.94 | | | 13 A Argon 39.95 | 10 N Nitrogen 14.01 | | | 23 V Vanadium 50.94 | 12 M Magnesium 24.31 | | | 69 E Europium 153.92 | 16 S Sulfur 32.06 | 16 S Sulfur 32.06 | 53 I Iodine 126.90 | 69 E Europium 153.92 | 37 R Rubidium 85.47 | 10 N Nitrogen 14.01 | | | 13 A Argon 39.95 | 13 A Argon 39.95 | 37 R Rubidium 85.47 | 36 Kr Krypton 83.80 |
| 37 Rb Rubidium 85.47 | Sr Strontium 87.62 | Y Yttrium 88.91 | Zr Zirconium 91.22 | Nb Niobium 92.91 | Mo Molybdenum 95.95 | Tc Technetium (98) | Ru Ruthenium 101.07 | Rh Rhodium 102.91 | Pd Palladium 106.42 | Ag Silver 107.87 | Cd Cadmium 112.41 | In Indium 114.82 | Sn Tin 118.71 | Sb Antimony 121.76 | Te Tellurium 127.60 | I Iodine 126.90 | Xe Xenon 131.29 | | | | | | | |
| 55 Cs Cesium 132.91 | Ba Barium 137.33 | 57 - 71 Lanthanides | | Hf Hafnium 178.49 | Ta Tantalum 180.95 | W Tungsten 183.84 | Re Rhenium 186.21 | Os Osmium 190.23 | Ir Iridium 192.22 | Pt Platinum 195.08 | Au Gold 196.97 | Hg Mercury 200.59 | Tl Thallium 204.38 | Pb Lead 207.20 | Bi Bismuth 208.98 | Po Polonium (209) | At Astatine (210) | Rn Radon (222) | | | | | | |
| 69 E Europium 153.92 | | | 69 E Europium 153.92 | 10 N Nitrogen 14.01 | 104 Rf Rutherfordium (261) | 10 N Nitrogen 14.01 | | | 53 I Iodine 126.90 | 69 E Europium 153.92 | 92 U Uranium 238.03 | 122 W Wolfram 208.98 | 110 Ds Darmstadtium (281) | 15 P Phosphorus 30.97 | | | 37 R Rubidium 85.47 | 8 O Oxygen 16.00 | 120 J Joliotium 289.10 | 69 E Europium 153.92 | 6 C Carbon 12.01 | 52 T Tennessine 289.10 | 118 Og Oganesson (294) | |

| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



| | | | | | | | | | | | | | | | | | | | |
|----------------------------------|--------------------------------|-------------------------------|-------------------------------------|--------------------------------|----------------------------------|-------------------------------|---------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|-------------------------------|---------------------------------|-----------------------------------|----------------------------------|------------------------------------|----------------------------|------------------------------|
| IA 1 H Hydrogen 1.01 | IIA | | | | | | | | | | | | | | | | VIIIA 2 He Helium 4.00 | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | | | | | | | | | | | | | | | | | 10 Ne Neon 20.18 | |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | | | | | | | | | | | | | | | | | 18 Ar Argon 39.95 | |
| 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | | | | | | | | | | | | | | | | | 36 Kr Krypton 83.80 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirconium 91.22 | 41 Nb Niobium 92.91 | 42 Mo Molybdenum 95.95 | 43 Tc Technetium 98 | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.87 | 48 Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Lanthanides | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Tungsten 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.97 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.38 | 82 Pb Lead 207.20 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actinides | 104 Rf Rutherfordium (261) | 105 Db Dubnium (268) | 106 Sg Seaborgium (271) | 107 Bh Bohrium (270) | 108 Hs Hassium (277) | 109 Mt Meitnerium (276) | 110 Ds Darmstadtium (281) | 111 Rg Roentgenium (290) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium 289 | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) | | |



Doelstelling
Handleiding objecten
Nieuwe waarnemers
Heb ik het juiste object?
Planning maken

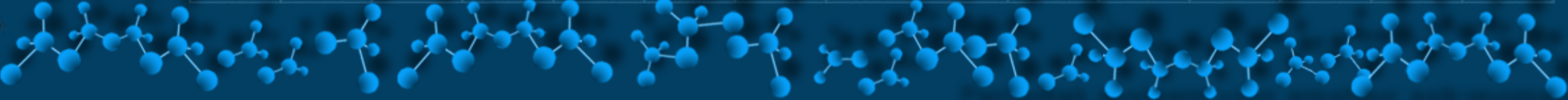
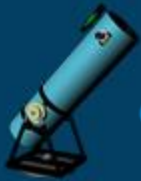
Korte belichtingstijden

Langere belichting

Beeld voor 7 – 15 cm kijker

Beeld voor 20 – 35 cm kijker

| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|--------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium 145 | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.96 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



110 objecten

Met kleine telescopen zichtbaar

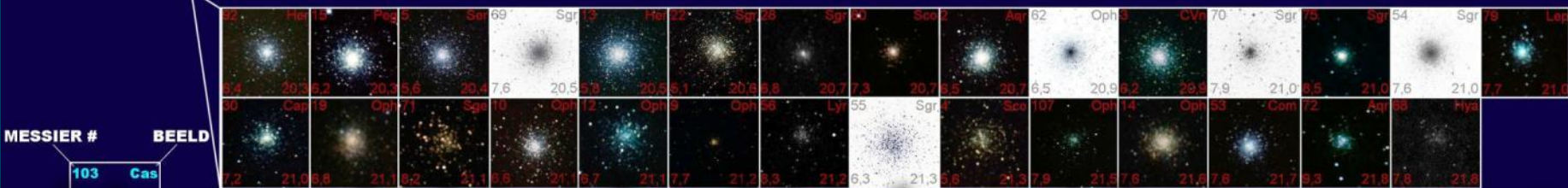
Periodiek stelsel van Messier objecten

De objecten zijn verdeeld per categorie waarbij de rangschikking volgens de oppervlaktehelderheid werd opgesteld. Per categorie neemt de oppervlaktehelderheid af van links naar rechts en van boven naar onder. De sterrenstelsels zijn verdeeld volgens type. Bij het begin staan de dwerg elliptische sterrenstelsels gevolgd door de normale elliptische exemplaren, dan de 'lenticulars', de balkspiraalen, normale spiralen en tot slot het enige onregelmatige sterrenstelsel van de lijst.

De negatieve beelden komen van het internet en worden voorlopig gebruikt tot en eigen foto beschikbaar is. De hieronder aangegeven conventies hebben enkel betrekking op de andere foto's. Bij alle foto's bevindt het noorden zich bovenaan en het oosten links. De objecten die groter zijn dan het standaardvak zijn aangepast zodat deze in het vak passen. Voor de andere objecten, uitgezonderd M 43, is de schaal niet aangepast. M43 werd groter gemaakt om dit object van M42 te onderscheiden. De foto's werden vervaardigd met een 150 cm f/9 Richey Chretien en een Canon EOS 500D. Uitzonderingen zijn M 31, M44 en M45, deze werden met een 30 m telescoop gemaakt.



Guido Gubbels, december 2016



- Sterren
- Planetaire nevel / supernova rest
- Diffuse nevel
- Open sterrenhoop
- Sterrenstelsel
- Onregelmatige sterrenhoop

In deze modif. versie van de Messier lijst zijn 110 objecten opgenomen. De lijst bevat volgende soorten van objecten, verdeeld per categorie in de tabel:
 3 Sterren: 1 asterism, 1 dubbelster, 1 met weggevoerd. 7 diffuse nevels: in kleine instrumenten is bij M16 enkele de sterren zichtbaar, maar aangezien de nevel fijn bij het object is, wordt de nevel opgenomen. 40 sterrenstelsels: 2 dwerg elliptische, 4 lenticulars, 4 balkspiraalen, 13 gewone spiralen en 1 onregelmatig sterrenstelsel.
 26 open sterrenhoopen, 29 bolvormige sterrenhoopen.

29 bolvormige sterrenhopen

Geen enkel probleem zelfs bij zwakke exemplaren

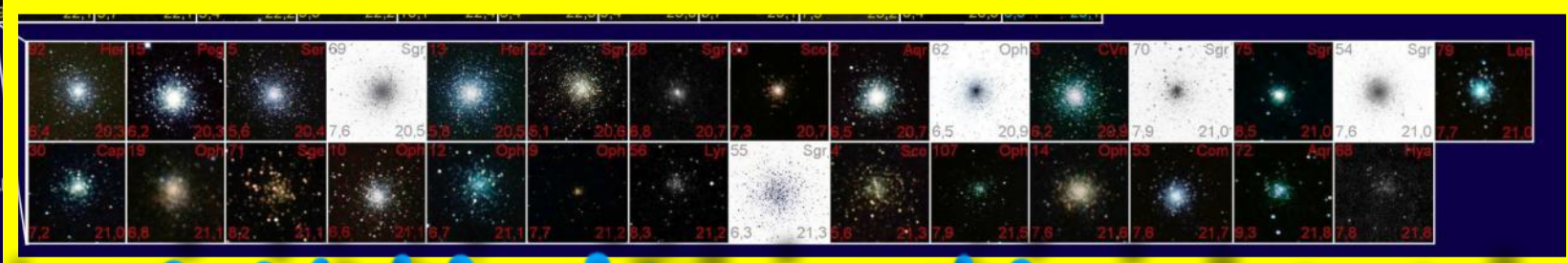
Periodiek stelsel van Messier objecten

De objecten zijn verdeeld per categorie waarbij de rangschikking volgens de oppervlaktehelderheid werd opgesteld. Per categorie neemt de oppervlaktehelderheid af van links naar rechts en van boven naar onder. De sterrenstelsels zijn verdeeld volgens type. Bij het begin staan de dwerg elliptische sterrenstelsels gevolgd door de normale elliptische exemplaren, dan de 'lenticulars', de balkspiraalen, normale spiralen en tot slot het enige onregelmatige sterrenstelsel van de lijst.

De negatieve beelden komen van het internet en worden voorlopig gebruikt tot en eigen foto beschikbaar is. De hieronder aangegeven conventies hebben enkel betrekking op de andere foto's. Bij alle foto's bevindt het noorden zich bovenaan en het oosten links. De objecten die groter zijn dan het standaardvak zijn aangepast zodat deze in het vak passen. Voor de andere objecten, uitgezonderd M 43, is de schaal niet aangepast. M43 werd groter gemaakt om dit object van M42 te onderscheiden. De foto's werden vervaardigd met een 150 cm f/9 Richey Chretien en een Canon EOS 500D. Uitzonderingen zijn M 31, M44 en M45, deze werden met een 30 m telesens gemaakt.



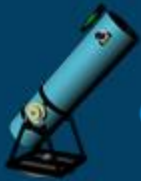
Guido Gubbels, december 2016



MESSIER # BEEL
103 Cas
74 19,9

- Planetaire nevel / supernova rest
- Diffuse nevel
- Open sterrenhoop
- Sterrenstelsel
- Bolvormige sterrenhoop

In deze mode is de versie van de lijst met 103 Messier objecten opgenomen. De lijst bevat 10 objecten van de eerste versie, verdeeld per categorie in de tabel. 3 Sterren: 1 asterism, 1 dubbelster, 1 met een weggevoerd. 7 diffuse nevels: in kleine instrumenten is bij M16 enkele de sterren zichtbaar, maar aangezien de nevel fijn is bij het object wordt de nevel opgenomen. 40 sterrenstelsels: 2 dwerg elliptische, 4 lenticulars, 4 balkspiraalen, 13 gewone spiralen en 1 onregelmatig sterrenstelsel. 26 open sterrenhopen. 29 bolvormige sterrenhopen.



40 sterrenstelsels

Vormloze grijze vlekjes net (niet) zichtbaar

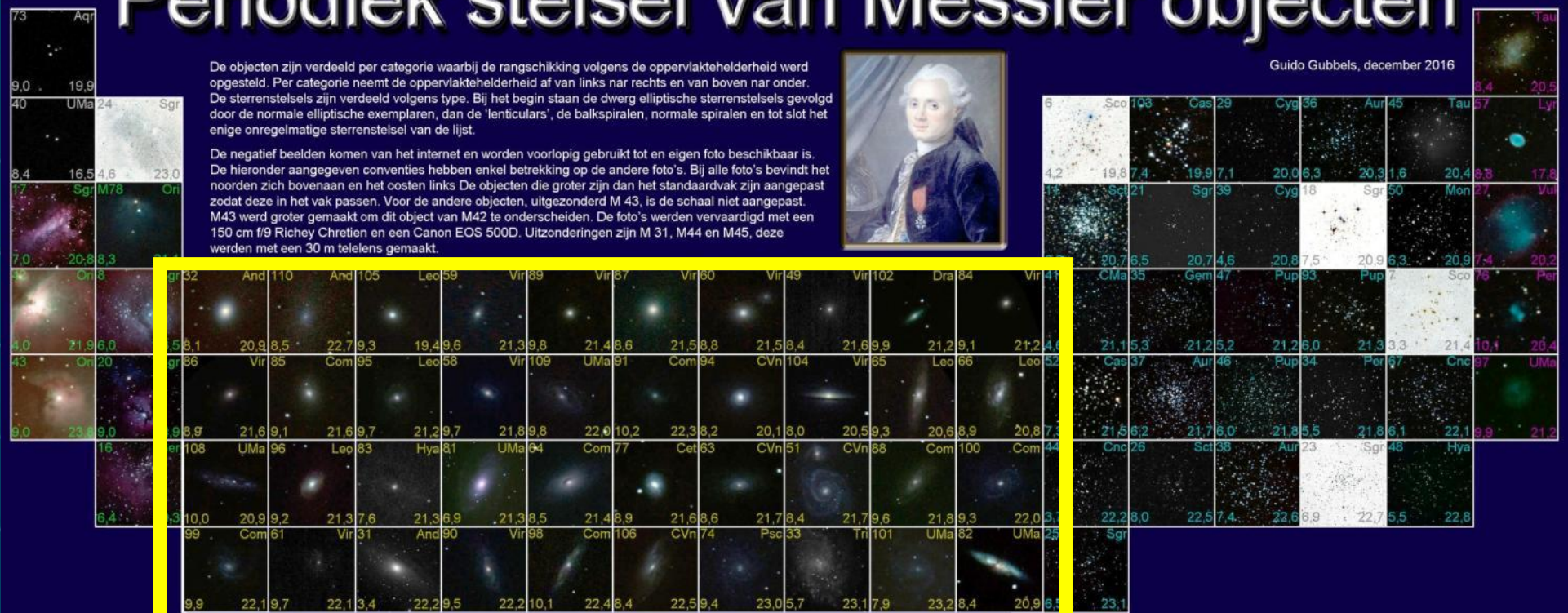
Periodiek stelsel van Messier objecten

Guido Gubbels, december 2016



De objecten zijn verdeeld per categorie waarbij de rangschikking volgens de oppervlaktehelderheid werd opgesteld. Per categorie neemt de oppervlaktehelderheid af van links naar rechts en van boven naar onder. De sterrenstelsels zijn verdeeld volgens type. Bij het begin staan de dwerg elliptische sterrenstelsels gevolgd door de normale elliptische exemplaren, dan de 'lenticulars', de balkspiraal, normale spiralen en tot slot het enige onregelmatige sterrenstelsel van de lijst.

De negatieve beelden komen van het internet en worden voorlopig gebruikt tot en eigen foto beschikbaar is. De hieronder aangegeven conventies hebben enkel betrekking op de andere foto's. Bij alle foto's bevindt het noorden zich bovenaan en het oosten links. De objecten die groter zijn dan het standaardvak zijn aangepast zodat deze in het vak passen. Voor de andere objecten, uitgezonderd M 43, is de schaal niet aangepast. M43 werd groter gemaakt om dit object van M42 te onderscheiden. De foto's werden vervaardigd met een 150 cm f/9 Richey Chretien en een Canon EOS 500D. Uitzonderingen zijn M 31, M44 en M45, deze werden met een 30 m telesens gemaakt.



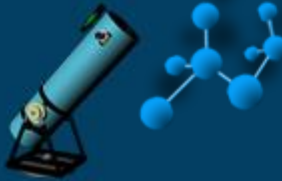
MESSIER # BEELD

103 Cas

7.4 19.9

- Sterren
- Planetaire nevel / supernova rest
- Diffuse nevel
- Open sterrenhoop
- Sterrenstelsel
- Vormloze sterrenhoop

In deze modif. versie van de Messier lijst zijn 110 objecten opgenomen. De lijst bevat volgende soorten van objecten, verdeeld per categorie in de tabel:
 3 Sterren: 1 asterism, 1 dubbelster, 1 met weggevoerd. 7 diffuse nevels: in kleine instrumenten is bij M16 enkele de sterren net zichtbaar, maar aangezien de nevel fijn bij het object is, wordt de nevel opgenomen. 40 sterrenstelsels: 2 dwerg elliptische, 4 lenticulars, 4 balkspiraal, 13 gewone spiralen en 1 onregelmatig sterrenstelsel.
 26 open sterrenhopen, 29 bolvormige sterrenhopen.



Messier nam waar vanuit zuid Frankrijk

Sommige objecten heel laag boven horizon (16 + 5)

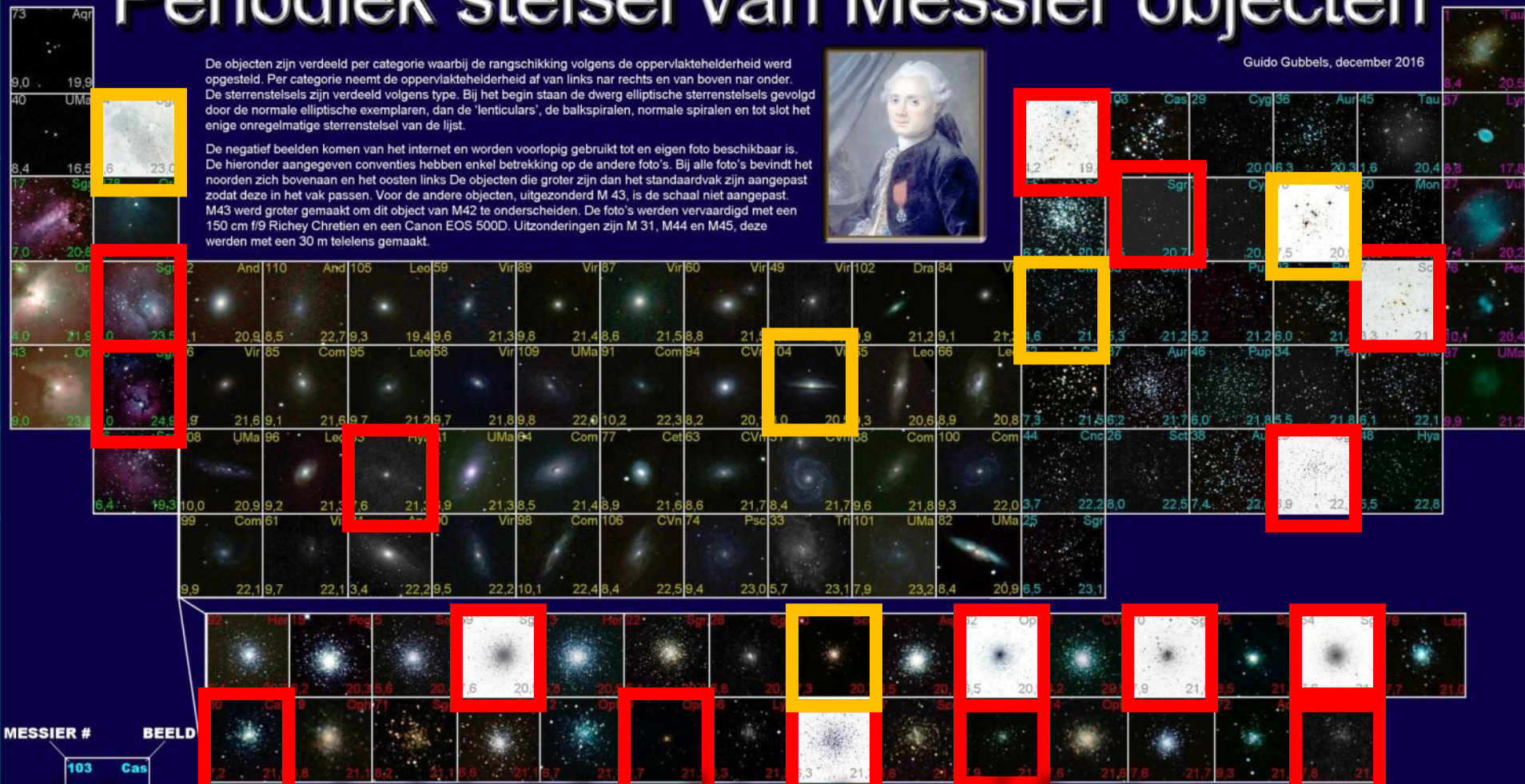
Periodiek stelsel van Messier objecten

De objecten zijn verdeeld per categorie waarbij de rangschikking volgens de oppervlaktehelderheid werd opgesteld. Per categorie neemt de oppervlaktehelderheid af van links naar rechts en van boven naar onder. De sterrenstelsels zijn verdeeld volgens type. Bij het begin staan de dwerg elliptische sterrenstelsels gevolgd door de normale elliptische exemplaren, dan de 'lenticulars', de balkspiraalen, normale spiralen en tot slot het enige onregelmatige sterrenstelsel van de lijst.

De negatief beelden komen van het internet en worden voorlopig gebruikt tot en eigen foto beschikbaar is. De hieronder aangegeven conventies hebben enkel betrekking op de andere foto's. Bij alle foto's bevindt het noorden zich bovenaan en het oosten links. De objecten die groter zijn dan het standaardvak zijn aangepast zodat deze in het vak passen. Voor de andere objecten, uitgezonderd M 43, is de schaal niet aangepast. M43 werd groter gemaakt om dit object van M42 te onderscheiden. De foto's werden vervaardigd met een 150 cm f/9 Richey Chretien en een Canon EOS 500D. Uitzonderingen zijn M 31, M44 en M45, deze werden met een 30 m telesens gemaakt.



Guido Gubbels, december 2016



MESSIER # BEELD

103 Cas

7,4 19,9

In deze modif. versie van de Messier lijst zijn 110 objecten opgenomen. De lijst bevat volgende soorten van objecten, verdeeld per categorie in de tabel:

3 Sterren; 1 asterism, 1 dubbelster, 1 met een weggevoerd; 7 diffuse nevels; in kleine instrumenten is bij M16 enkele de sterren niet zichtbaar, maar aangezien de nevel f... bij het object ...

... 40 sterrenstelsels; 2 dwerg elliptische, 2 lenticulars, 4 balkspiraalen, 3 gewone spiralen en 1 onregelmatig sterrenstelsel.

26 open sterrenhoopen, 29 bolvormige sterrenhoopen.

| | | | | | | | | | | | | | | | | | | |
|----------------------------------|-------------------------------------|--------------------------------|-------------------------------------|--------------------------------|----------------------------------|--------------------------------|---------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|------------------------------------|--------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------|---------------------------|
| IA 1 H Hydrogen 1.01 | IIA 4 Be Beryllium 9.01 | | | | | | | | | | | VIIIA 2 He Helium 4.00 | | | | | | |
| 3 Li Lithium 6.94 | 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 |
| 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | 22 Ti Titanium 47.87 | 23 V Vanadium 50.94 | 24 Cr Chromium 52.00 | 25 Mn Manganese 54.94 | 26 Fe Iron 55.85 | 27 Co Cobalt 58.93 | 28 Ni Nickel 58.69 | 29 Cu Copper 63.55 | 30 Zn Zinc 65.38 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.64 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirconium 91.22 | 41 Nb Niobium 92.91 | 42 Mo Molybdenum 95.95 | 43 Tc Technetium (98) | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.87 | 48 Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Lanthanides | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Tungsten 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.97 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.38 | 82 Pb Lead 207.20 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actinides | 104 Rf Rutherfordium (261) | 105 Db Dubnium (262) | 106 Sg Seaborgium (263) | 107 Bh Bohrium (264) | 108 Hs Hassium (277) | 109 Mt Meitnerium (276) | 110 Ds Darmstadtium (281) | 111 Rg Roentgenium (280) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium 289 | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) | |



Beginnend (Belgische) amateur

Objecten minimaal ca 20° boven horizon

Diversiteit objecten

Objecten meteen zichtbaar

Details perifeer is ok

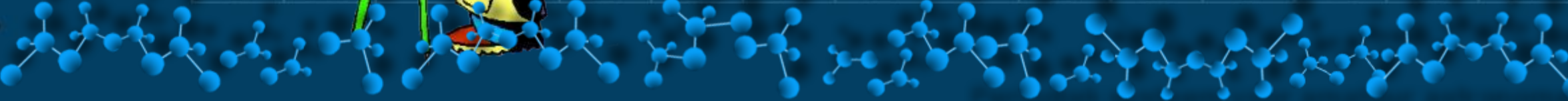
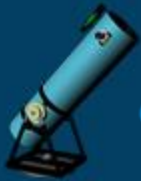
Moeilijke objecten mogen maar
Moeten de uitzondering zijn

Gevorderde amateur

Details zichtbaar

Mogen een uitdaging vormen

| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|-----------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|-------------------------------|----------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|--------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 | |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium (231) | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



| | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------------|-------------------------------|--------------------------------|-------------------------------------|---------------------------------|----------------------------------|---------------------------------|-------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|--------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|--|--|
| IA | | | | | | | | | | | VIII A | | | | | | | | | | |
| 1 H Hydrogen 1.01 | IIA | | | | | | | | | | 2 He Helium 4.00 | | | | | | | | | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | | | | |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | | | | | | | | | | | 13 Al Aluminium 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | | | | |
| | | IIIB | | IVB | | VB | | VIB | | VIIB | | VIIIB | | IIIB | | VIII B | | | | | |
| 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | 22 Ti Titanium 47.87 | 23 V Vanadium 50.94 | 24 Cr Chromium 52.00 | 25 Mn Manganese 54.94 | 26 Fe Iron 55.85 | 27 Co Cobalt 58.93 | 28 Ni Nickel 58.69 | 29 Cu Copper 63.55 | 30 Zn Zinc 65.38 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.63 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | | | | |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirconium 91.22 | 41 Nb Niobium 92.91 | 42 Mo Molybdenum 95.95 | 43 Tc Technetium 98.91 | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.87 | 48 Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | | | | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Lanthanides | | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Tungsten 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.97 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.38 | 82 Pb Lead 207.2 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | | | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actinides | | 104 Rf Rutherfordium (261) | 105 Db Dubnium (268) | 106 Sg Seaborgium (271) | 107 Bh Bohrium (270) | 108 Hs Hassium (277) | 109 Mt Meitnerium (276) | 110 Ds Darmstadtium (281) | 111 Rg Roentgenium (290) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium 289 | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) | | | |



Lijsten

Messier

Sommige objecten te laag
Zichtbaarheid stelsels



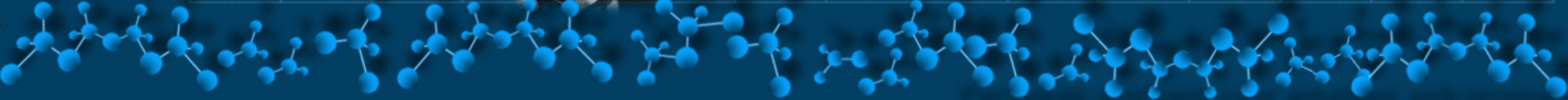
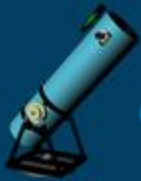
New General Catalogue

Voornameijk gevorderden

| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |

Caldwell lijst

'The f....'



| | | | | | | | | | | | | | | | | | | | |
|----------------------------------|-------------------------------------|--|---------------------------------------|-------------------------------------|---------------------------------------|---|-------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|-------------------------------------|--|--|--|---|--|--|-------------------------------------|-----------------------------|
| IA 1 H Hydrogen 1.01 | IIA 4 Be Beryllium 9.01 | III A 21 Sc Scandium 44.96 | IV A 22 Ti Titanium 47.88 | V B 23 V Vanadium 50.94 | VI B 24 Cr Chromium 52.00 | VII B 25 Mn Manganese 54.94 | VIII B 26 Fe Iron 55.85 | VIII B 27 Co Cobalt 58.93 | VIII B 28 Ni Nickel 58.69 | VIII B 29 Cu Copper 63.55 | VIII B 30 Zn Zinc 65.38 | VIII B 31 Ga Gallium 69.72 | VIII B 32 Ge Germanium 72.64 | VIII B 33 As Arsenic 74.92 | VIII B 34 Se Selenium 78.97 | VIII B 35 Br Bromine 79.90 | VIII B 36 Kr Krypton 83.80 | VIII A 2 He Helium 4.00 | |
| 3 Li Lithium 6.94 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 67 Fr Francium (223) | 68 Ra Radium (226) |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 67 Fr Francium (223) | 68 Ra Radium (226) | 109 Mt Meitnerium (276) | 110 Ds Darmstadtium (281) | 111 Rg Roentgenium (290) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium 289 | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) | | | | |



Caldwell lijst

Moderne vervanging Messier

109 objecten

67 objecten boven horizon

60 komen 20° boven horizon

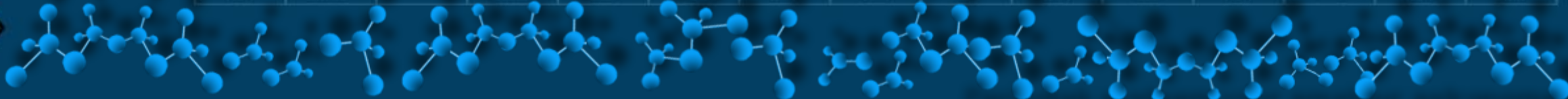
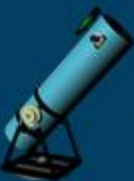
Van gigantisch tot piepklein

Superhelder tot super zwak

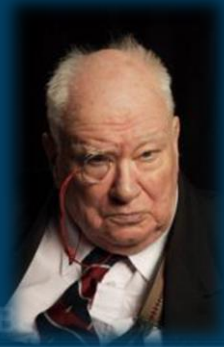
Gebaseerd op fotografie

C57 = Barnard's sterrenstelsel

DEC = -14° 48'



| | |
|-------------------------------|--------------------------------|
| IA | |
| 1 H Hydrogen 1.01 | IIA |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |
| 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 |
| 19 K Kalium 39.10 | 20 Ca Calcium 40.08 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 |
| 87 Fr Francium (223) | 88 Ra Radium (226) |



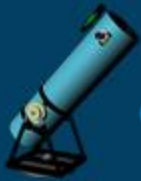
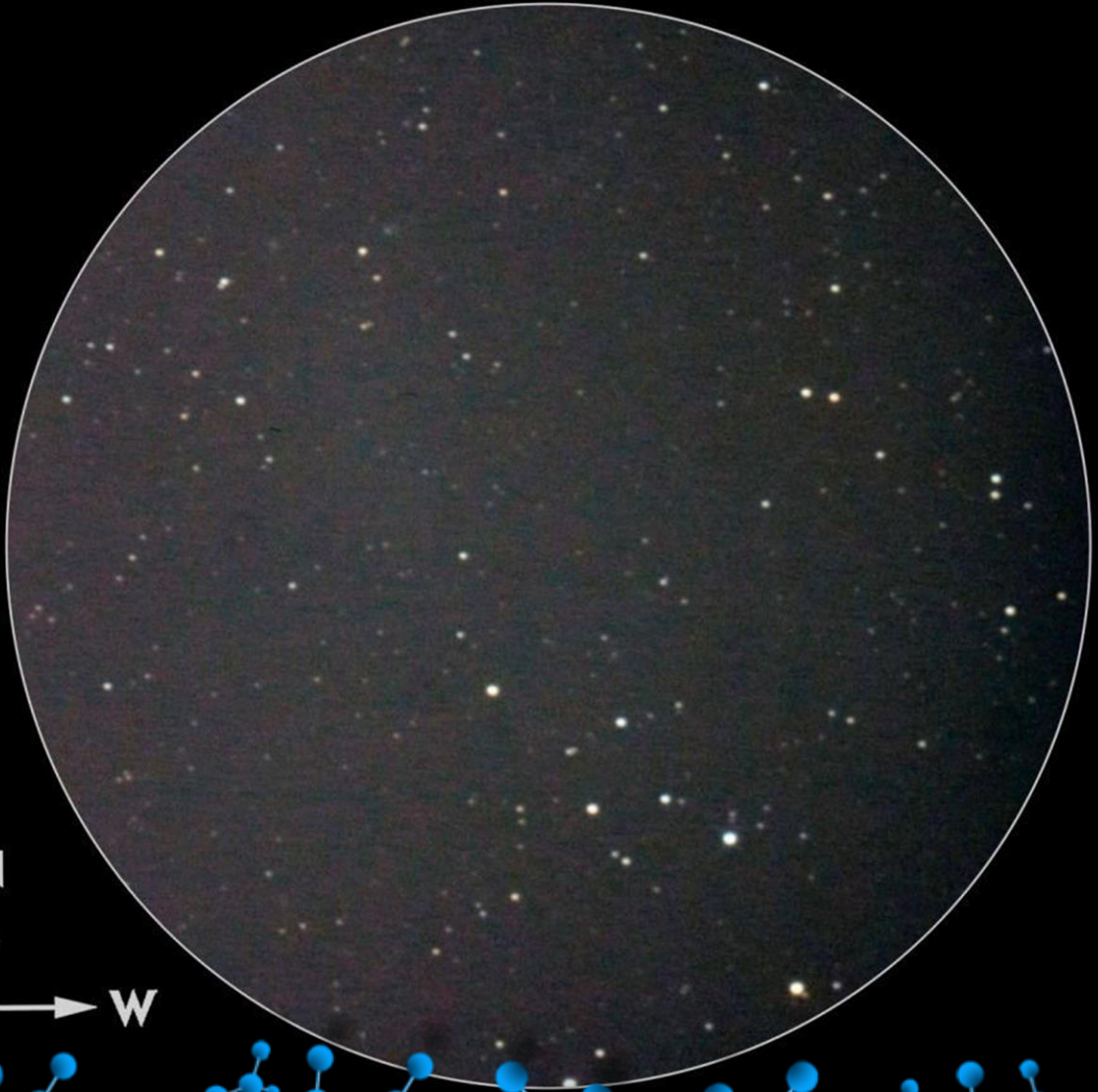
C57 = Barnard's sterrenstelsel

DEC = -14° 48'

| | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cadmium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) |

12 augustus 2016 22u 38m UT

NGC 6822, Barnard's sterrenstelsel in Sagittarius



150 mm Ritchey-Chretien f/9
 Canon EOS 500D, 1600 ASA, 387s (1200) © Guido Gubbels
 Periodiek systeem voor amateur astronomen

Periodiek systeem voor amateur astronomen

| | |
|----------------------------------|-------------------------------------|
| IA 1 H Hydrogen 1.01 | IIA 4 Be Beryllium 9.01 |
| 3 Li Lithium 6.94 | 12 Mg Magnesium 24.31 |
| 11 Na Sodium 22.99 | 20 Ca Calcium 40.08 |
| 19 K Potassium 39.10 | 38 Sr Strontium 87.62 |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 |
| 87 Fr Francium (223) | 88 Ra Radium (226) |

Periodic Table of the Elements

| | | | | | | |
|------------------------|-------------------------------------|--------------------------------|----------------------------------|-------------------------------|-------------------------------|----------------------------------|
| 57 - 71 Lanthanides | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Tungsten 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 |
| 89 - 103 Actinides | 104 Rf Rutherfordium (261) | 105 Db Dubnium (268) | 106 Sg Seaborgium (271) | 107 Bh Bohrium (278) | 108 Hs Hassium (277) | 109 Mt Meitnerium (276) |

| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |

- Messier
- Objecten DEC < -20° weg
- Te zwakke sterrenstelsels weg
- Evenwichtige verdeling seizoen
- Belgische omstandigheden
- Piek waarneemtijd jongeren
- Aanvullen met
- Objecten uit NGC lijst
- Niet traditionele deepsky
- Dubbelsterren, variabelen
- Minder gekende lijsten
- Sterrenstelsel niet langer dominant
- Morfologie passend in tabel



Periodiek systeem voor amateur astronomen



Messier

Objecten DEC < -20° weg

Te zwakke sterrenstelsels weg

Evenwichtige verdeling seizoenen

Belgische omstandigheden

Piek waarneemtijd jongeren

Aanvullen met

Objecten uit NGC lijst

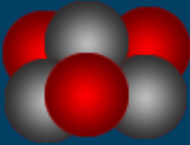
Niet traditionele deepsky

Dubbelsterren, variabelen

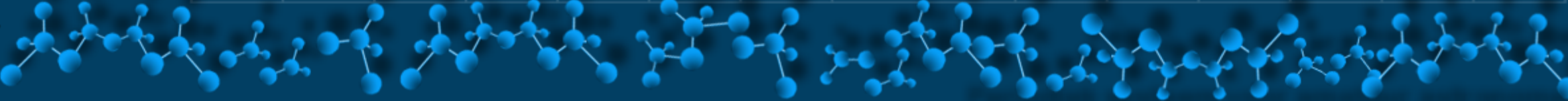
Minder gekende lijsten

Sterrenstelsel niet langer dominant

Morfologie passend in tabel

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------------|---|------------------------------|------------------------|---------------------------|--------------------------|------------------------------|-------------------------------|-----------------------------|----------------------------|----------------------------|-------------------------------|------------------------------|--------------------------------|--------------------------------|-------------------------------|-------------------------------|-------------------------------|--|--|--|--|--|--|--|--|--|--|--|
| IA | | | | | | | | | | VIII A | | | | | | | | | | | | | | | | | | | |
| 1 H Hydrogen 1.01 | IIA | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | | | | | | | | | | | | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |  | | | | | | | | | | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | | | | | | | | | | | | |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | III B | IV B | V B | VI B | VII B | VIII B | VIII B | VIII B | IX B | X B | 16 S Sulfur 32.06 | 39 Y Yttrium 88.91 | 16 S Sulfur 32.06 | 22 T Tellurium 127.60 | 69 E Europium 151.96 | 69 E Europium 151.96 | 12 M Manganese 54.94 | | | | | | | | | | | |
| PERIODI EK | | | | | | | | | | | | | | | SYSTEME EM | | | | | | | | | | | | | | |
| Rb Rubidium 85.47 | Sr Strontium 87.62 | Y Yttrium 88.91 | Zr Zirconium 91.22 | Nb Niobium 92.91 | Mo Molybdenum 95.95 | Tc Technetium (98) | Ru Ruthenium 101.07 | Rh Rhodium 102.91 | Pd Palladium 106.42 | Ag Silver 107.87 | Cd Cadmium 112.41 | In Indium 114.82 | Sn Tin 118.71 | Sb Antimony 121.76 | Te Tellurium 127.60 | I Iodine 126.90 | Xe Xenon 131.29 | | | | | | | | | | | | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Lanthanides | VOOR | | | | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | AMATEUR | | | | | | 85 At Astatine (210) | 86 Rn Radon (222) | | | | | | | | | | | | | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actinides | Rf Rutherfordium (261) | Db Dubnium (268) | Sg Seaborgium (271) | Bh Bohrium (270) | Hs Hassium (277) | Mt Meitnerium (276) | Ds Darmstadtium (281) | Rg Roentgenium (280) | Cn Copernicium (285) | Nh Nihonium (284) | Fl Flerovium 289 | Mc Moscovium (288) | Lv Livermorium (293) | Ts Tennessine (294) | Og Oganesson (294) | | | | | | | | | | | | |

| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------|------------------------------|------------------------|--------------------------|--------------------------|--------------------------|-----------------------|--------------------------|----------------------------|----------------------------|------------------------------|-------------------------------|---------------------------------|--------------------------------|
| 57 La Lanthanum 138.91 | ASTRONOMEN | | | | | | | | | | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | Th Thorium 232.04 | Pa Protactinium 231.04 | U Uranium 238.03 | Np Neptunium (237) | Pu Plutonium (244) | Am Americium (243) | Cm Curium (247) | Bk Berkelium (247) | Cf Californium (251) | Es Einsteinium (252) | Fm Fermium (257) | Md Mendelevium (258) | No Nobelium (259) | Lr Lawrencium (262) |



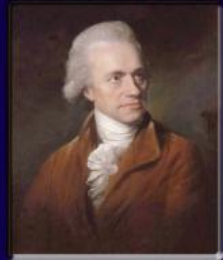
Periodiek systeem voor amateur astronomen

| | | | |
|----|-------------------------|-----|--------------------------|
| IA | | | |
| 1 | H Hydrogen 1.01 | | |
| | | IIA | |
| 3 | Li Lithium 6.94 | 4 | Be Beryllium 9.01 |
| 11 | Na Natrium 22.99 | 12 | Mg Magnesium 24.31 |
| 19 | K Kalium 39.10 | 20 | Ca Calcium 40.08 |
| 37 | Rb Rubidium 85.47 | 38 | Sr Strontium 87.62 |
| 55 | Cs Cesium 132.91 | 56 | Ba Barium 137.33 |
| 87 | Fr Francium (223) | 88 | Ra Radium (226) |

| | |
|-------|--------------------------|
| VIIIA | |
| 2 | He Helium 4.00 |
| 10 | Ne Neon 20.18 |
| 18 | Ar Argon 39.95 |
| 36 | Kr Krypton 83.80 |
| 54 | Xe Xenon 131.29 |
| 86 | Rn Radon (222) |
| 118 | Og Oganesson (294) |

| | | | |
|----|-------|------|-------|
| 8 | Cyg | | |
| 8 | Lyr | 8 | Cep |
| 8 | N2261 | 3 | N7023 |
| 11 | M78 | 11 | M16 |
| 11 | M17 | 21,1 | 16 |
| 16 | M20 | 20,8 | 11 |
| 22 | N2024 | 24,9 | 22 |
| 11 | 11 | 21,9 | 8 |

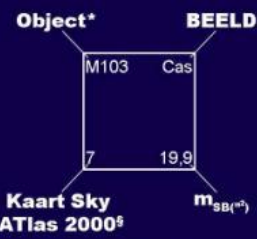
De objecten zijn verdeeld per categorie waarbij de volgorde afhankelijk is per categorie:
 Dubbelsterren: volgens bekendheid; diffuse nevels: oplopend volgens diameter; open sterrenhopen: oplopend volgens aantal sterren; bolvormige sterrenhopen oplopend volgens afstand tot de aarde; planetaire nevels (en 1 supernova restant): oplopend volgens werkelijke diameter van het object.
 De sterrenstelsels werden eerst verdeeld per subgroep: dwerg elliptische stelsels; gewone elliptische stelsels; lenticulaire stelsels; balkspiraal, gewone spiralen en tot slot onregelmatige sterrenstelsels. In elke subgroep staan de stelsels oplopend volgens oppervlakte helderheid.
 Objecten die gelijk zijn wat betreft het gehanteerde criterium werden vervolgens oplopend gesorteerd volgens alfabetische volgorde van het gebruikte catalogusnummer.
 De afbeeldingen zijn gekozen zodat ze het beeld in telescopen met een objectief diameter van 20cm - 40cm het best benaderen. De schaal voor de afbeeldingen is verschillend. Deze keuze werd gemaakt opdat zoveel mogelijk van het object in het beeld past. Vier objecten zijn te groot om in het beeldveld van een telescoop te passen: M44, M45, M31 en M33. Voor deze zijn binoculairs aangewezen om het object in zijn geheel waar te nemen.



sir William Herschel

Guido Gubbels, december 2016

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|------|------|------|--------|------|--------|------|-------|------|--------|------|---------|------|-------|------|--------|------|-------|------|-------|------|-------|------|------|------|-------|------|-------|------|------|------|-------|------|------|------|
| M78 | Orn | M16 | Sgr | Picot1 | Boo | STAR25 | Dra | M39 | Cyg | STAR27 | Del | Stock23 | Cam | N2169 | Orn | N1662 | Orn | M36 | Aur | M34 | Per | N1545 | Per | M58 | Vir | N2903 | Leo | M104 | Vir | M65 | Leo | M66 | Leo | 76 | Per |
| 11 | 21,1 | 16 | 19,3 | (7) | (3) | | | 9 | 20,8 | (16) | 1 | 1 | 11 | 19,0 | 11 | 21,8 | 5 | 20,3 | 4 | 21,8 | 4 | 21,4 | 13 | 21,8 | 6 | 22,5 | 14 | 20,5 | 13 | 20,6 | 5 | 20,8 | 4 | 20,4 | |
| M17 | Sgr | M43 | Orn | N6910 | Cyg | N2129 | Gem | N2301 | Mon | N7686 | And | M50 | Mon | M41 | CMa | M29 | Cyg | N2360 | CMa | N1342 | Per | M45 | Tau | M108 | UMa | M96 | Leo | M81 | UMa | M64 | Com | M77 | Cet | 27 | Vul |
| 16 | 20,8 | 11 | 23,8 | 8 | 20,8 | 5 | 19,8 | 12 | 20,3 | 4 | 12 | 20,9 | 19 | 21,1 | 9 | 20,0 | 12 | 21,7 | 4 | 21,3 | 4 | 20,4 | 2 | 20,9 | 13 | 21,3 | 2 | 21,3 | 7 | 21,4 | 10 | 21,6 | 7,4 | 20,2 | |
| M20 | Sgr | M8 | Sgr | N6709 | Aql | M47 | Pup | N7380 | Cep | N6633 | Oph | M38 | Aur | M48 | Hya | M103 | Cas | M52 | Cas | M46 | Pup | N1647 | Tau | M63 | CVn | M51 | CVn | N2683 | Lyr | M31 | And | M98 | Com | 97 | UMa |
| 22 | 24,9 | 22 | 23,5 | 16 | 21,2 | 12 | 21,2 | 3 | 21,5 | 15 | 20,7 | 5 | 22,6 | 12 | 22,8 | 1 | 19,9 | 3 | 21,5 | 12 | 21,8 | 5 | 23,6 | 7 | 21,7 | 7 | 21,7 | 6 | 22,1 | 4 | 22,2 | 13 | 22,4 | 2 | 21,2 |
| N2024 | Orn | M42 | Orn | N6802 | Vul | N457 | Cas | N884 | Per | N869 | Per | M44 | Cnc | M35 | Gem | IC4756 | Sgr | M67 | Cnc | M11 | Sci | M37 | Aur | M106 | CVn | N891 | And | M33 | Tri | M82 | UMa | N4449 | CVn | M1 | Tau |
| 11 | 11 | 21,9 | 8 | 20,2 | 1 | 20,9 | 1 | 22,4 | 1 | 21,6 | 6 | 22,2 | 5 | 21,2 | 15 | 21,5 | 12 | 22,1 | 16 | 20,7 | 5 | 21,7 | 7 | 22,5 | 4 | 22,7 | 4 | 23,1 | 2 | 20,9 | 7 | 22,2 | 5 | 20,5 | |



*M = Messier N = NGC
 §(7) = object staat niet vermeld op de kaart

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|------|-----|------|-----|------|-----|------|-------|------|------|------|-------|------|-------|------|-------|------|-------|------|------|------|-------|------|-------|------|-------|------|-------|------|
| M22 | Sgr | M71 | Sgr | M10 | Oph | M12 | Oph | N5053 | Cam | M107 | Oph | N6535 | Sgr | N6712 | Sci | N6760 | Aql | M5 | Sgr | M13 | Her | M30 | Cap | M92 | Her | N5440 | Sgr | N5345 | Vir |
| 22 | 20,6 | 16 | 21,1 | 15 | 21,1 | 15 | 21,7 | 23,4 | 15 | 21,5 | 16 | 18,8 | 15 | 20,3 | 16 | 19,9 | 15 | 20,4 | 8 | 20,5 | 23 | 21,0 | 8 | 20,3 | 22 | 19,3 | 17 | 20,4 | |
| M90 | Sci | M56 | Lyr | M15 | Peg | M3 | CVn | N6617 | Oph | M2 | Aql | N5897 | Lib | N6466 | Oph | N5486 | Boo | N6346 | Orn | M53 | Com | N5634 | Vir | N6229 | Per | N7006 | Del | N2419 | Lyr |
| 22 | 20,7 | 8 | 21,2 | 17 | 20,3 | 7 | 20,6 | 15 | 14,2 | 17 | 29,7 | 31 | 23,0 | 15 | 19,4 | 7 | 22,8 | 10 | 22,0 | 7 | 21,7 | 14 | 21,8 | 8 | 21,2 | 16 | 21,7 | 5 | 23,3 |

De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.
 Aantal objecten per categorie: 3 dubbelsterren; 10 heldere nevels; 3 asterisms (opgenomen bij open sterrenhopen); 37 open sterrenhopen; 6 planetaire nevels; 1 supernova restant; 30 bolvormige sterrenhopen en 30 sterrenstelsels (2 dwerg elliptisch; 3 elliptisch; 3 lenticulaire; 3 balkspiraal; 15 gewone spiralen en 2 onregelmatige sterrenstelsels).

- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/ supernova rest
- Bolvormige sterrenhoop

| | |
|-----|---------------------------|
| 71 | Lu Lutetium 174.97 |
| 103 | Lr Lawrencium (262) |



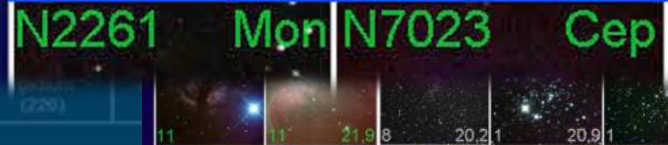
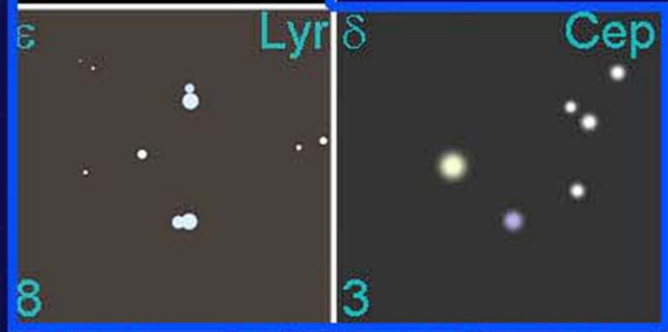
Periodiek systeem voor amateur astronomen

IA

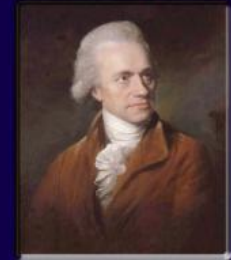
| | | | |
|----|----|-----------|--------|
| 1 | H | Hydrogen | 1.01 |
| 3 | Li | Lithium | 6.94 |
| 11 | Na | Sodium | 22.99 |
| 19 | K | Potassium | 39.10 |
| 37 | Rb | Rubidium | 85.47 |
| 55 | Cs | Cesium | 132.91 |
| 87 | Fr | Francium | (223) |

VIIIA

| | | | |
|-----|----|-----------|--------|
| 2 | He | Helium | 4.00 |
| 10 | Ne | Neon | 20.18 |
| 18 | Ar | Argon | 39.95 |
| 36 | Kr | Krypton | 83.80 |
| 54 | Xe | Xenon | 131.29 |
| 86 | Rn | Radon | (222) |
| 118 | Og | Oganesson | (294) |



...rie waarbij de volgorde afhankelijk is per categorie:
 diffuse nevels; oplopend volgens diameter; open sterrenhopen;
 vormige sterrenhopen oplopend volgens afstand tot de aarde;
 (stant); oplopend volgens werkelijke diameter van het object.
 beeld per subgroep: dwerg elliptische stelsels; gewone elliptische
 ralen, gewone spiralen en tot slot onregelmatige sterrenstelsels.
 oplopend volgens oppervlakte helderheid.
 et gehanteerde criterium werden vervolgens oplopend gesorteerd
 et gebruikte catalogusnummer.

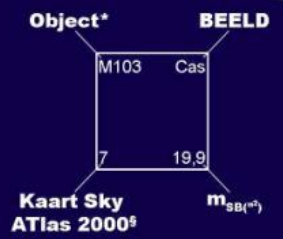


sir William Herschel

...ze het beeld in telescopen met een objectief diameter van 20cm - 40cm
 de afbeeldingen is verschillend. Deze keuze werd gemaakt opdat
 beeld past. Vier objecten zijn te groot om in het beeldveld van een
 en M33.. Voor deze zijn binoculairs aangewezen om het object in zijn

Guido Gubbels, december 2016

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|--------|------|---------|------|-------|------|--------|-------|-------|------|-------|-------|-------|--------|------|-------|-------|-------|-------|------|-----|-------|-------|-------|-----|-------|-----|-------|-----|----|----|----|---|
| Cyg | STAR27 | Del | Stock23 | Cam | N2169 | Ori | N1662 | Ori | M36 | Aur | M34 | Per | N1545 | Per | M58 | Vir | N2903 | Leo | M104 | Vir | M65 | Leo | M66 | Leo | M76 | Per | | | | | | | |
| 20.8 | (16) | 1 | 11 | 19.0 | 11 | 21.8 | 5 | 20.3 | 4 | 21.8 | 4 | 21.4 | 13 | 21.8 | 6 | 22.5 | 14 | 20.5 | 13 | 20.6 | 5 | 20.8 | 4 | 20.4 | | | | | | | | | |
| Mon | N7686 | And | M50 | Mon | M41 | CMa | M29 | Cyg | N2360 | CMa | N1342 | Per | M45 | Tau | M108 | UMa | M96 | Leo | M81 | UMa | M64 | Com | M77 | Cet | M27 | Vul | | | | | | | |
| 20.3 | 4 | 20.4 | 12 | 20.9 | 19 | 21.1 | 9 | 20.0 | 12 | 21.7 | 4 | 21.3 | 4 | 20.4 | 2 | 20.9 | 13 | 21.3 | 2 | 21.3 | 7 | 21.4 | 10 | 21.6 | 7 | 20.2 | | | | | | | |
| Cep | N6633 | Oph | M38 | Aur | M48 | Hya | M103 | Cas | M52 | Cas | M46 | Pup | N1647 | Tau | M63 | CVn | M51 | CVn | N2683 | Lyn | M31 | And | M98 | Com | M97 | UMa | | | | | | | |
| 15 | 15 | 20 | 7 | 5 | 22 | 6 | 12 | 22 | 8 | 1 | 19 | 9 | 3 | 21 | 5 | 12 | 21 | 8 | 5 | 23 | 6 | 7 | 21 | 7 | 22 | 2 | 21 | 2 | | | | | |
| Per | N869 | Per | M44 | Cnc | M35 | Gem | IC4756 | Ser | M67 | Cnc | M11 | Sci | M37 | Aur | M106 | CVn | N891 | And | M33 | Tri | M82 | UMa | N4449 | CVn | M1 | Tau | | | | | | | |
| 22 | 22 | 20 | 7 | 8 | 21 | 2 | 17 | 20 | 3 | 7 | 20 | 8 | 15 | 19 | 9 | 15 | 20 | 4 | 8 | 20 | 5 | 23 | 21 | 0 | 8 | 20 | 3 | 22 | 19 | 3 | 17 | 20 | 4 |
| M20 | Sci | M56 | Lyr | M15 | Peg | M3 | CVn | N6617 | Oph | M2 | Agr | N5897 | Lib | IC4635 | Oph | N5486 | Boo | N6342 | Ors | M53 | Com | N5634 | Vir | N6229 | Per | N7006 | Del | N2419 | Lyn | | | | |
| 22 | 20 | 7 | 8 | 21 | 2 | 17 | 20 | 3 | 7 | 20 | 8 | 15 | 19 | 9 | 15 | 20 | 4 | 8 | 20 | 5 | 23 | 21 | 0 | 8 | 20 | 3 | 22 | 19 | 3 | 17 | 20 | 4 | |
| 22 | 20 | 7 | 8 | 21 | 2 | 17 | 20 | 3 | 7 | 20 | 8 | 15 | 19 | 9 | 15 | 20 | 4 | 8 | 20 | 5 | 23 | 21 | 0 | 8 | 20 | 3 | 22 | 19 | 3 | 17 | 20 | 4 | |

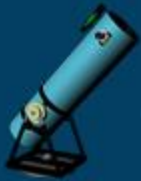


*M = Messier N = NGC
 5(7) = object staat niet vermeld op de kaart

De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.

Aantal objecten per categorie: 3 dubbelsterren; 10 heldere nevels; 3 asterisms (opgenomen bij open sterrenhopen); 37 open sterrenhopen; 6 planetaire nevels; 1 supernova restant; 30 vormige sterrenhopen en 30 sterrenstelsels (2 dwerg elliptisch; 3 elliptisch; 4 lentilaire; 3 balkspiraalen; 15 gewone spiralen en 2 onregelmatige sterrenstelsels).

- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/ supernova rest
- Vormige sterrenhopen



Periodiek systeem voor amateur astronomen

| | | |
|-------------------------------|--|--------------------------------|
| IA | | IIA |
| 1 H Hydrogen 1.01 | | |
| 3 Li Lithium 6.94 | | 4 Be Beryllium 9.01 |
| 11 Na Natrium 22.99 | | 12 Mg Magnesium 24.31 |
| 19 K Kalium 39.10 | | 20 Ca Calcium 40.08 |
| 37 Rb Rubidium 85.47 | | 38 Sr Strontium 87.62 |
| 55 Cs Cesium 132.91 | | 56 Ba Barium 137.33 |
| 87 Fr Francium (223) | | 88 Ra Radium (226) |

| |
|---------------------------------|
| VIIIA |
| 2 He Helium 4.00 |
| 10 Ne Neon 20.18 |
| 18 Ar Argon 39.95 |
| 36 Kr Krypton 83.80 |
| 54 Xe Xenon 131.29 |
| 86 Rn Radon (222) |
| 118 Og Oganesson (294) |

De objecten zijn verdeeld per categorie waarbij de volgorde afhankelijk is per categorie:
 Dubbelsterren: volgens bekendheid; diffuse nevels: oplopend volgens diameter; open sterrenhopen: oplopend volgens aantal sterren; bolvormige sterrenhopen oplopend volgens afstand tot de aarde; planetaire nevels (en 1 supernova restant): oplopend volgens werkelijke diameter van het object.
 De sterrenstelsels werden eerst verdeeld per subgroep: dwerg elliptische stelsels; gewone elliptische stelsels; lenticulaire stelsels; balkspiraalen, gewone spiralen en tot slot onregelmatige sterrenstelsels.
 In elke subgroep staan de stelsels oplopend volgens oppervlakte helderheid.
 Objecten die gelijk zijn wat betreft het gehanteerde criterium werden vervolgens oplopend gesorteerd volgens alfabetische volgorde van het gebruikte catalogusnummer.



Guido Gubbels, december 2016



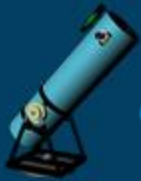
Kaart Sky Atlas 2000^g $m_{SB}^{(m)}$

*M = Messier N = NGC
 §(7) = object staat niet vermeld op de kaart

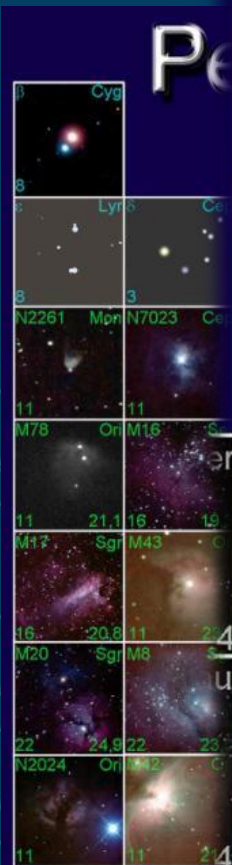
De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.

Aantal objecten per categorie: 3 dubbelsterren; 10 heldere nevels; 3 asterisms (opgenomen bij open sterrenhopen); 37 open sterrenhopen; 6 planetaire nevels; 1 supernova restant; 30 bolvormige sterrenhopen en 30 sterrenstelsels (2 dwerg elliptisch; 3 elliptisch; 4 lenticulaire; 3 balkspiraalen; 15 gewone spiralen en 2 onregelmatige sterrenstelsels).

- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/ supernova rest
- Bolvormige sterrenhoop



| | | |
|-------------------------------|--|--------------------------------|
| IA | | IIA |
| 1 H Hydrogen 1.01 | | 4 Be Beryllium 9.01 |
| 3 Li Lithium 6.94 | | 12 Mg Magnesium 24.31 |
| 11 Na Natrium 22.99 | | 20 Ca Calcium 40.08 |
| 19 K Kalium 39.10 | | 38 Sr Strontium 87.62 |
| 37 Rb Rubidium 85.47 | | 56 Ba Barium 137.33 |
| 55 Cs Cesium 132.91 | | 88 Ra Radium (226) |
| 87 Fr Francium (223) | | |



Object*

| | |
|------|------|
| M103 | Cas |
| 7 | 19,9 |

Kaart Sky ATLAS 2000⁵

*M = Messier N = NGC
⁵(7) = object staat niet vermeld op de kaart

| | | | | | | | | | |
|------|------|-------|------|-------|------|-----|------|-------|------|
| M32 | And | M110 | And | M105 | Leo | M87 | Vir | N1023 | Per |
| 4 | 20,9 | 4 | 22,7 | 13 | 19,4 | 13 | 21,5 | 4 | 21,9 |
| M102 | Dra | M84 | Vir | N3115 | Sex | M86 | Vir | M95 | Leo |
| 2 | 21,2 | 13 | 21,2 | 15 | 21,3 | 13 | 21,6 | 13 | 21,2 |
| M58 | Vir | N2903 | Leo | M104 | Vir | M65 | Leo | M66 | Leo |
| 13 | 21,8 | 6 | 22,5 | 14 | 20,5 | 13 | 20,6 | 5 | 20,8 |
| M108 | UMa | M96 | Leo | M81 | UMa | M64 | Com | M77 | Cet |
| 2 | 20,9 | 13 | 21,3 | 2 | 21,3 | 7 | 21,4 | 10 | 21,6 |
| M63 | CVn | M51 | CVn | N2683 | Lyn | M31 | And | M98 | Com |
| 6 | 21,7 | 7 | 21,7 | 6 | 22,1 | 4 | 22,2 | 13 | 22,4 |
| M106 | CVn | N891 | And | M33 | Tri | M82 | UMa | N4449 | CVn |
| 7 | 22,0 | 4 | 22,7 | 4 | 23,1 | 12 | 20,9 | 7 | 2,22 |

Periodiek systeem voor amateur astronomen

Guido Gubbels, december 2016

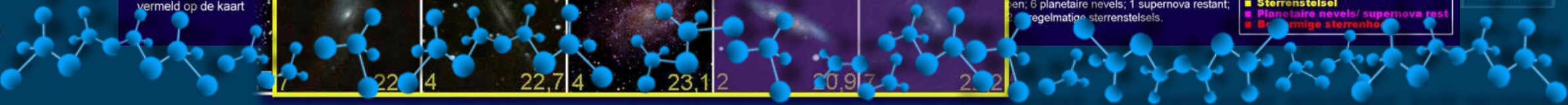
| | | | | | | | | | |
|------|------|-------|------|-------|------|-----|------|-------|------|
| M32 | And | M110 | And | M105 | Leo | M87 | Vir | N1023 | Per |
| 4 | 20,9 | 4 | 22,7 | 13 | 19,4 | 13 | 21,5 | 4 | 21,9 |
| M102 | Dra | M84 | Vir | N3115 | Sex | M86 | Vir | M95 | Leo |
| 2 | 21,2 | 13 | 21,2 | 15 | 21,3 | 13 | 21,6 | 13 | 21,2 |
| M58 | Vir | N2903 | Leo | M104 | Vir | M65 | Leo | M66 | Leo |
| 13 | 21,8 | 6 | 22,5 | 14 | 20,5 | 13 | 20,6 | 5 | 20,8 |
| M108 | UMa | M96 | Leo | M81 | UMa | M64 | Com | M77 | Cet |
| 2 | 20,9 | 13 | 21,3 | 2 | 21,3 | 7 | 21,4 | 10 | 21,6 |
| M63 | CVn | M51 | CVn | N2683 | Lyn | M31 | And | M98 | Com |
| 6 | 21,7 | 7 | 21,7 | 6 | 22,1 | 4 | 22,2 | 13 | 22,4 |
| M106 | CVn | N891 | And | M33 | Tri | M82 | UMa | N4449 | CVn |
| 7 | 22,0 | 4 | 22,7 | 4 | 23,1 | 12 | 20,9 | 7 | 2,22 |

0, M8 en M20. Deze werden toch

en; 6 planetaire nevels; 1 supernova restant; 2 regelmatige sterrenstelsels.

- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/ supernova rest
- Bolvormige sterrenhoop

| |
|----------------------------------|
| VIIIA |
| 2 He Helium 4.00 |
| 10 Ne Neon 20.18 |
| 18 Ar Argon 39.95 |
| 36 Kr Krypton 83.80 |
| 54 Xe Xenon 131.29 |
| 86 Rn Radon (222) |
| 118 Og Oganesson (294) |
| 71 Lu Lutetium 174.97 |
| 103 Lr Lawrencium (262) |



Periodiek systeem voor amateur astronomen


























Guido Gubbels, december 2016

De objecten zijn verdeeld per categorie waarbij de volgorde afhankelijk is per categorie:
 Dubbelsterren: volgens bekendheid; diffuse nevels: oplopend volgens diameter; open sterrenhopen: oplopend volgens aantal sterren; bolvormige sterrenhopen oplopend volgens afstand tot de aarde; planetaire nevels (en 1 supernova restant): oplopend volgens werkelijke diameter van het object.
 De sterrenstelsels werden eerst verdeeld per subgroep: dwerg elliptische stelsels; gewone elliptische stelsels; lenticulaire stelsels; balkspiraalen, gewone spiralen en tot slot onregelmatige sterrenstelsels. In elke subgroep staan de stelsels oplopend volgens oppervlakte helderheid.
 Objecten die gelijk zijn wat betreft het gehanteerde criterium werden vervolgens oplopend gesorteerd volgens alfabetische volgorde van het gebruikte catalogusnummer.

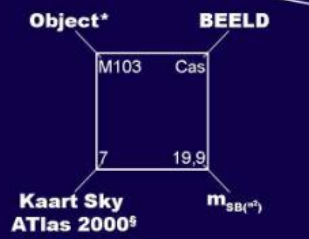
De afbeeldingen zijn gekozen zodat ze het beeld in telescopen met een objectief diameter van 20cm - 40cm het best benaderen. De schaal voor de afbeeldingen is verschillend. Deze keuze werd gemaakt opdat zoveel mogelijk van het object in het beeld past. Vier objecten zijn te groot om in het beeldveld van een telescoop te passen: M44, M45, M31 en M33. Voor deze zijn binoculairs aangewezen om het object in zijn geheel waar te nemen.
























sir William Herschel

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | |
|----------------------------------|-------------------------------------|
| IA 1 H Hydrogen 1.01 | IIA 4 Be Beryllium 9.01 |
| 3 Li Lithium 6.94 | 12 Mg Magnesium 24.31 |
| 11 Na Natrium 22.99 | 20 Ca Calcium 40.08 |
| 19 K Kalium 39.10 | 38 Sr Strontium 87.62 |
| 37 Rb Rubidium 85.47 | 56 Ba Barium 137.33 |
| 55 Cs Cesium 132.91 | 88 Ra Radium (226) |



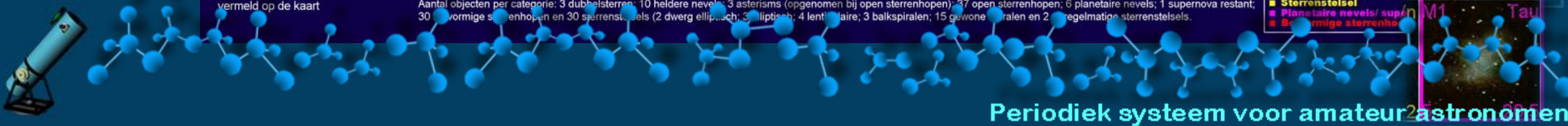
*M = Messier N = NGC
 †(7) = object staat niet vermeld op de kaart


| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.

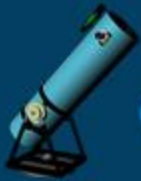
Aantal objecten per categorie: 3 dubbelsterren; 10 heldere nevels; 3 asterisms (opgenomen bij open sterrenhopen); 37 open sterrenhopen; 6 planetaire nevels; 1 supernova restant; 30 bolvormige sterrenhopen en 30 sterrenstelsels (2 dwerg elliptisch; 3 elliptisch; 4 lenticulaire; 3 balkspiraalen; 15 gewone spiralen en 2 onregelmatige sterrenstelsels).

- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/ supernova restant
- Bolvormige sterrenhoop

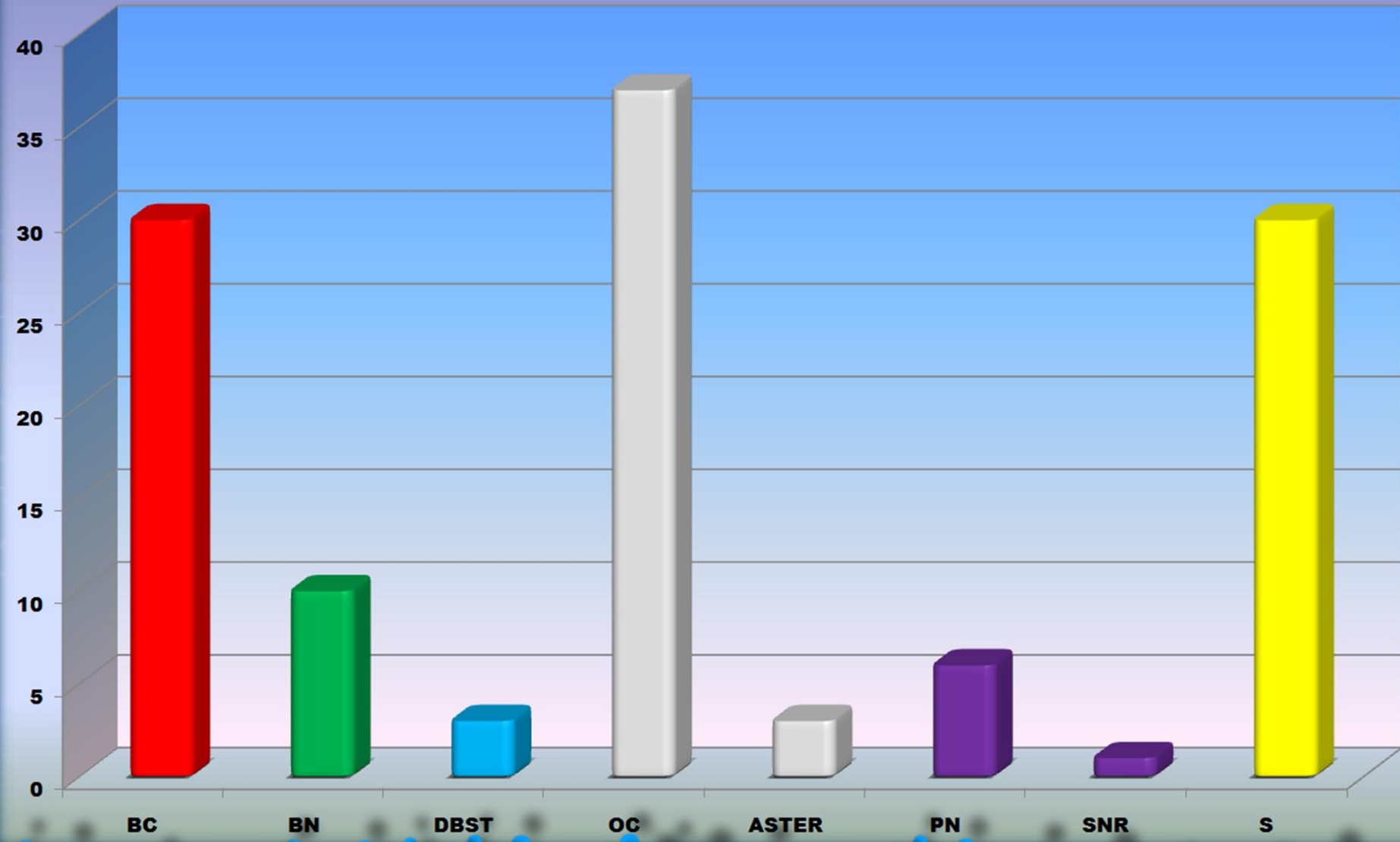


| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------------|---|-------------------------------------|--------------------------------|----------------------------------|-------------------------------|-------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|-------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------|---------------------------------|----------------------------------|----------------------------------|------------------------------|------------------------------|----------------------------------|---------------------------------|-------------------------------|-------------------------------|-------------------------------|----------------------------|
| IA | | | | | | | | | | VIII A | | | | | | | | | | | | | | | | | | |
| 1 H Hydrogen 1.01 | IIA | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | | | | | | | | | | | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |  | | | | | | | | | | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | | | | | | | | | | | |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | III B | IV B | V B | V I B | V II B | V III B | V III B | V III B | IB | IIB | 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | 25 Mn Manganese 54.94 | 26 Fe Iron 55.85 | 27 Co Cobalt 58.93 | 5 B Boron 10.81 | 69 E Einsteinium 287.10 | 69 E Einsteinium 287.10 | 52 T Tennessine 289 | 120 J Jubilee 289 | 69 E Einsteinium 287.10 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | | |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | Zr Zirconium 91.22 | Nb Niobium 92.91 | Mo Molybdenum 95.95 | Tc Technetium (98) | Ru Ruthenium 101.07 | Rh Rhodium 102.91 | Pd Palladium 106.42 | Ag Silver 107.87 | Cd Cadmium 112.41 | In Indium 114.82 | Sn Tin 118.71 | Sb Antimony 121.76 | Te Tellurium 127.60 | I Iodine 126.90 | Xe Xenon 131.29 | 52 Pd Palladium 106.42 | 69 E Einsteinium 287.10 | 69 E Einsteinium 287.10 | 52 T Tennessine 289 | 120 J Jubilee 289 | 69 E Einsteinium 287.10 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Lanthanides | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Tungsten 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.97 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.38 | 82 Pb Lead 207.2 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | 16 S Sulfur 32.06 | 52 T Tennessine 289 | 13 A Astronomen 289 | 52 T Tennessine 289 | 53 I Iridium 192.22 | 69 E Einsteinium 287.10 | 19 K Potassium 39.10 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actinides | 104 Rf Rutherfordium (261) | 105 Db Dubnium (268) | 106 Sg Seaborgium (271) | 107 Bh Bohrium (270) | 108 Hs Hassium (277) | 109 Mt Meitnerium (276) | 110 Ds Darmstadtium (281) | 111 Rg Roentgenium (290) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium 289 | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) | | | | | | | | | | | |

| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



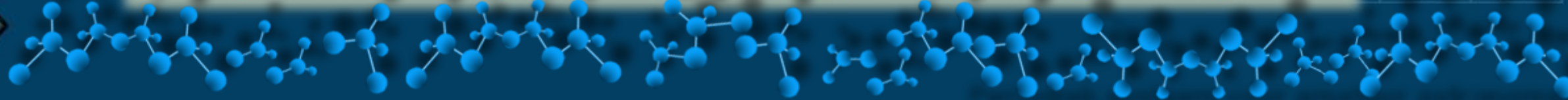
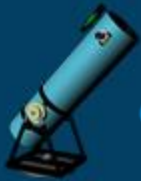
Aantal objecten per soort



| | |
|----------------------------------|-------------------------------------|
| IA 1 H Hydrogen 1.01 | IIA 4 Be Beryllium 9.01 |
| 3 Li Lithium 6.94 | 12 Mg Magnesium 24.31 |
| 11 Na Natrium 22.99 | 20 Ca Calcium 40.08 |
| 19 K Potassium 39.10 | 38 Sr Strontium 87.62 |
| 37 Rb Rubidium 85.47 | 56 Ba Barium 137.33 |
| 55 Cs Cesium 132.91 | 88 Ra Radium (226) |
| 87 Fr Francium (223) | |

| | |
|-------------------------------------|------------------------------------|
| VIIA 9 F Fluorine 19.00 | VIIIA 2 He Helium 4.00 |
| 17 Cl Chloorine 35.45 | 10 Ne Neon 20.18 |
| 35 Br Bromine 79.90 | 18 Ar Argon 39.95 |
| 53 I Jodium 126.90 | 36 Kr Krypton 83.80 |
| 85 At Astatine (210) | 54 Xe Xenon 131.29 |
| 117 Ts Tennessine (294) | 86 Rn Radon (222) |
| | 118 Og Oganesson (294) |

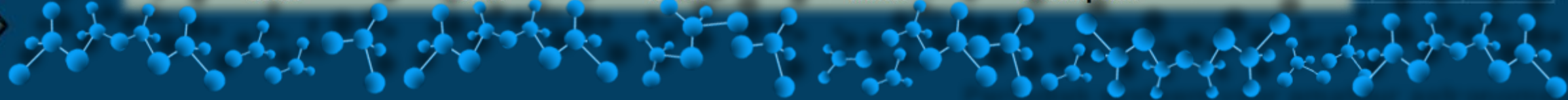
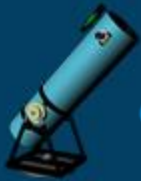
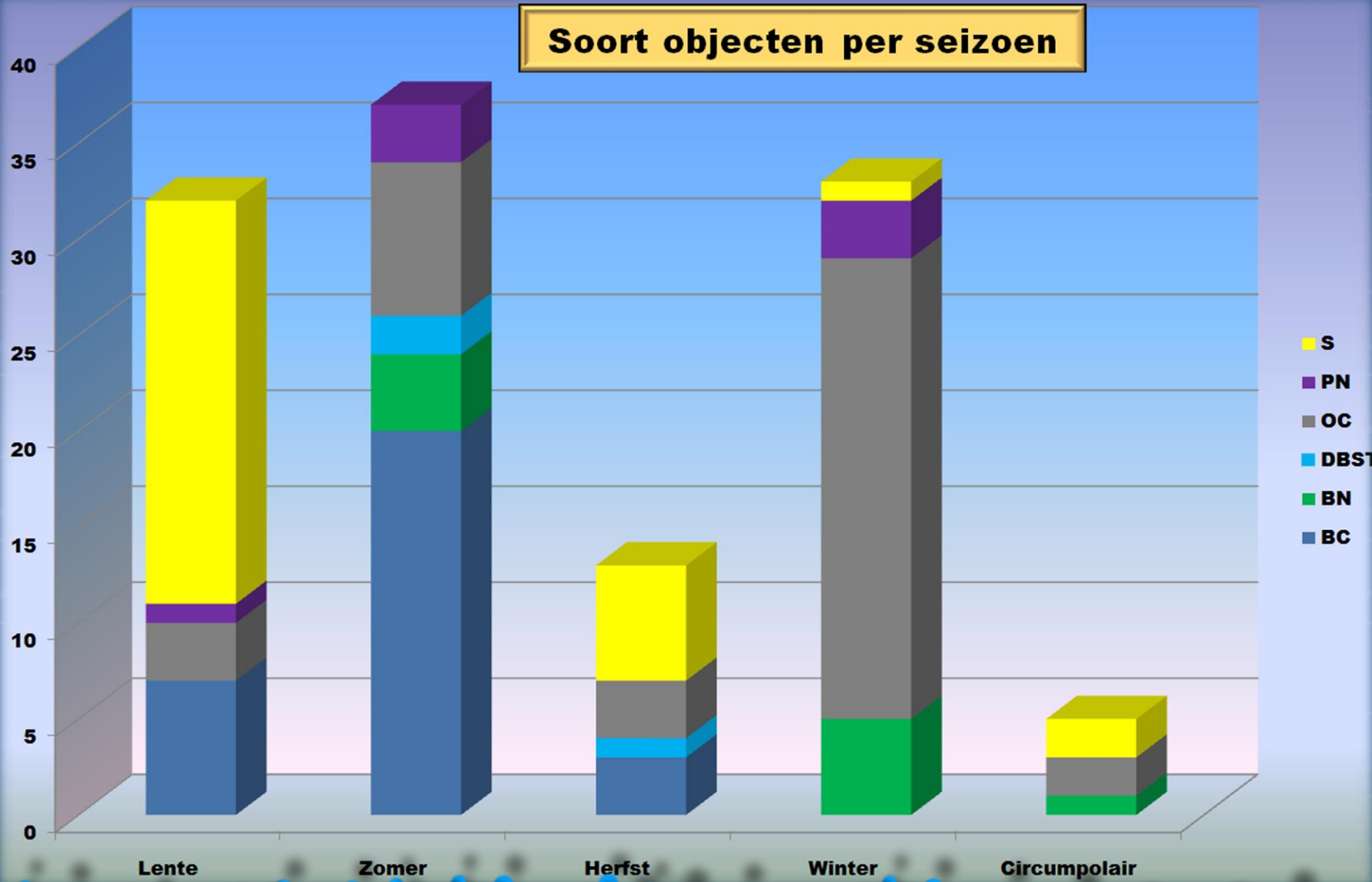
| | |
|---------------------------------|----------------------------------|
| 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



| | |
|--------------------------------------|---------------------------------------|
| 1 H Hydrogen 1.01 | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |
| 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 |
| 19 K Potassium 39.10 | 20 Ca Calcium 40.08 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 |
| 87 Fr Francium (223) | 88 Ra Radium (226) |

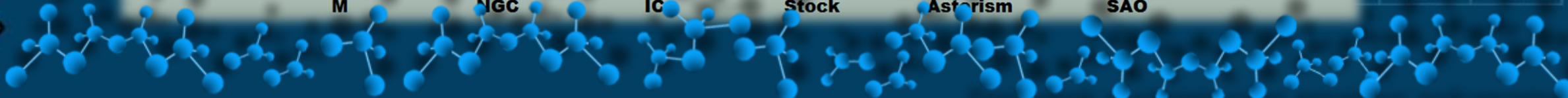
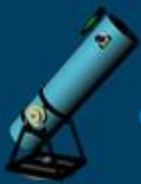
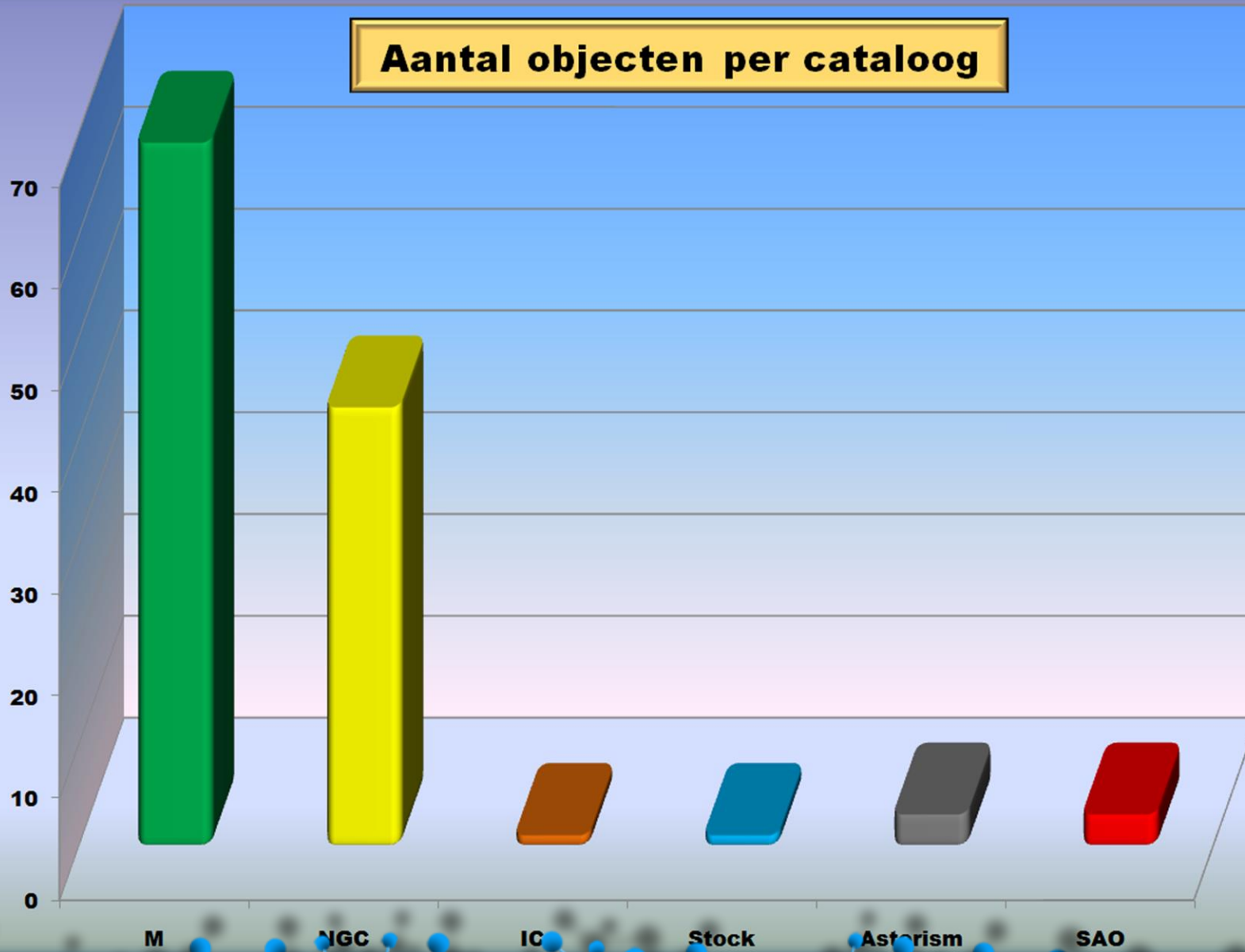
| | |
|---|--|
| | 2 He Helium 4.00 |
| 9 F Fluorine 19.00 | 10 Ne Neon 20.18 |
| 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 |
| 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 |
| 53 I Iodine 126.90 | 54 Xe Xenon 131.29 |
| 85 At Astatine (210) | 86 Rn Radon (222) |
| 117 Ts Tennessine (294) | 118 Og Oganesson (294) |

Soort objecten per seizoen



| | |
|-------------------------------|--------------------------------|
| 1 H Hydrogen 1.01 | IIA |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |
| 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 |
| 19 K Kalium 39.10 | 20 Ca Calcium 40.08 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 |
| 87 Fr Francium (223) | 88 Ra Radium (226) |

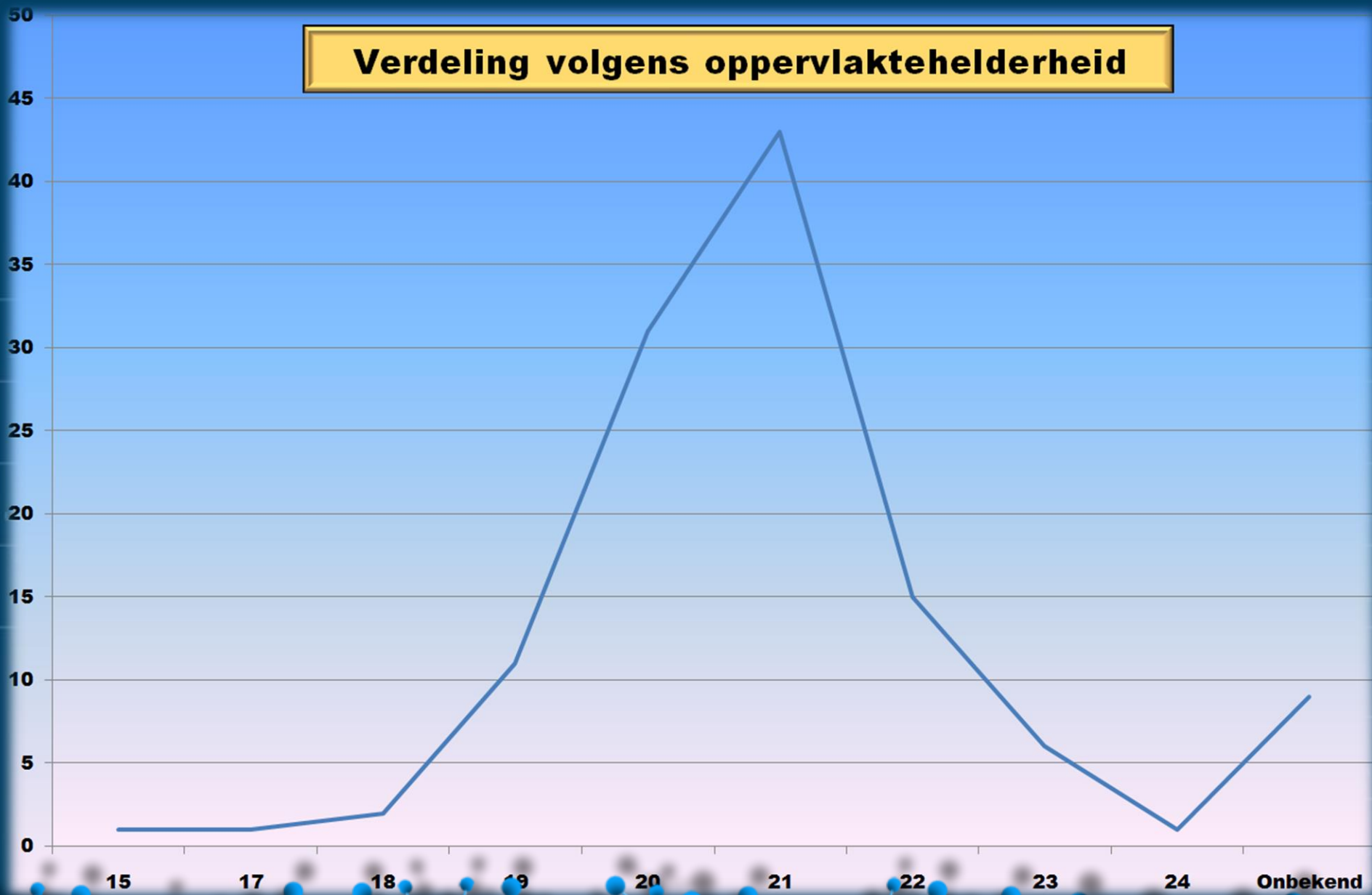
| | |
|----------------------------------|---------------------------------|
| VIIA | VIIIA |
| 9 F Fluorine 19.00 | 2 He Helium 4.00 |
| 17 Cl Chloorine 35.45 | 10 Ne Neon 20.18 |
| 35 Br Bromine 79.90 | 18 Ar Argon 39.95 |
| 53 I Jodium 126.90 | 36 Kr Krypton 83.80 |
| 85 At Astatine (210) | 54 Xe Xenon 131.29 |
| 117 Ts Tennessine (294) | 86 Rn Radon (222) |
| 70 Yb Ytterbium 173.05 | 118 Og Oganesson (294) |
| 102 No Nobelium (259) | 88 Lu Lutetium 174.97 |
| 103 Lr Lawrencium (262) | |



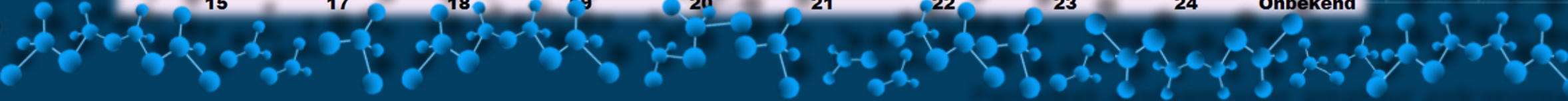
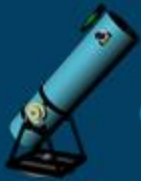
| | |
|----------------------------------|-------------------------------------|
| IA 1 H Hydrogen 1.01 | IIA 4 Be Beryllium 9.01 |
| 3 Li Lithium 6.94 | 12 Mg Magnesium 24.31 |
| 11 Na Natrium 22.99 | 20 Ca Calcium 40.08 |
| 19 K Potassium 39.10 | 38 Sr Strontium 87.62 |
| 37 Rb Rubidium 85.47 | 56 Ba Barium 137.33 |
| 55 Cs Cesium 132.91 | 88 Ra Radium (226) |
| 87 Fr Francium (223) | |

| | |
|-------------------------------------|------------------------------------|
| VIIA 9 F Fluorine 19.00 | VIIIA 2 He Helium 4.00 |
| 17 Cl Chloorne 35.45 | 10 Ne Neon 20.18 |
| 35 Br Bromine 79.90 | 18 Ar Argon 39.95 |
| 53 I Iodine 126.90 | 36 Kr Krypton 83.80 |
| 85 At Astatine (210) | 54 Xe Xenon 131.29 |
| 117 Ts Tennessine (294) | 86 Rn Radon (222) |
| | 118 Og Oganesson (294) |

Verdeling volgens oppervlaktehelderheid



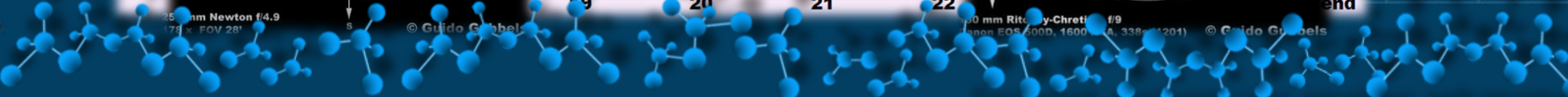
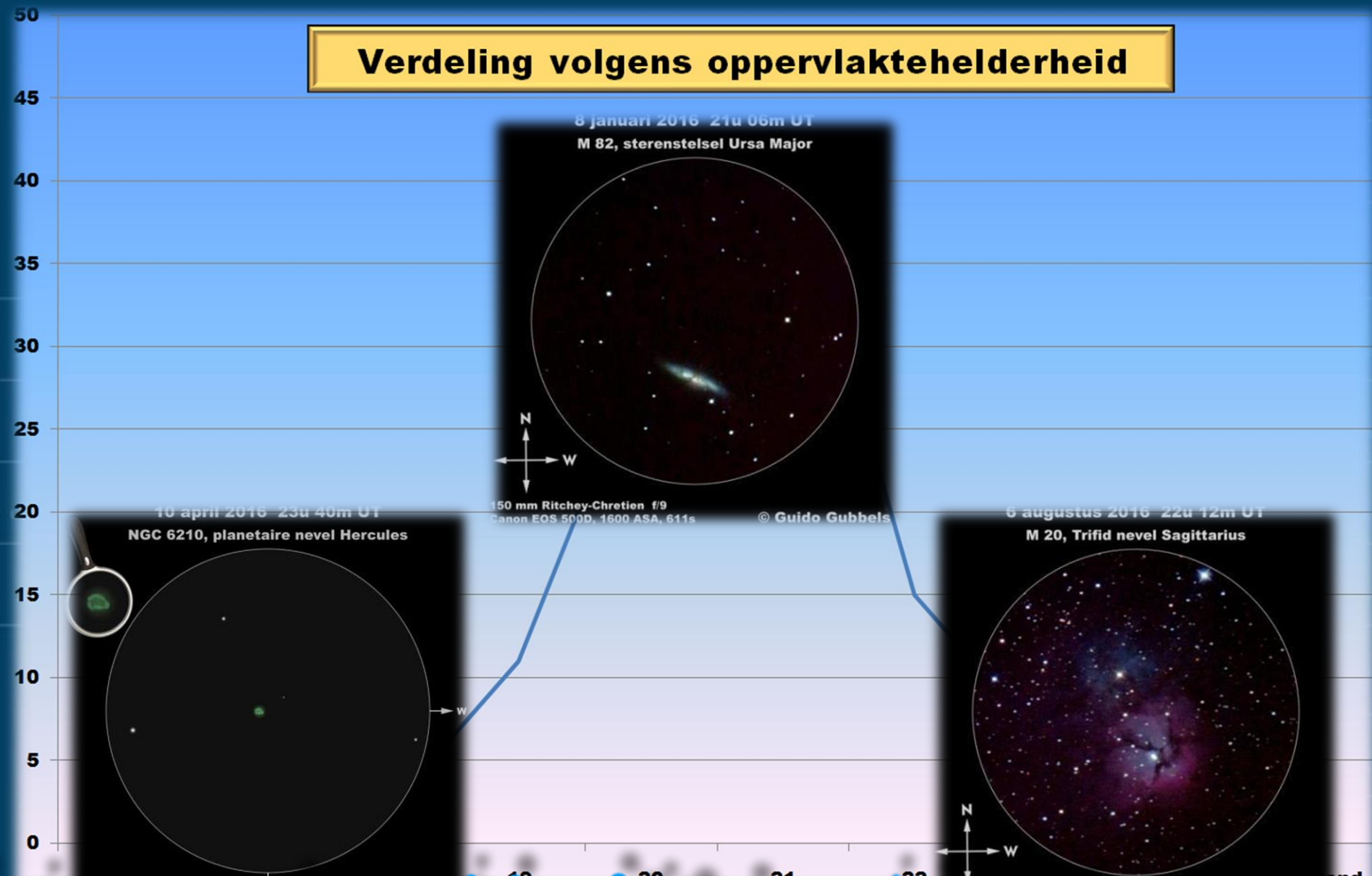
| | |
|---------------------------------|----------------------------------|
| 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



| | |
|-------------------------------|--------------------------------|
| IA | |
| 1 H Hydrogen 1.01 | |
| 3 Li Lithium 6.94 | IIA |
| 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 |
| 19 K Kalium 39.10 | 20 Ca Calcium 40.08 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 |
| 87 Fr Francium (223) | 88 Ra Radium (226) |

| | |
|--------------------------------|---------------------------------|
| | VIIIA |
| | 2 He Helium 4.00 |
| VIIA | 10 Ne Neon 20.18 |
| 9 F Fluorine 19.00 | 18 Ar Argon 39.95 |
| 17 Cl Chloorine 35.45 | 36 Kr Krypton 83.80 |
| 35 Br Bromine 79.90 | 54 Xe Xenon 131.29 |
| 53 I Jodium 126.90 | 86 Rn Radon (222) |
| 85 At Astatine (210) | 118 Og Oganesson (294) |

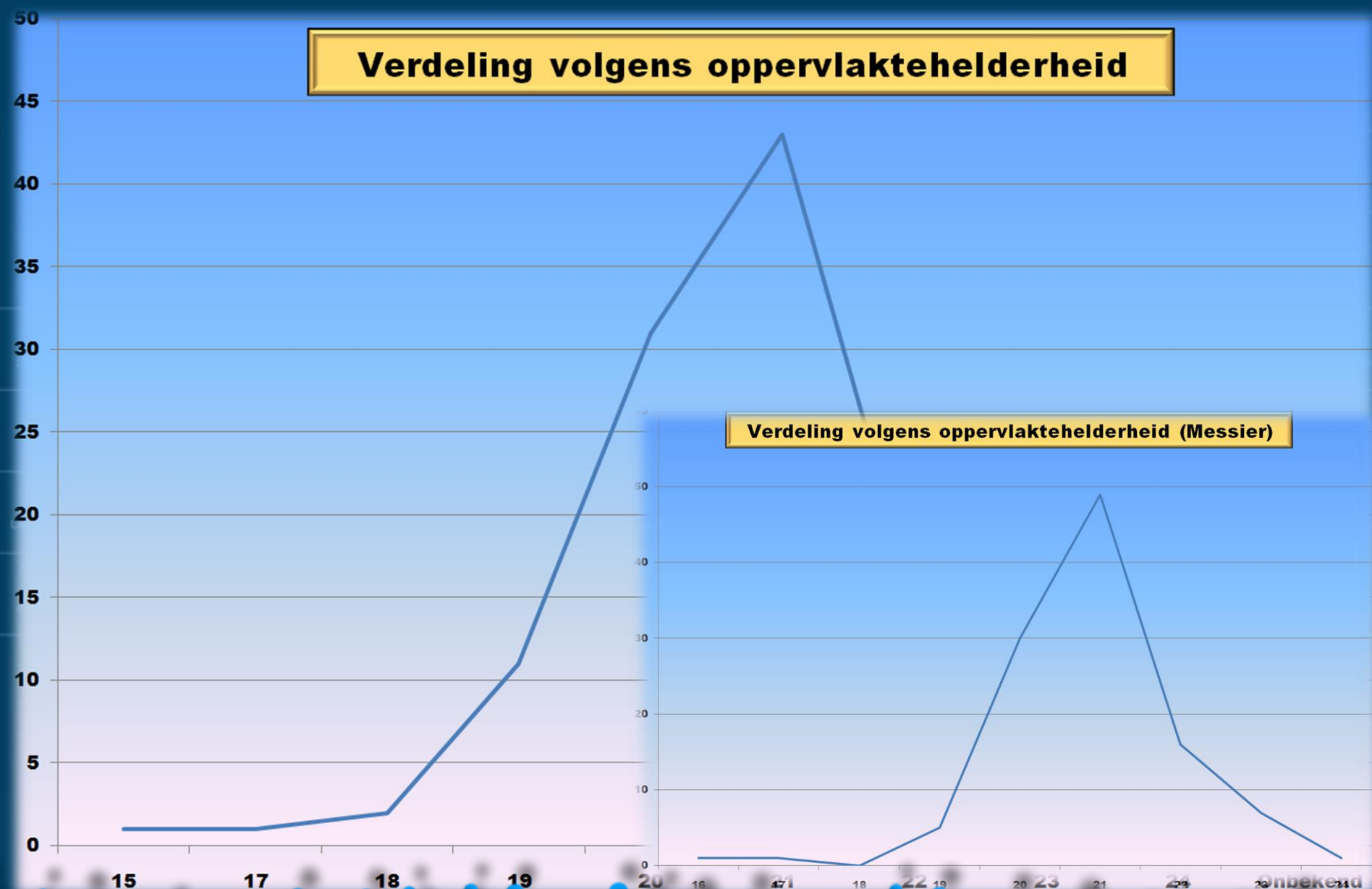
Verdeling volgens oppervlaktehelderheid



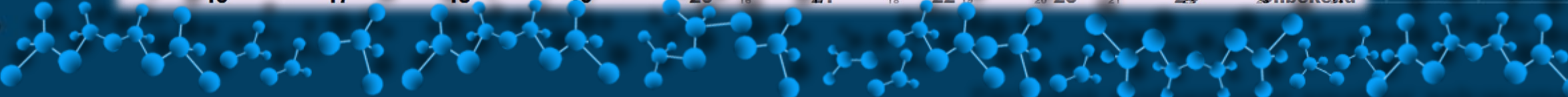
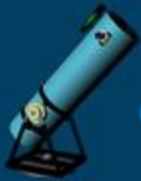
| | |
|-------------------------------|--------------------------------|
| IA | |
| 1 H Hydrogen 1.01 | IIA |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |
| 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 |
| 19 K Kalium 39.10 | 20 Ca Calcium 40.08 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 |
| 87 Fr Francium (223) | 88 Ra Radium (226) |

| | |
|----------------------------------|----------------------------------|
| VIIA | VIIIA |
| 9 F Fluorine 19.00 | 2 He Helium 4.00 |
| 17 Cl Chloorne 35.45 | 10 Ne Neon 20.18 |
| 35 Br Bromine 79.90 | 18 Ar Argon 39.95 |
| 53 I Jodium 126.90 | 36 Kr Krypton 83.80 |
| 85 At Astatine (210) | 54 Xe Xenon 131.29 |
| 117 Ts Tennessine (294) | 86 Rn Radon (222) |
| | 118 Og Oganesson (294) |
| 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 102 No Nobelium (259) | 103 Lr Lawrencium (262) |

Verdeling volgens oppervlaktehelderheid



Verdeling volgens oppervlaktehelderheid (Messier)



| | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------------|--|--|--|--|--|--|--|--|------------------------------------|-----------------------------------|-----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|----------------------------------|----------------------------------|--|--|--|--|--|--|
| IA | | | | | | | | | | VIII A | | | | | | | | | | | | | | |
| 1 H Hydrogen 1.01 | IIA | | | | | | | | | 2 He Helium 4.00 | VIII B | | | | | | | | | | | | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | | | | | | | | | |
| 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 | | | | | | | | | 13 Al Aluminium 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chloorine 35.45 | 18 Ar Argon 39.95 | | | | | | | | | |
| 19 K Kalium 39.10 | 20 Ca Calcium 40.08 | | | | | | | | | 28 Ni Nikkel 58.69 | 29 Cu Koper 63.55 | 30 Zn Zink 65.38 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.63 | 33 As Arsenic 74.92 | 34 Se Selonium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | | | | | | |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | | | | | | | | | 46 Pd Palladium 106.42 | 47 Ag Zilver 107.87 | 48 Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimonium 121.76 | 52 Te Telluurium 127.60 | 53 I Jodium 126.90 | 54 Xe Xenon 131.29 | | | | | | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | | | | | | | | | 78 Pt Platina 195.08 | 79 Au Goud 196.97 | 80 Hg Mercurium 200.59 | 81 Tl Thalium 204.38 | 82 Pb Lood 207.20 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | | | | | | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | | | | | | | | | 110 Ds Darmstadtium (261) | 111 Rg Roentgenium (261) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium (289) | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) | | | | | | |
| | | | | | | | | | | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 | | | | | | |
| | | | | | | | | | | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) | | | | | | |

Doelstellingen



Objecten DEC < -20° weg

Uitzonderingen maken de regel

4 objecten lager

2 Bolvormige sterrenhopen

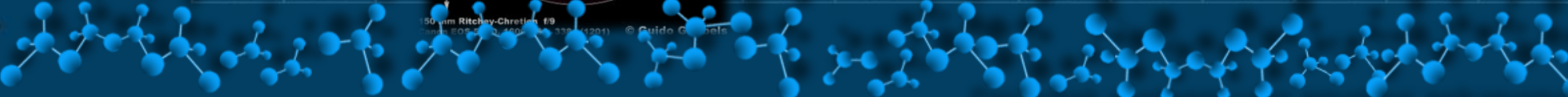
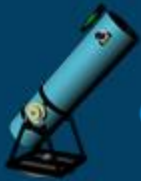
M22 (-23°35')

M30 (-23°)

2 Diffuse nevels

M8 (-24°28')

M20 (-22°58')



| | | |
|----|-------------------------------|------------------------------|
| IA | 1 H Hydrogen 1.01 | IIA |
| | 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |
| | 11 Na Sodium 22.99 | |
| | 19 K Potassium 39.10 | |
| | 37 Rb Rubidium 85.47 | |
| | 55 Cs Cesium 132.91 | |
| | 87 Fr Francium (223) | |

| | |
|-------|---------------------------------|
| VIIIA | 2 He Helium 4.00 |
| | 10 Ne Neon 20.18 |
| | 18 Ar Argon 39.95 |
| | 36 Kr Krypton 83.80 |
| | 54 Xe Xenon 131.29 |
| | 86 Rn Radon (222) |
| | 118 Og Oganesson (294) |

Doelstellingen



Objecten DEC < -20° weg



Evenwichtige verdeling seizoen

Belgische omstandigheden

Piek waarneemtijd jongeren

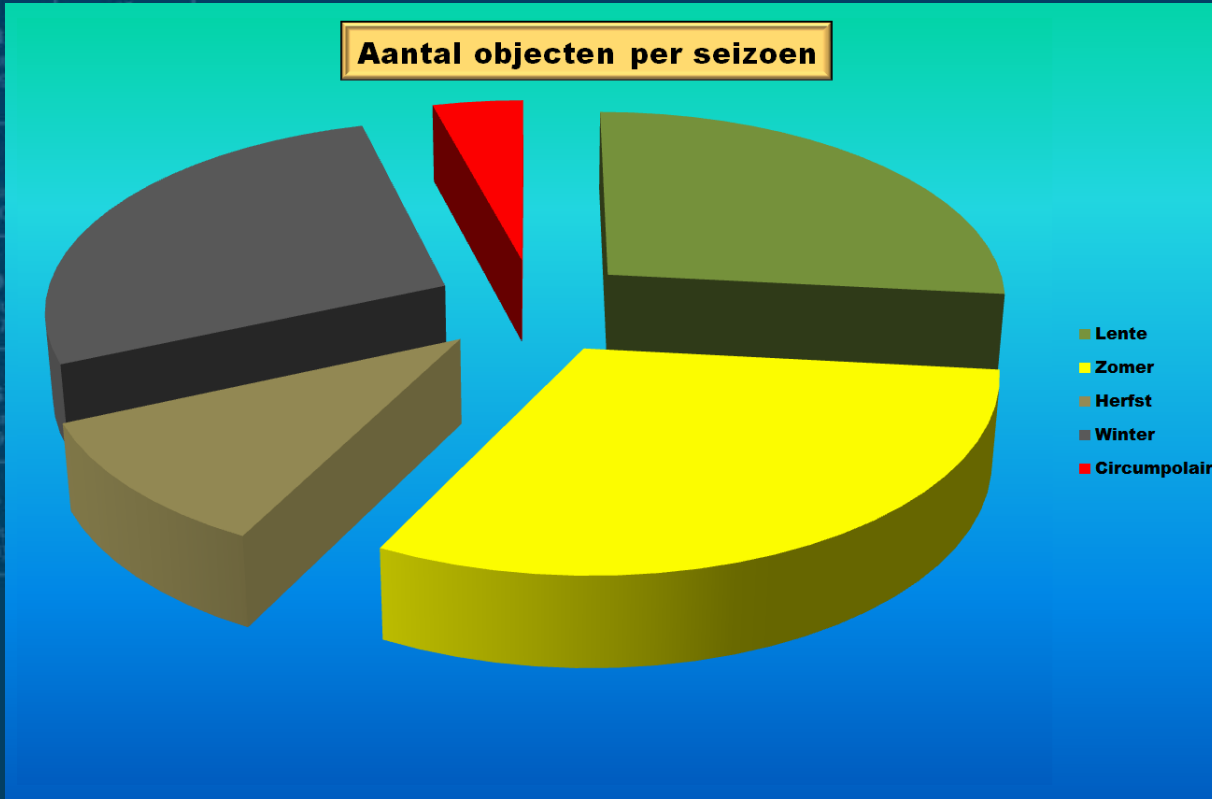
Lente = 32 objecten

Zomer = 37 objecten

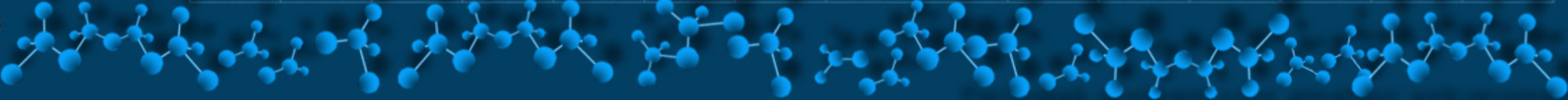
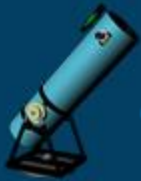
Herfst = 13 objecten

Winter = 33 objecten

Circumpolair = 5 objecten



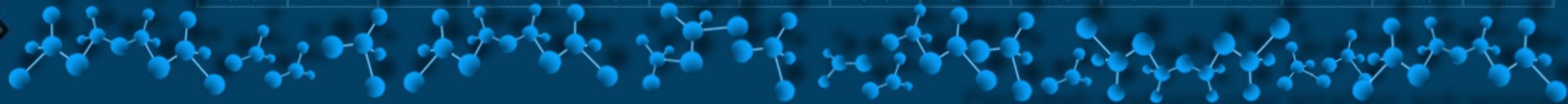
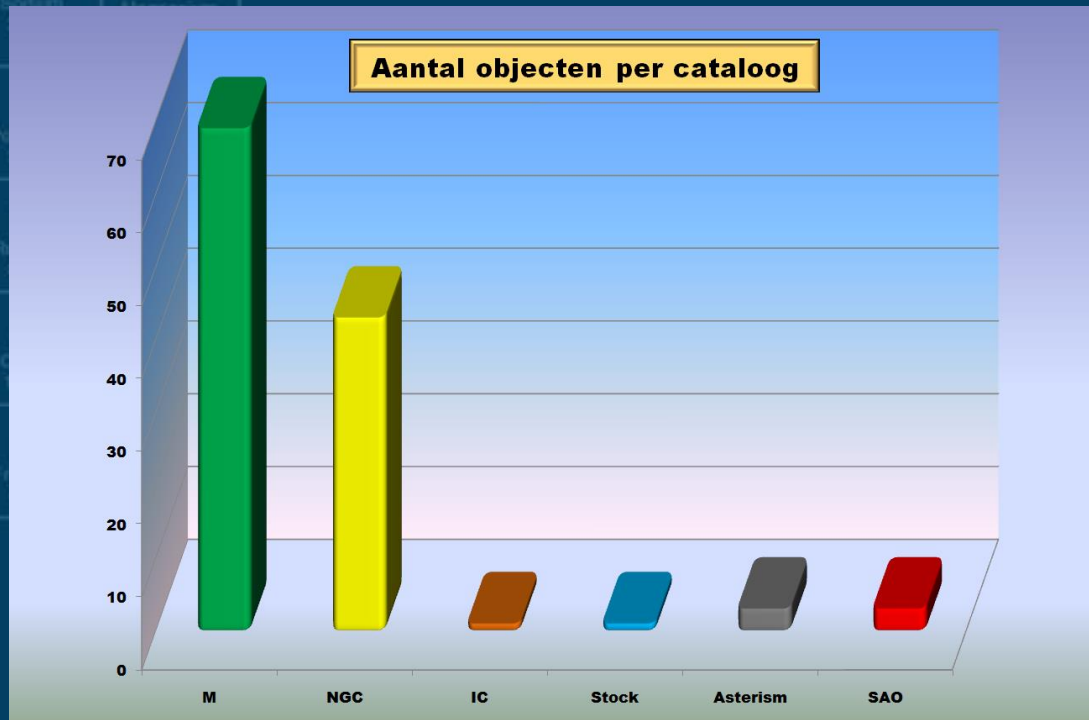
| | | | | | | | | | | | | | | |
|-------------------------------|-------------------------------|------------------------------------|------------------------------|--------------------------------|--------------------------------|--------------------------------|-----------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|--------------------------------|----------------------------------|
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |
|-------------------------------|-------------------------------|------------------------------------|------------------------------|--------------------------------|--------------------------------|--------------------------------|-----------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|--------------------------------|----------------------------------|



| | | | | | | | |
|----------------------------------|-------------------------------------|--------------------------------|---------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|
| IA 1 H Hydrogen 1.01 | IIA 4 Be Beryllium 9.01 | VA 5 B Boron 10.81 | VI 6 C Carbon 12.01 | VII 7 N Nitrogen 14.01 | VIII 8 O Oxygen 16.00 | IX 9 F Fluorine 19.00 | X 10 Ne Neon 20.18 |
| 11 Na Sodium | 12 Mg Magnesium | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 |
| 19 K Potassium | 20 Ca Calcium | 21 Sc Scandium | 22 Ti Titanium | 23 V Vanadium | 24 Cr Chromium | 25 Mn Manganese | 26 Fe Iron |
| 27 Co Cobalt | 28 Ni Nickel | 29 Cu Copper | 30 Zn Zinc | 31 Ga Gallium | 32 Ge Germanium | 33 As Arsenic | 34 Se Selenium |
| 35 Br Bromine | 36 Kr Krypton | 37 Rb Rubidium | 38 Sr Strontium | 39 Y Yttrium | 40 Zr Zirconium | 41 Nb Niobium | 42 Mo Molybdenum |
| 43 Tc Technetium | 44 Ru Ruthenium | 45 Rh Rhodium | 46 Pd Palladium | 47 Ag Silver | 48 Cd Cadmium | 49 In Indium | 50 Sn Tin |
| 51 Sb Antimony | 52 Te Tellurium | 53 I Iodine | 54 Xe Xenon | 55 Ba Barium | 56 La Lanthanum | 57 Ce Cerium | 58 Pr Praseodymium |
| 59 Nd Neodymium | 60 Pm Promethium | 61 Sm Samarium | 62 Eu Europium | 63 Gd Gadolinium | 64 Tb Terbium | 65 Dy Dysprosium | 66 Ho Holmium |
| 67 Er Erbium | 68 Tm Thulium | 69 Yb Ytterbium | 70 Lu Lutetium | 71 Hf Hafnium | 72 Ta Tantalum | 73 W Tungsten | 74 Re Rhenium |
| 75 Os Osmium | 76 Ir Iridium | 77 Pt Platinum | 78 Au Gold | 79 Hg Mercury | 80 Tl Thallium | 81 Pb Lead | 82 Bi Bismuth |
| 83 Po Polonium | 84 At Astatine | 85 Rn Radon | 86 Fr Francium | 87 Ra Radium | 88 Ac Actinium | 89 Th Thorium | 90 Pa Protactinium |
| 91 U Uranium | 92 Np Neptunium | 93 Pu Plutonium | 94 Am Americium | 95 Cm Curium | 96 Bk Berkelium | 97 Cf Californium | 98 Es Einsteinium |
| 99 Fm Fermium | 100 Md Mendelevium | 101 No Nobelium | 102 Lr Lawrencium | 103 Rg Roentgenium | 104 Nh Nihonium | 105 Fl Flerovium | 106 Mc Moscovium |
| 107 Lv Livermorium | 108 Ts Tennessine | 109 Og Oganesson | 110 Ds Darmstadtium | 111 Rg Roentgenium | 112 Nh Nihonium | 113 Fl Flerovium | 114 Mc Moscovium |
| 115 Lv Livermorium | 116 Ts Tennessine | 117 Og Oganesson | 118 Og Oganesson | 119 Uue Ununennium | 120 Uub Unbibium | 121 Uut Ununtrium | 122 Uuq Unquadium |
| 123 Uup Unpentium | 124 Uuq Unquadium | 125 Uuq Unquadium | 126 Uuq Unquadium | 127 Uuq Unquadium | 128 Uuq Unquadium | 129 Uuq Unquadium | 130 Uuq Unquadium |

Doelstellingen

- ☹️ Objecten DEC < -20° weg
- ☹️ Evenwichtige verdeling seizoenen
- Belgische omstandigheden
- Piek waarneemtijd jongeren
- 😊 Niet traditionele deepsky
- 3 dubbelsterren
- 1 ook variabel
- 3 Asterisms
- 2 bij heldere ster
- 1 bij sterrenstelsel



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|--|--|--|--|--|--|--|--|--|--------------------------------|--|--|--|--|--|--|--|--|--|---------------------------------|--|--|--|--|--|--|--|--|--|--------------------------------|--|--|--|--|--|--|--|--|--|------------------------------------|--|--|--|--|--|--|--|--|--|---------------------------------|--|--|--|--|--|--|--|--|--|----------------------------------|--|--|--|--|--|--|--|--|--|---------------------------------|--|--|--|--|--|--|--|--|--|--------------------------------|--|--|--|--|--|--|--|--|--|----------------------------------|--|--|--|--|--|--|--|--|--|-------------------------------|--|--|--|--|--|--|--|--|--|----------------------------------|--|--|--|--|--|--|--|--|--|--------------------------------|--|--|--|--|--|--|--|--|--|--------------------------------|--|--|--|--|--|--|--|--|--|--------------------------------|--|--|--|--|--|--|--|--|--|---------------------------------|--|--|--|--|--|--|--|--|--|--------------------------------|--|--|--|--|--|--|--|--|--|------------------------------|--|--|--|--|--|--|--|--|--|
| IA | | | | | | | | | | | | | | | | | | | | VIIIA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 H Hydrogen 1.01 | | | | | | | | | | IIA | | | | | | | | | | 2 He Helium 4.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 Li Lithium 6.94 | | | | | | | | | | 4 Be Beryllium 9.01 | | | | | | | | | | 5 B Boron 10.81 | | | | | | | | | | 6 C Carbon 12.01 | | | | | | | | | | 7 N Nitrogen 14.01 | | | | | | | | | | 8 O Oxygen 16.00 | | | | | | | | | | 9 F Fluorine 19.00 | | | | | | | | | | 10 Ne Neon 20.18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 Na Sodium 22.99 | | | | | | | | | | 12 Mg Magnesium 24.31 | | | | | | | | | | IIB | | | | | | | | | | IVB | | | | | | | | | | VB | | | | | | | | | | VIB | | | | | | | | | | VIIB | | | | | | | | | | VIIIB | | | | | | | | | | VIII | | | | | | | | | | 9 S Sulfur 32.06 | | | | | | | | | | 17 Cl Chlorine 35.45 | | | | | | | | | | 18 Ar Argon 39.95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 K Potassium 39.10 | | | | | | | | | | 20 Ca Calcium 40.08 | | | | | | | | | | 21 Sc Scandium 44.96 | | | | | | | | | | 22 Ti Titanium 47.88 | | | | | | | | | | 23 V Vanadium 50.94 | | | | | | | | | | 24 Cr Chromium 52.00 | | | | | | | | | | 25 Mn Manganese 54.94 | | | | | | | | | | 26 Fe Iron 55.85 | | | | | | | | | | 27 Co Cobalt 58.93 | | | | | | | | | | 28 Ni Nickel 58.71 | | | | | | | | | | 29 Cu Copper 63.55 | | | | | | | | | | 30 Zn Zinc 65.39 | | | | | | | | | | 31 Ga Gallium 69.72 | | | | | | | | | | 32 Ge Germanium 72.64 | | | | | | | | | | 33 As Arsenic 74.92 | | | | | | | | | | 34 Se Selenium 78.97 | | | | | | | | | | 35 Br Bromine 79.90 | | | | | | | | | | 36 Kr Krypton 83.80 | | | | | | | | | |
| 37 Rb Rubidium 85.47 | | | | | | | | | | 38 Sr Strontium 87.62 | | | | | | | | | | 39 Y Yttrium 88.91 | | | | | | | | | | 40 Zr Zirconium 91.22 | | | | | | | | | | 41 Nb Niobium 92.91 | | | | | | | | | | 42 Mo Molybdenum 95.94 | | | | | | | | | | 43 Tc Technetium 98.91 | | | | | | | | | | 44 Ru Ruthenium 101.07 | | | | | | | | | | 45 Rh Rhodium 102.91 | | | | | | | | | | 46 Pd Palladium 106.42 | | | | | | | | | | 47 Ag Silver 107.87 | | | | | | | | | | 48 Cd Cadmium 112.41 | | | | | | | | | | 49 In Indium 114.82 | | | | | | | | | | 50 Sn Tin 118.71 | | | | | | | | | | 51 Sb Antimony 121.76 | | | | | | | | | | 52 Te Tellurium 127.60 | | | | | | | | | | 53 I Iodine 126.90 | | | | | | | | | | 54 Xe Xenon 131.29 | | | | | | | | | |
| 55 Cs Cesium 132.91 | | | | | | | | | | 56 Ba Barium 137.33 | | | | | | | | | | 57 La Lanthanum 138.91 | | | | | | | | | | 58 Ce Cerium 140.12 | | | | | | | | | | 59 Pr Praseodymium 140.91 | | | | | | | | | | 60 Nd Neodymium 144.24 | | | | | | | | | | 61 Pm Promethium 144.91 | | | | | | | | | | 62 Sm Samarium 150.36 | | | | | | | | | | 63 Eu Europium 151.96 | | | | | | | | | | 64 Gd Gadolinium 157.25 | | | | | | | | | | 65 Tb Terbium 158.93 | | | | | | | | | | 66 Dy Dysprosium 162.50 | | | | | | | | | | 67 Ho Holmium 164.93 | | | | | | | | | | 68 Er Erbium 167.26 | | | | | | | | | | 69 Tm Thulium 168.93 | | | | | | | | | | 70 Yb Ytterbium 173.05 | | | | | | | | | | 71 Lu Lutetium 174.97 | | | | | | | | | | | | | | | | | | | |
| 69 Fr Francium 223 | | | | | | | | | | 70 Ra Radium 226 | | | | | | | | | | 71 Ac Actinium 227 | | | | | | | | | | 72 Th Thorium 232.04 | | | | | | | | | | 73 Pa Protactinium 231.04 | | | | | | | | | | 74 U Uranium 238.03 | | | | | | | | | | 75 Np Neptunium 237 | | | | | | | | | | 76 Pu Plutonium 244 | | | | | | | | | | 77 Am Americium 243 | | | | | | | | | | 78 Cm Curium 247 | | | | | | | | | | 79 Bk Berkelium 247 | | | | | | | | | | 80 Cf Californium 251 | | | | | | | | | | 81 Es Einsteinium 252 | | | | | | | | | | 82 Fm Fermium 257 | | | | | | | | | | 83 Md Mendelevium 258 | | | | | | | | | | 84 No Nobelium 259 | | | | | | | | | | 85 Lr Lawrencium 262 | | | | | | | | | | | | | | | | | | | |

Doelstellingen



Objecten DEC < -20° weg



Evenwichtige verdeling seizoenen
Belgische omstandigheden

Piek waarneemtijd jongeren



Niet traditionele deepsky

Dubbelsterren, variabelen



Sterrenstelsel niet langer dominant

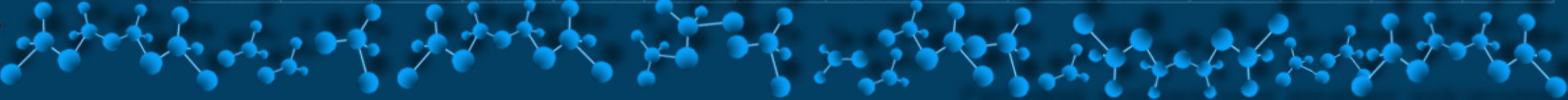
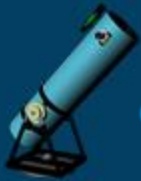
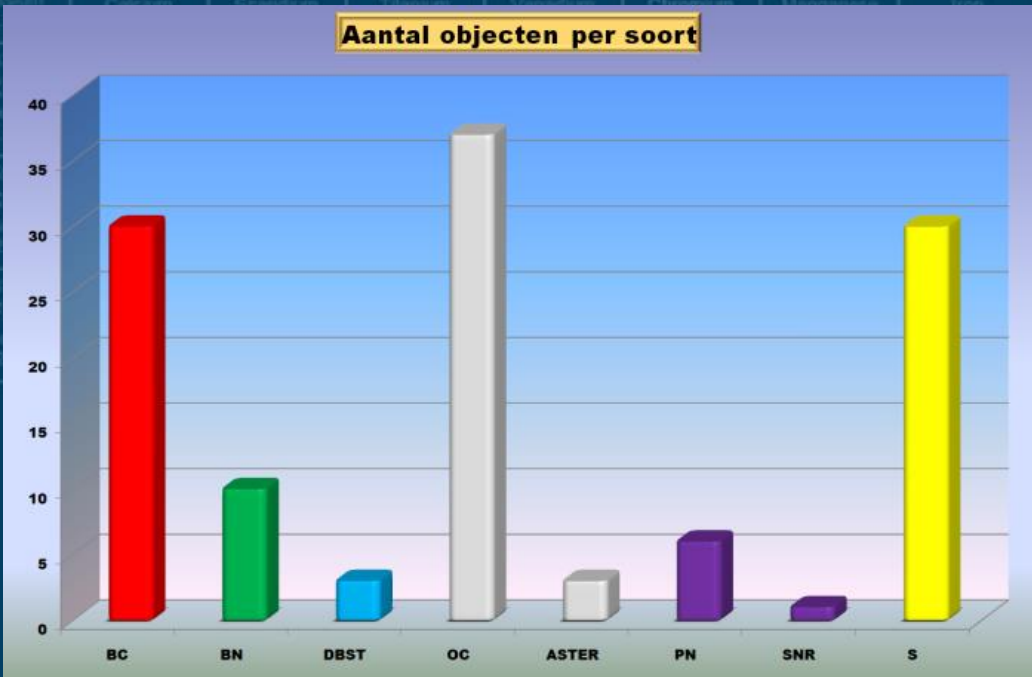
OC = 40 (3 asterisms)

BC = 30

S = 30

BN = 10

PN = 6 + 1

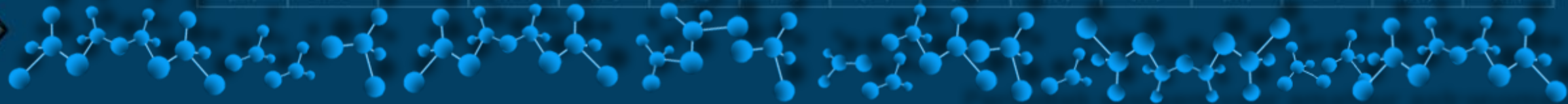
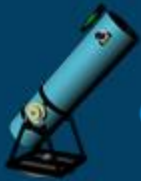


| | | | | | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------------|-------------------------------|--------------------------------|-------------------------------------|---------------------------------|----------------------------------|---------------------------------|-------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|---------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|
| IA | | | | | | | | | | | | | | | | VIII A | | | |
| 1 H Hydrogen 1.01 | IIA | | | | | | | | | | VA | | VIA | | VIIA | | 2 He Helium 4.00 | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | | |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | | | | | | | | | | | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | | |
| 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | 22 Ti Titanium 47.87 | 23 V Vanadium 50.94 | 24 Cr Chromium 52.00 | 25 Mn Manganese 54.94 | 26 Fe Iron 55.85 | 27 Co Cobalt 58.93 | 28 Ni Nickel 58.69 | 29 Cu Copper 63.55 | 30 Zn Zinc 65.38 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.64 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | | |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirconium 91.22 | 41 Nb Niobium 92.91 | 42 Mo Molybdenum 95.95 | 43 Tc Technetium (98) | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.87 | 48 Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Lanthanides | | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Tungsten 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.97 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.38 | 82 Pb Lead 207.20 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actinides | | 104 Rf Rutherfordium (261) | 105 Db Dubnium (268) | 106 Sg Seaborgium (271) | 107 Bh Bohrium (270) | 108 Hs Hassium (277) | 109 Mt Meitnerium (276) | 110 Ds Darmstadtium (285) | 111 Rg Roentgenium (288) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium (289) | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) | |

Doelstellingen

- ☹️ Objecten DEC < -20° weg
- ☹️ Evenwichtige verdeling seizoen
- Belgische omstandigheden
- Piek waarneemtijd jongeren
- 😊 Niet traditionele deepsky
- Dubbelsterren, variabelen
- 😊 Sterrenstelsel niet langer dominant
- Morfologie passend in tabel

| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



Periodiek systeem voor amateur astronomen

| | | |
|----|-------------------------------|--------------------------------|
| IA | 1 H Hydrogen 1.01 | IIA |
| | 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |
| | 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 |
| | 19 K Kalium 39.10 | 20 Ca Calcium 40.08 |
| | 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 |
| | 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 |
| | 87 Fr Francium (223) | 88 Ra Radium (226) |

| | |
|-------|---------------------------------|
| VIIIA | 2 He Helium 4.00 |
| | 10 Ne Neon 20.18 |
| | 18 Ar Argon 39.95 |
| | 36 Kr Krypton 83.80 |
| | 54 Xe Xenon 131.29 |
| | 86 Rn Radon (222) |
| | 118 Og Oganesson (294) |

| | | | |
|-----|-------|-----|-------|
| 8 | Cyg | | |
| 8 | Lyr | Cep | |
| 8 | N2261 | Mon | N7023 |
| 11 | | | |
| M78 | Orn | M16 | Ser |
| 11 | 21.1 | 16 | 19.3 |
| M17 | Sgr | M43 | Orn |
| 16 | 20.8 | 11 | 23.8 |
| M20 | Sgr | M8 | Sgr |
| 22 | 24.9 | 22 | 23.5 |
| 11 | | | |

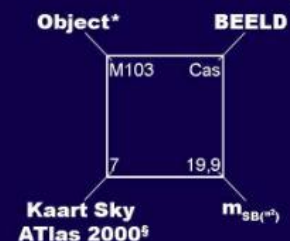
De objecten zijn verdeeld per categorie waarbij de volgorde afhankelijk is per categorie:
 Dubbelsterren: volgens bekendheid; diffuse nevels: oplopend volgens diameter; open sterrenhopen: oplopend volgens aantal sterren; bolvormige sterrenhopen oplopend volgens afstand tot de aarde; planetaire nevels (en 1 supernova restant): oplopend volgens werkelijke diameter van het object.
 De sterrenstelsels werden eerst verdeeld per subgroep: dwerg elliptische stelsels; gewone elliptische stelsels; lenticulaire stelsels; balkspiraal, gewone spiralen en tot slot onregelmatige sterrenstelsels. In elke subgroep staan de stelsels oplopend volgens oppervlakte helderheid.
 Objecten die gelijk zijn wat betreft het gehanteerde criterium werden vervolgens oplopend gesorteerd volgens alfabetische volgorde van het gebruikte catalogusnummer.
 De afbeeldingen zijn gekozen zodat ze het beeld in telescopen met een objectief diameter van 20cm - 40cm het best benaderen. De schaal voor de afbeeldingen is verschillend. Deze keuze werd gemaakt opdat zoveel mogelijk van het object in het beeld past. Vier objecten zijn te groot om in het beeldveld van een telescoop te passen: M44, M45, M31 en M33. Voor deze zijn binoculairs aangewezen om het object in zijn geheel waar te nemen.



sir William Herschel

Guido Gubbels, december 2016

| | | | | | | | | | | | |
|------|------|-------|------|-------|------|-----|------|-------|------|-------|------|
| M32 | And | M110 | And | M105 | Leo | M87 | Vir | N1023 | Per | M57 | Lyr |
| 4 | 20,9 | 4 | 22,7 | 13 | 19,4 | 13 | 21,5 | 4 | 21,9 | 8 | 15,7 |
| M102 | Dra | M84 | Vir | N3115 | Sex | M86 | Vir | M95 | Leo | N2392 | Gem |
| 2 | 21,2 | 13 | 21,2 | 15 | 21,3 | 13 | 21,6 | 13 | 21,2 | 5 | 18,8 |
| M58 | Vir | N2903 | Leo | M104 | Vir | M65 | Leo | M66 | Leo | M6 | Per |
| 13 | 21,8 | 6 | 22,5 | 14 | 20,5 | 13 | 20,6 | 5 | 20,8 | 4 | 20,4 |
| M108 | UMa | M96 | Leo | M81 | UMa | M64 | Com | M77 | Cet | M7 | Vul |
| 2 | 20,9 | 13 | 21,3 | 2 | 21,3 | 7 | 21,4 | 10 | 21,6 | 4 | 20,2 |
| M63 | CVn | M51 | CVn | N2683 | Lyr | M31 | And | M98 | Com | M97 | UMa |
| 7 | 21,7 | 7 | 21,7 | 6 | 22,1 | 4 | 22,2 | 13 | 22,4 | 2 | 21,2 |
| M106 | CVn | N891 | And | M33 | Tri | M82 | UMa | N4449 | CVn | M1 | Tau |
| 7 | 22,5 | 4 | 22,7 | 4 | 23,1 | 2 | 20,9 | 7 | 22,2 | 5 | 20,5 |



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|------|-----|------|-----|------|-----|------|-------|------|------|------|-------|------|-------|------|-------|------|-----|------|-----|------|-------|------|-------|------|-------|------|-------|------|
| M22 | Sgr | M71 | Sgr | M10 | Oph | M12 | Oph | N5053 | Com | M107 | Oph | N6535 | Ser | N6712 | Scr | N6780 | Aql | M3 | Ser | M13 | Her | M30 | Cap | M92 | Her | N5440 | Sgr | N6348 | Her |
| 22 | 20,8 | 16 | 21,1 | 15 | 21,1 | 15 | 21,1 | 7 | 23,4 | 15 | 21,5 | 16 | 18,8 | 16 | 20,3 | 16 | 19,9 | 15 | 20,4 | 8 | 20,5 | 23 | 21,0 | 9 | 20,3 | 22 | 19,3 | 17 | 20,6 |
| M80 | Sex | M56 | Lyr | M15 | Peg | M3 | CVn | N617 | Oph | M2 | Aql | N5097 | Lib | N5095 | Oph | N5466 | Boo | M57 | Gas | M53 | Com | N5634 | Vir | N6228 | Her | N7006 | Del | N2419 | Lyr |
| 22 | 20,7 | 9 | 21,2 | 17 | 20,3 | 7 | 20,9 | 15 | 19,2 | 17 | 20,7 | 21 | 22,0 | 15 | 19,8 | 7 | 22,8 | 16 | 22,0 | 7 | 21,7 | 14 | 21,8 | 8 | 21,2 | 16 | 21,7 | 5 | 23,3 |

*M = Messier N = NGC
^g(7) = object staat niet vermeld op de kaart

De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op een laagere hoogte waargenomen te worden.
 Aantal objecten per categorie: 3 dubbelsterren; 10 heldere nevels; 3 asterismen (comenomenen); 37 open sterrenhopen; 3 planetaire nevels; 1 supernova restant; 2 bolvormige sterrenhopen; 3 sterrenstelsels; 2 dwerg elliptisch; 3 optisch; 4 lenticulaire; 3 balkspiraal; 1 gewone spiralen en 2 onregelmatige sterrenstelsels.

- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/ supernova rest
- Bolvormige sterrenhoop

| |
|----------------------------------|
| 71 Lu Lutetium 174.97 |
| 103 Lr Lawrencium (262) |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------------|-------------------------------------|--|---------------------------------------|--|------------------------------------|--------------------------------------|-----------------------------------|--|---------------------------------------|---|---|--|---|--|-------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|-------------------------------------|--|--|--|---|--|--|---|--|---------------------------------------|--|--|---|---|---|---|---|---|--|---|--------------------------------------|---|--|--|--|---|--|---|---|--|---|---|---|---|--|---|--|---|--|--|---|--|---|--|--|---|--|---|---------------------------------------|--|---|---------------------------------------|--|--|--|---------------------------------------|--|--|--|--|---|---|---|---|---|--------------------------------------|---|---|---|---------------------------------------|--|---|---|
| IA 1 H Hydrogen 1.01 | IIA 4 Be Beryllium 9.01 | III A 13 Al Aluminum 26.98 | III B 14 Si Silicon 28.09 | IV A 15 P Phosphorus 30.97 | IV B 16 S Sulfur 32.06 | V A 17 Cl Chlorine 35.45 | VIA 18 Ar Argon 39.95 | VII A 19 K Potassium 39.10 | VII B 20 Ca Calcium 40.08 | VIII A 21 Sc Scandium 44.96 | VIII B 22 Ti Titanium 47.88 | VIII C 23 V Vanadium 50.94 | VIII D 24 Cr Chromium 52.00 | VIII E 25 Mn Manganese 54.94 | VIII F 26 Fe Iron 55.85 | VIII G 27 Co Cobalt 58.93 | VIII H 28 Ni Nickel 58.71 | VIII I 29 Cu Copper 63.55 | VIII J 30 Zn Zinc 65.38 | VIII K 31 Ga Gallium 69.72 | VIII L 32 Ge Germanium 72.64 | VIII M 33 As Arsenic 74.92 | VIII N 34 Se Selenium 78.97 | VIII O 35 Br Bromine 79.90 | VIII P 36 Kr Krypton 83.80 | VIII Q 37 Rb Rubidium 85.47 | VIII R 38 Sr Strontium 87.62 | VIII S 39 Y Yttrium 88.91 | VIII T 40 Zr Zirconium 91.22 | VIII U 41 Nb Niobium 92.91 | VIII V 42 Mo Molybdenum 95.94 | VIII W 43 Tc Technetium 98.91 | VIII X 44 Ru Ruthenium 101.07 | VIII Y 45 Rh Rhodium 102.91 | VIII Z 46 Pd Palladium 106.42 | VIII AA 47 Ag Silver 107.87 | VIII AB 48 Cd Cadmium 112.41 | VIII AC 49 In Indium 114.82 | VIII AD 50 Sn Tin 118.71 | VIII AE 51 Sb Antimony 121.76 | VIII AF 52 Te Tellurium 127.60 | VIII AG 53 I Iodine 126.90 | VIII AH 54 Xe Xenon 131.29 | VIII AI 55 Ba Barium 137.33 | VIII AJ 56 La Lanthanum 138.91 | VIII AK 57 Ce Cerium 140.12 | VIII AL 58 Pr Praseodymium 140.91 | VIII AM 59 Nd Neodymium 144.24 | VIII AN 60 Pm Promethium 144.91 | VIII AO 61 Sm Samarium 150.36 | VIII AP 62 Eu Europium 151.96 | VIII AQ 63 Gd Gadolinium 157.25 | VIII AR 64 Tb Terbium 158.93 | VIII AS 65 Dy Dysprosium 162.50 | VIII AT 66 Ho Holmium 164.93 | VIII AU 67 Er Erbium 167.26 | VIII AV 68 Tm Thulium 168.93 | VIII AW 69 Yb Ytterbium 173.05 | VIII AX 70 Lu Lutetium 174.97 | VIII AY 71 Hf Hafnium 178.49 | VIII AZ 72 Ta Tantalum 180.95 | VIII BA 73 W Tungsten 183.84 | VIII BB 74 Re Rhenium 186.21 | VIII BC 75 Os Osmium 190.23 | VIII BD 76 Ir Iridium 192.22 | VIII BE 77 Pt Platinum 195.08 | VIII BF 78 Au Gold 196.97 | VIII BG 79 Hg Mercury 200.59 | VIII BH 80 Tl Thallium 204.38 | VIII BI 81 Pb Lead 207.20 | VIII BJ 82 Bi Bismuth 208.98 | VIII BK 83 Po Polonium (209) | VIII BL 84 At Astatine (210) | VIII BM 85 Rn Radon (222) | VIII BN 86 Fr Francium (223) | VIII BO 87 Ra Radium (226) | VIII BP 88 Ac Actinium (227) | VIII BQ 89 Th Thorium 232.04 | VIII BR 90 Pa Protactinium 231.04 | VIII BS 91 U Uranium 238.03 | VIII BT 92 Np Neptunium 237 | VIII BU 93 Pu Plutonium 244 | VIII BV 94 Am Americium 243 | VIII BW 95 Cm Curium 247 | VIII BX 96 Bk Berkelium 247 | VIII BY 97 Cf Californium 251 | VIII BZ 98 Es Einsteinium 252 | VIII C0 99 Fm Fermium 257 | VIII C1 100 Md Mendelevium 258 | VIII C2 101 No Nobelium 259 | VIII C3 102 Lr Lawrencium 262 |
|----------------------------------|-------------------------------------|--|---------------------------------------|--|------------------------------------|--------------------------------------|-----------------------------------|--|---------------------------------------|---|---|--|---|--|-------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|-------------------------------------|--|--|--|---|--|--|---|--|---------------------------------------|--|--|---|---|---|---|---|---|--|---|--------------------------------------|---|--|--|--|---|--|---|---|--|---|---|---|---|--|---|--|---|--|--|---|--|---|--|--|---|--|---|---------------------------------------|--|---|---------------------------------------|--|--|--|---------------------------------------|--|--|--|--|---|---|---|---|---|--------------------------------------|---|---|---|---------------------------------------|--|---|---|

Doelstellingen

- ☹️ Objecten DEC < -20° weg
- ☹️ Evenwichtige verdeling seizoen
- Belgische omstandigheden
- Piek waarneemtijd jongeren

- 😊 Niet traditionele deepsky
- Dubbelsterren, variabelen
- 😊 Sterrenstelsel niet langer dominant
- 😊 Morfologie passend in tabel

Periodiek systeem voor amateur astronomen

De objecten zijn verdeeld per categorie waarbij de volgorde afhankelijk is per categorie:

- Dubbelsterren: volgens bekendheid; diffuse nevels: oplopend volgens diameter; open sterrenhopen: oplopend volgens aantal sterren; bolvormige sterrenhopen oplopend volgens afstand tot de aarde; planetaire nevels (en 1 supernova restant): oplopend volgens wetkelijke diameter van het object.
- De sterrenstelsels werden eerst verdeeld per subgroep: dwerg elliptische stelsels; gewone elliptische stelsels; leniculaire stelsels; balkspiraalen, gewone spiralen en tot slot onregelmatige sterrenstelsels. In elke subgroep staan de stelsels oplopend volgens oppervlakte helderheid.
- Objecten die gelijk zijn wat betreft het gekende criterium werden vervolgens oplopend gesorteerd volgens alfabetische volgorde van het gebruikte catalogusnummer.

De afbeeldingen zijn gekozen zodat ze het beeld in telescopen met een objectief diameter van 20cm - 40cm het best betanderen. De schaal voor de afbeeldingen is verschillend. Deze keuze werd gemaakt opdat zoveel mogelijk van het object in het beeld past. Vier objecten zijn te groot om in het beeldveld van een telescoop te passen: M44, M45, M31 en M33. Voor deze zijn binoculairs aangegeven om het object in zijn geheel waar te nemen.



Sir William Herschel

Guido Gubbels, december 2016



Object* BEELD



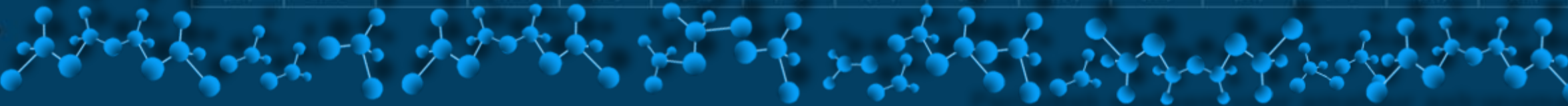
Kaart Sky ATLAS 2000⁺

*M = Messier N = NGC
 (7) = object staat niet vermeld op de kaart

De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20' boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.

Aantal objecten per categorie: 3 dubbelsterren; 10 heldere nevels; 3 asterisms (opgenomen bij open sterrenhopen); 37 open sterrenhopen; 6 planetaire nevels; 1 supernova restant; 30 bolvormige sterrenhopen en 30 sterrenstelsels (2 dwerg elliptisch, 3 elliptisch, 4 leniculaire, 3 balkspiraalen, 15 gewone spiralen en 2 onregelmatige sterrenstelsels).

- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/supernova rest
- Bolvormige sterrenhoop



Verdeling volgens oppervlaktehelderheid



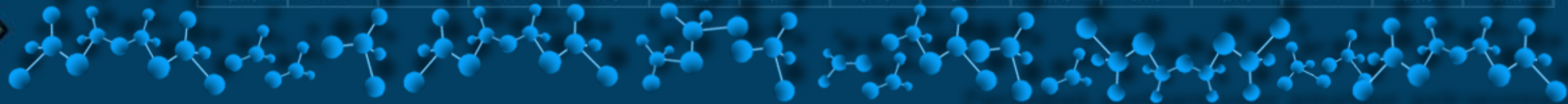
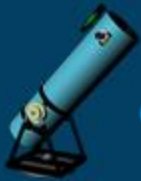
Doelstelling

- ☹️ Objecten DEC < -20° weg
- ☹️ Evenwichtige verdeling seizoenen
- Belgische omstandigheden
- Piek waarneemtijd jongeren

- 😊 Niet traditionele deepsky
- Dubbelsterren, variabelen
- 😊 Sterrenstelsel niet langer dominant
- 😊 Morfologie passend in tabel

- 😊 Moeilijke objecten mogen maar moeten uitzonderingen zijn
- 5 a 6 objecten

| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



Binoculair objecten

13 maart 2016 21u 58m UT
M 44 (Praesepe), open sterrenhoop Cancer

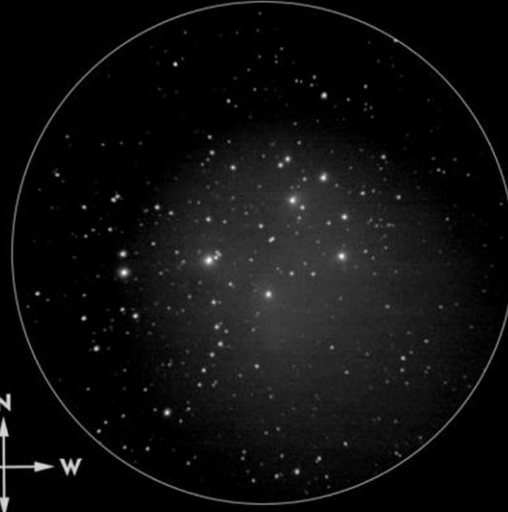


Canon EOS 500D, 300 mm tele
f/5.6, 1600 ASA, 22s (80)



© Guido Gubbels

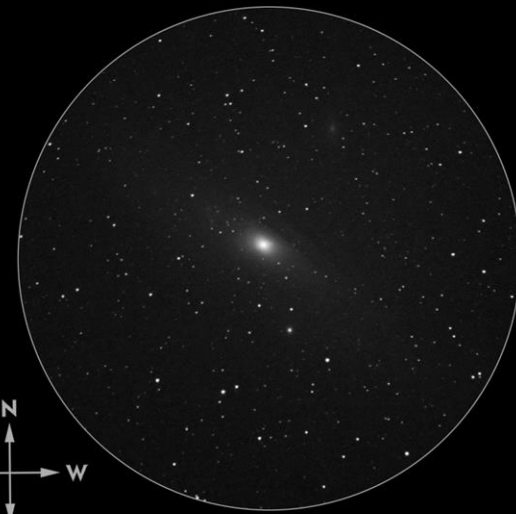
13 maart 2016 20u 41m UT
M 45 (Plejaden), open sterrenhoop Taurus



Canon EOS 500D, 300 m telelens
f/5.6, 1600 ASA, 84s (300)

© Guido Gubbels

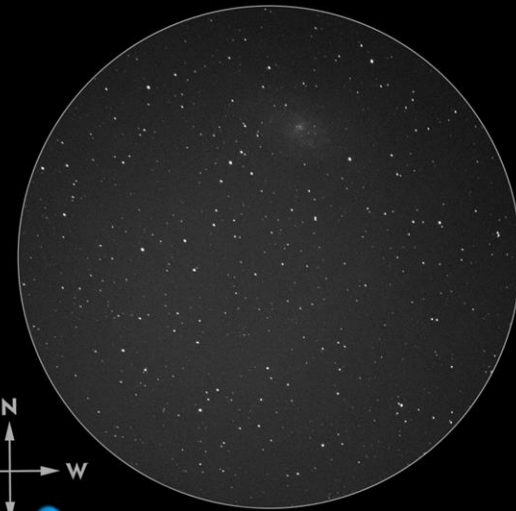
4 september 2013 22u 37m UT
M 31, sterrenstelsel Andromeda



Canon EOS 500D, 300 mm f/5
6x 800 ASA, 30s

© Guido Gubbels

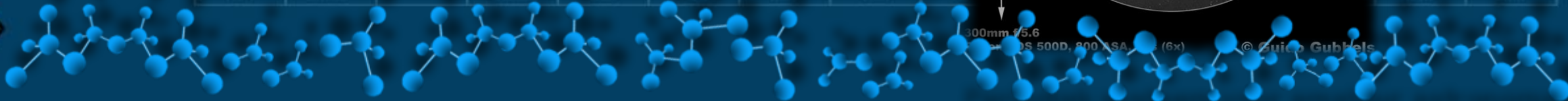
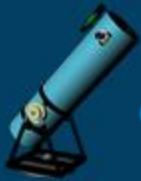
28 oktober 2013 18u 51m UT
M 33, sterrenstelsel Triangulum




Canon EOS 500D, 300 mm f/5.6
6x 800 ASA, 30s (6x)

© Guido Gubbels

| | | | | | | | | | | | |
|-----------------------|---------------------|--------------------------|----------------------|------------------------|----------------------|------------------------|--------------------|---------------------|----------------------|-----------------------|----------------------|
| 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| Ac | Th | Pa | U | Np | Pu | Am | Cm | Bk | Cf | Es | Fm |
| Actinium (227) | Thorium (232.04) | Protactinium (231.04) | Uranium (238.03) | Nephtunium (237) | Plutonium (244) | Americium (243) | Curium (247) | Berkelium (247) | Californium (251) | Einsteinium (252) | Fermium (257) |
| 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 |
| Nd | Pm | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Neodymium (144.24) | Promethium (145) | Samarium (150.36) | Europium (151.96) | Gadolinium (157.25) | Terbium (158.93) | Dysprosium (162.50) | Hoium (164.93) | Erbium (167.26) | Thulium (168.93) | Ytterbium (173.05) | Lutetium (174.97) |
| 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 |
| No | Lr | Rf | Hf | Ta | W | Re | Os | Ir | Pt | Au | Hg |
| Nobelium (259) | Lawrencium (262) | Rutherfordium (261) | Hafnium (178.49) | Tantalum (180.95) | Tungsten (183.85) | Rhenium (186.21) | Osmium (190.23) | Iridium (192.22) | Platinum (195.08) | Gold (196.97) | Mercury (200.59) |



| | | | | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------------|---|--------------------------------|-------------------------------------|--------------------------------|----------------------------------|---------------------------------|--|-------------------------------|-----------------------------|----------------------------|------------------------------|--------------------------------|--------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------|
| IA | | | | | | | | | | | | | | | | VIII A | | |
| 1 H Hydrogen 1.01 | IIA | | | | | | | | | | III A | IV A | V A | VI A | VII A | 2 He Helium 4.00 | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |  | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | III B | IV B | V B | VI B | VII B | VIII B | VIII B | VIII B | VIII B | I B | II B | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 |
| 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | 22 Ti Titanium 47.87 | 1 H 69 E 52 T | | | 26 Fe Iron 55.85 | 27 Co Cobalt 58.93 | 15 P 16 S 13 A | | | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.63 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirconium 91.22 | Nb Niobium 92.91 | Mo Molybdenum 95.95 | Tc Technetium (98) | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.91 | Pd Palladium 106.42 | Ag Silver 107.87 | Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Lanthanides | | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Tungsten 183.84 | 75 Re Rhenium 186.21 | 15 P 13 A 19 K 19 K 69 E 52 T | | | | 82 Pb Lead 207.20 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actinides | | 104 Rf Rutherfordium (261) | 105 Db Dubnium (268) | 106 Sg Seaborgium (271) | 107 Bh Bohrium (270) | Hs Hassium (277) | Mt Meitnerium (276) | Ds Darmstadtium (281) | Rg Roentgenium (290) | Cn Copernicium (285) | Nh Nihonium (284) | 114 Fl Flerovium 289 | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) |

| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |

| | | | | | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------|-------------------------------|-------------------------------------|--------------------------------|----------------------------------|-------------------------------|---------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|-------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------|-------|---------------------------|
| IA | | | | | | | | | | | | | | | | | | VIIIA | |
| 1 H Hydrogen 1.01 | | | | | | | | | | | | | | | | | | | 2 He Helium 4.00 |
| | IIA | | | | | | | | | | | IIIA | IVA | VA | VIA | VIIA | | | |
| 3 Li Lithium 6.94 | Be Beryllium 9.01 | | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | | |
| 11 Na Sodium 22.99 | Mg Magnesium 24.31 | | | | | | | | | | | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | | |
| 19 K Potassium 39.10 | Ca Calcium 40.08 | IIIB | IVB | VB | VIB | VIIB | VIIIB | VIIIB | VIIIB | IB | IIB | | | | | | | | |
| 23 Sc Scandium 44.96 | Ti Titanium 47.87 | 24 Cr Chromium 52.00 | 25 Mn Manganese 54.94 | 26 Fe Iron 55.85 | 27 Co Cobalt 58.93 | 28 Ni Nickel 58.69 | 29 Cu Copper 63.55 | 30 Zn Zinc 65.38 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.63 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | | | | | |
| 37 Rb Rubidium 85.47 | Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirconium 91.22 | 41 Nb Niobium 92.91 | 42 Mo Molybdenum 95.95 | 43 Tc Technetium 98 | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.87 | 48 Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | | |
| 55 Cs Cesium 132.91 | Ba Barium 137.33 | 57 - 71 Lanthanides | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Tungsten 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.97 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.38 | 82 Pb Lead 207.20 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | | |
| 87 Fr Francium (223) | Ra Radium (226) | 89 - 103 Actinides | 104 Rf Rutherfordium (261) | 105 Db Dubnium (268) | 106 Sg Seaborgium (271) | 107 Bh Bohrium (270) | 108 Hs Hassium (277) | 109 Mt Meitnerium (276) | 110 Ds Darmstadtium (281) | 111 Rg Roentgenium (290) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium 289 | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) | | |

Handleiding

Pdf formaat met links binnen document

Sjabloon

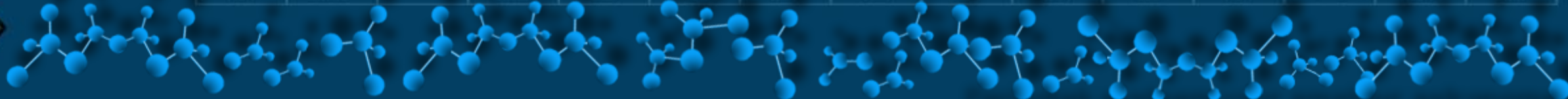
png formaat met transparante achtergrond

Photoshop bestand met lagen

Te verkrijgen via:

VVS Werkgroep deepsky

| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



Een periodiek systeem voor amateurastronomen

| | | | | | | |
|----------|-----------------|----------|----------|----------|----------|-----------|
| | 1 H 1.008 | | | 9 F | 10 Ne | |
| | | 6 C | 7 N | | | |
| | | 13 Al | 15 P | 16 S | 17 Cl | 18 Ar |
| 29 Cu | 31 Ga | 32 Ge | 33 As | 34 Se | 35 Br | |
| 47 Ag | 48 Cd | 49 In | 51 Sb | 53 I | 54 Xe | |
| | | | | | | 118 Og |

Handleiding

versie 2018_01



KRIEGER

OBSERVATORIUM

Guido Gubbels, jan 2018

9 De objecten

| | |
|-------------------------------|--------------------------------|
| 1 H Hydrogen 1.01 | 2 He Helium 4.00 |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |
| 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 |
| 19 K Kalium 39.10 | 20 Ca Calcium 40.08 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 |
| 87 Fr Francium (223) | 88 Ra Radium (226) |

1
H
1.008

C
12
12.011

O
16
16.000

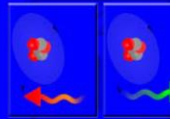
2
He
4.003

| | | | | | | | | | | | | | | | | | | | |
|-------|-------|--------|--------|-------|--------|---------|-------|--------|-------|-------|-------|------|-------|-------|-------|-------|-----|-------|-------|
| βCyg | | | | | | | | | | | | | | | N6210 | | | | |
| εLyr | δCep | | | | | | | | | | | | | M32 | M110 | M105 | M87 | N1023 | M57 |
| N2261 | N7023 | | | | | | | | | | | | | M102 | M84 | N5115 | M86 | M95 | N2392 |
| M78 | M16 | Picot1 | STAR25 | M39 | STAR27 | Stock23 | N2169 | N1662 | M36 | M34 | N1545 | M58 | N2903 | M104 | M65 | M66 | M76 | | |
| M17 | M43 | N6910 | N2129 | N2301 | N7686 | M50 | M41 | M29 | N2360 | N1342 | M45 | M108 | M96 | M81 | M64 | M77 | M27 | | |
| M20 | M8 | N6709 | M47 | N7380 | N6633 | M38 | M48 | M103 | M52 | M46 | N1647 | M63 | M51 | N2683 | M31 | M98 | M97 | | |
| N2024 | M42 | N6802 | N457 | N884 | N869 | M44 | M35 | IC4756 | M67 | M11 | M37 | M106 | N891 | M33 | M82 | N4449 | M1 | | |
| | | M22 | M71 | M10 | M12 | N5053 | M107 | N6535 | N6712 | N6760 | M5 | M13 | M30 | M92 | N6440 | N6342 | | | |
| | | M80 | M56 | M15 | M3 | N6517 | M2 | N5897 | N6356 | N5466 | N6934 | M53 | N5634 | N6229 | N7006 | N2419 | | | |

- Dubbelsterren
- Nevels
- Open sterrenhopen
- Sterrenstelsels
- Planetaire nevels
- Galactische clustere

Deze tabel geeft aan waar de individuele objecten zich bevinden in de uiteindelijke tabel. De kleuren duiden op het soort objecten.

1
H
1.008



4.003

Pagina
16

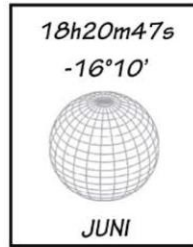
| | | | | |
|-----------------------------------|---------------------------------|-----------------------------------|-------------------------------------|----------------------------------|
| 6 C Carbon 12.011 | 7 N Stikstof 14.007 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 |
| 14 Si Silicium 28.086 | 15 P Fosfor 30.974 | 16 S Sulfur 32.06 | 17 Cl Chloor 35.45 | 18 Ar Argon 39.95 |
| 32 Ge Germanium 72.64 | 33 As Arsen 74.922 | 34 Se Selonium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 |
| 50 Sn Tin 118.710 | 51 Sb Antimon 121.757 | 52 Te Telluur 127.60 | 53 I Jodium 126.90 | 54 Xe Xenon 131.29 |
| 82 Pb Lood 207.2 | 83 Bi Bismut 208.980 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) |
| 114 Fl Flerovium (287) | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) |
| 71 Lu Lutetium 174.967 | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.948 | 74 W Wolfram 183.84 | 75 Re Rhenium 186.207 |
| 89 Tm Thulium 168.93 | 90 Yb Ytterbium 173.05 | 91 Lu Lutetium 174.967 | 92 U Uranium 238.029 | 93 Np Neptunium 237.048 |
| 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) | 104 Rf Rutherfordium (261) | 105 Db Dubnium (262) |

| | |
|-------------------------------|--------------------------------|
| IA | |
| 1 H Hydrogen 1.01 | IIA |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |
| 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 |
| 19 K Kalium 39.10 | 20 Ca Calcium 40.08 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 |
| 87 Fr Francium (223) | 88 Ra Radium (226) |

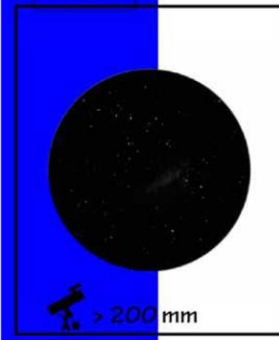
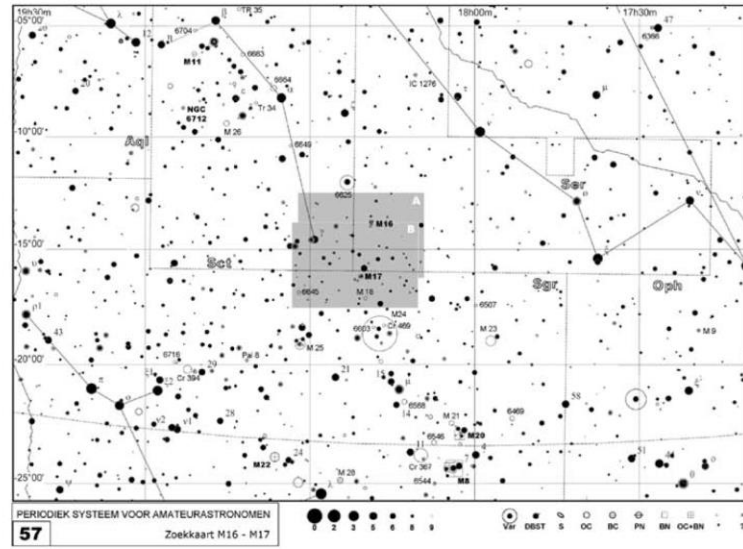
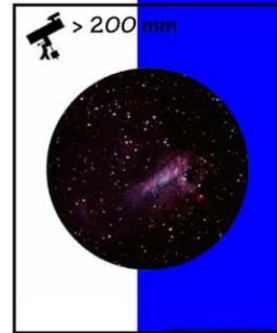
| | | | |
|--|-----------------------------------|----------------------------------|----------------------------------|
| | VIA | VIIA | VIIIA |
| | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 |
| | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 |
| | 34 Se Selonium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 |
| | 52 Te Tellurium 127.60 | 53 I Jodium 126.90 | 54 Xe Xenon 131.29 |
| | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) |
| | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) |
| | 89 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |

M 17
NGC 6618

Zwaannevel



Di + OC
Klas = III 3 m n:
m = 6,0
SB = 20,83
11' x 11'



H
1.008

O
16.00

Si
28.09

He
4.003

Pagina
8

H
1.008

KRIEGER
OBSERVATORIUM

4.003

Pagina
18

Overzicht van een fiche. Voor uitleg zie de tekst.

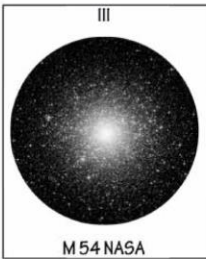
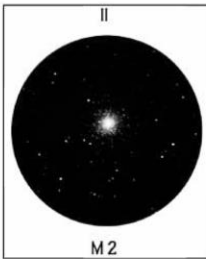
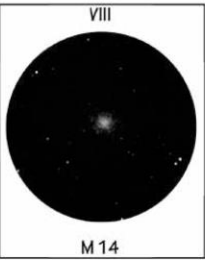
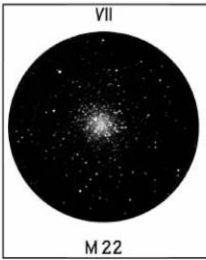
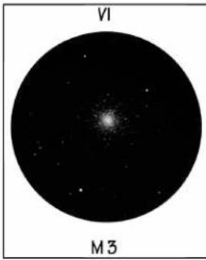
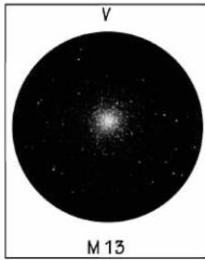
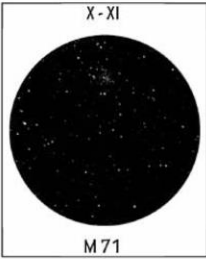
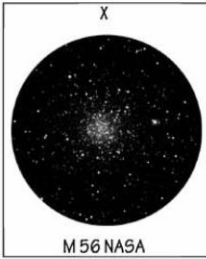
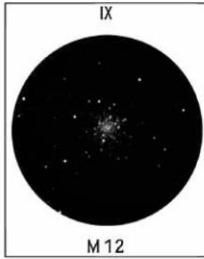
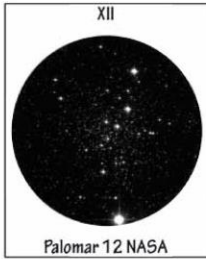
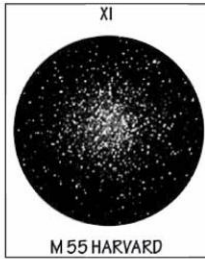
| | |
|----------------------------------|-------------------------------------|
| IA 1 H Hydrogen 1.01 | IIA 4 Be Beryllium 9.01 |
| 3 Li Lithium 6.94 | 6 C Carbon 12.01 |
| 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 |
| 19 K Kalium 39.10 | 20 Ca Calcium 40.08 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 |
| 87 Fr Francium (223) | 88 Ra Radium (226) |

1
H
1.008

6
C
12.011

16
O
15.999

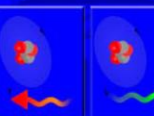
2
He
4.003



Classificatie van bolvormige sterrenhopen volgens Harlow Shapley en Helen B. Sawyer Hogg. Boven elke cluster staat de klasse. Onder de objecten staat om welk object het gaat. Aanduidingen achter het objectnummer geven aan dat het om geen eigen opname gaat.

| | | |
|-----------------------------------|-------------------------------------|------------------------------------|
| VIA 8 O Oxygen 16.00 | VIIA 9 F Fluorine 19.00 | VIIIA 2 He Helium 4.00 |
| 16 S Sulfur 32.06 | 17 Cl Chloorne 35.45 | 18 Ar Argon 39.95 |
| 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 |
| 52 Te Tellurium 127.60 | 53 I Jodine 126.90 | 54 Xe Xenon 131.29 |
| 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) |
| 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) |

1
H
1.008



4.003

Pagina
83

| | | |
|-----------------------------------|---------------------------------|----------------------------------|
| 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |

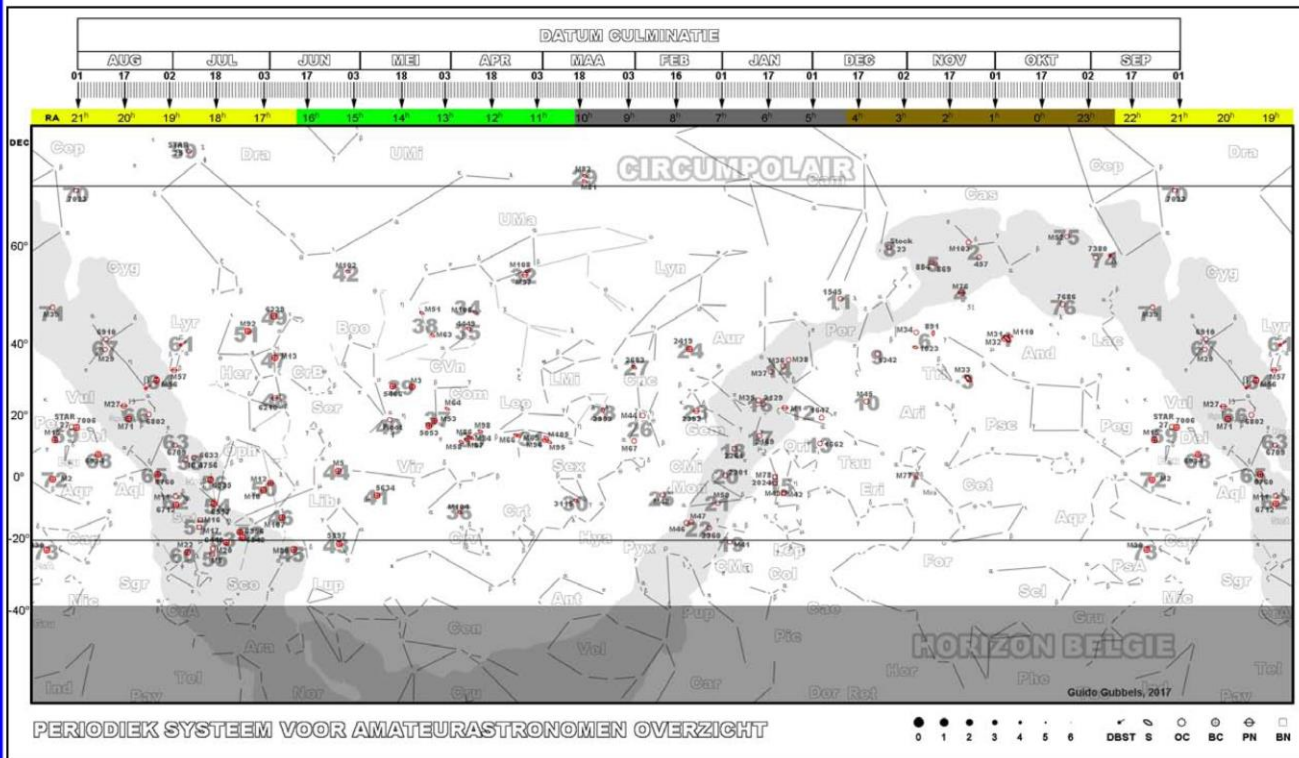
| | | |
|-------------------------------|--|--------------------------------|
| IA | | IIA |
| 1 H Hydrogen 1.01 | | |
| 3 Li Lithium 6.94 | | 4 Be Beryllium 9.01 |
| 11 Na Natrium 22.99 | | 12 Mg Magnesium 24.31 |
| 19 K Kalium 39.10 | | 20 Ca Calcium 40.08 |
| 37 Rb Rubidium 85.47 | | 38 Sr Strontium 87.62 |
| 55 Cs Cesium 132.91 | | 56 Ba Barium 137.33 |
| 87 Fr Francium (223) | | 88 Ra Radium (226) |

1
H
1.008

C O

S

2
He
4.003



1
H
1.008

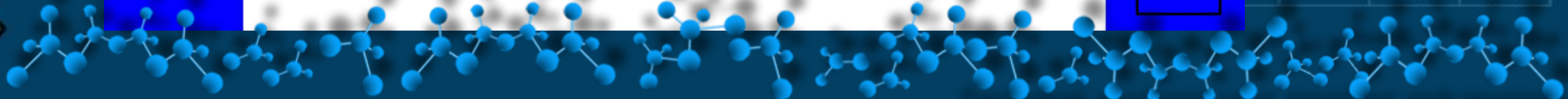
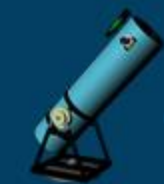
4
He
4.003

KRIEGER
OBSERVATORIUM

4
He
4.003

Pagina
189

| | | | |
|--|-----------------------------------|----------------------------------|----------------------------------|
| | VIA | VIIA | VIIIA |
| | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 |
| | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 |
| | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 |
| | 52 Te Tellurium 127.60 | 53 I Jodium 126.90 | 54 Xe Xenon 131.29 |
| | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) |
| | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) |
| | 89 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



| | |
|----------------------------------|-------------------------------------|
| IA 1 H Hydrogen 1.01 | IIA 4 Be Beryllium 9.01 |
| 3 Li Lithium 6.94 | 12 Mg Magnesium 24.31 |
| 11 Na Natrium 22.99 | 20 Ca Calcium 40.08 |
| 19 K Kalium 39.10 | 38 Sr Strontium 87.62 |
| 37 Rb Rubidium 85.47 | 56 Ba Barium 137.33 |
| 55 Cs Cesium 132.91 | 88 Ra Radium (226) |

1
H
1.008

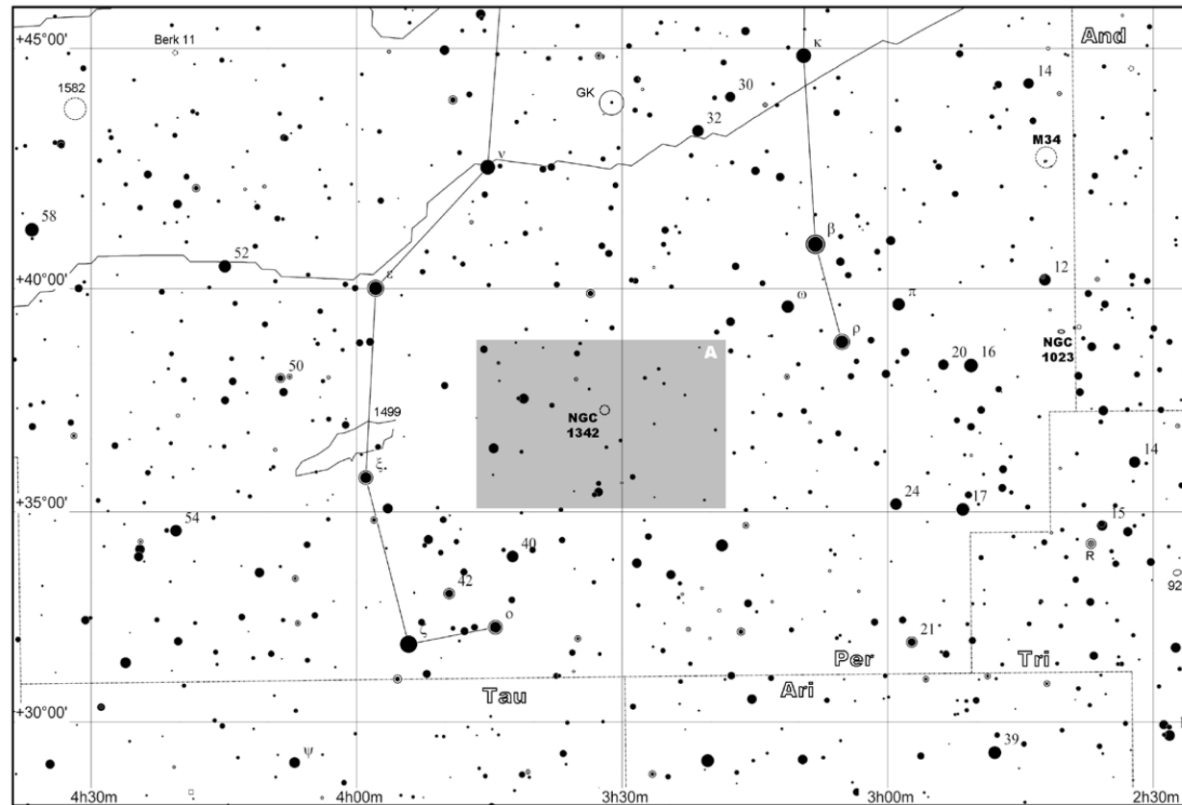
C
12.011

O
15.999

2
He
4.003

Zoekkaart

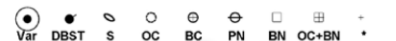
NGC 1342



PERIODIEK SYSTEEM VOOR AMATEURASTRONOMEN

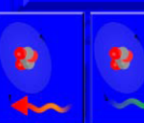
9

Zoekkaart NGC1342



| | | | |
|--|-----------------------------------|-------------------------------------|------------------------------------|
| | VIA 8 O Oxygen 16.00 | VIIA 9 F Fluorine 19.00 | VIIIA 2 He Helium 4.00 |
| | 16 S Sulfur 32.06 | 17 Cl Chloorne 35.45 | 10 Ne Neon 20.18 |
| | 34 Se Selonium 78.97 | 35 Br Bromine 79.90 | 18 Ar Argon 39.95 |
| | 52 Te Tellurium 127.60 | 53 I Jodium 126.90 | 36 Kr Krypton 83.80 |
| | 84 Po Polonium (209) | 85 At Astatine (210) | 54 Xe Xenon 131.29 |
| | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 86 Rn Radon (222) |
| | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 118 Og Oganesson (294) |
| | 89 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 88 Lu Lutetium 174.97 |
| | 103 Lr Lawrencium (262) | | |

1
H
1.008



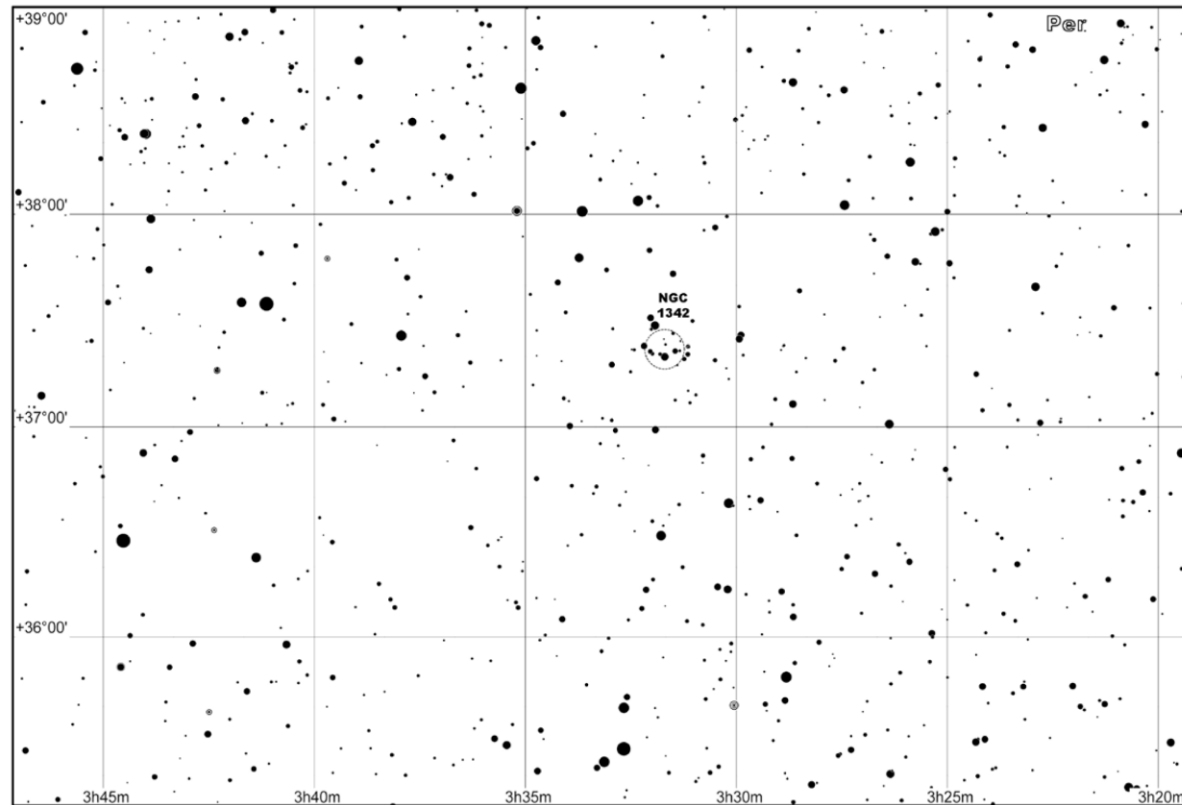
4.003

Pagina
209

| | | |
|----|-------------------------------|--------------------------------|
| IA | 1 H Hydrogen 1.01 | IIA |
| | 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |
| | 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 |
| | 19 K Kalium 39.10 | 20 Ca Calcium 40.08 |
| | 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 |
| | 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 |
| | 87 Fr Francium (223) | 88 Ra Radium (226) |

Detailkaart

NGC 1342



PERIODIEK SYSTEEM VOOR AMATEURASTRONOMEN

9A

Detailkaart NGC1342



| | | | | |
|--|-----------------------------------|----------------------------------|----------------------------------|-------|
| | | VIA | VIIA | VIIIA |
| | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | |
| | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | |
| | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | |
| | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | |
| | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | |
| | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) | |
| | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 | |
| | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) | |

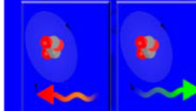
1
H
1.008

C
12.011

O
15.999

2
He
4.003

1
H
1.008



4.003

Pagina
210

13 Objecten in de tabel plaatsen

In een apart bestand is een grafisch formulier opgenomen dat eventueel kan gebruikt worden om de eigen beelden in op te nemen.

Het bestand 'PeriodiekAmateurastronoom' komt in twee formaten:

- * Een Photoshop bestand (psd) met drie lagen. De toplaag geeft de aanduidingen per vak, de tweede laag bevat de tabel met openingen en de onderste laag is een blanco laag. Door tekeningen of foto's boven die laatste laag op de juiste plaats te zetten kan een eigen periodiek systeem opgebouwd worden.
- * Het tweede bestand is een portable graphics network (png) bestand. Dit formaat heeft verschillende voordelen. Ten eerste kan je zo een hoge resolutie behouden terwijl het bestandsformaat klein blijft. Daarnaast bevat het een alpha-kanaal. Dit wil zeggen dat de lege kaders transparant zijn. Dit kan dan weer gebruikt worden als een toplaag in een grafisch of 'desktop publishing' programma. De eigen beelden kunnen daaronder geplaatst worden.

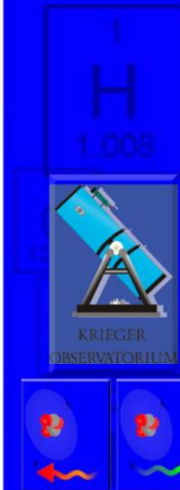
In elk van de vakken staat wat informatie over het object:

- * De benaming
- * Het sterrenbeeld
- * De oppervlaktehelderheid in vierkante boogseconden
- * Het kaartnummer van de Sky Atlas 2000 waar het object terug te vinden is. Opgelet, niet alle objecten staan op deze kaarten. In dat geval staat het kaartnummer tussen haakjes. De letter 'M' voor het objectnummer slaat op Messier en de letter 'N' op NGC.



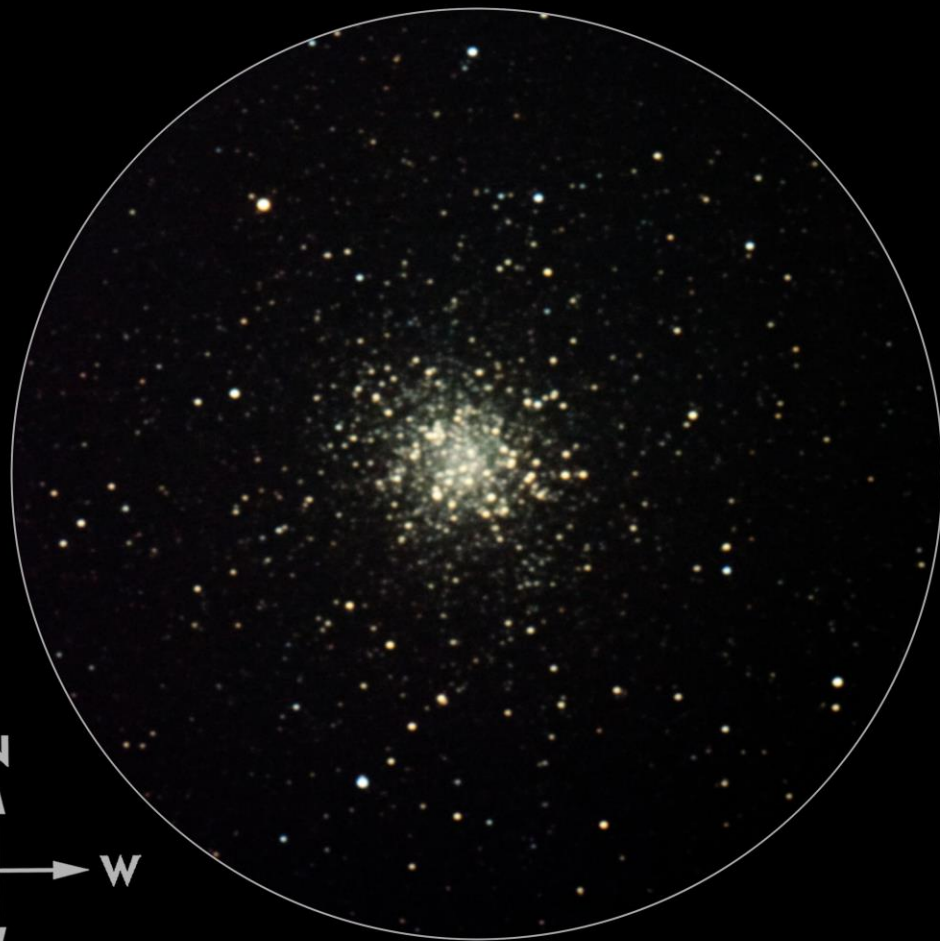
Betekenis van de aanduidingen in elk vak. De kleur van de informatie slaat op het soort object.

Om de objecten gemakkelijker te plaatsen is op de volgende pagina een blanco tabel opgenomen met enkel de aanduiding van de objecten erin.

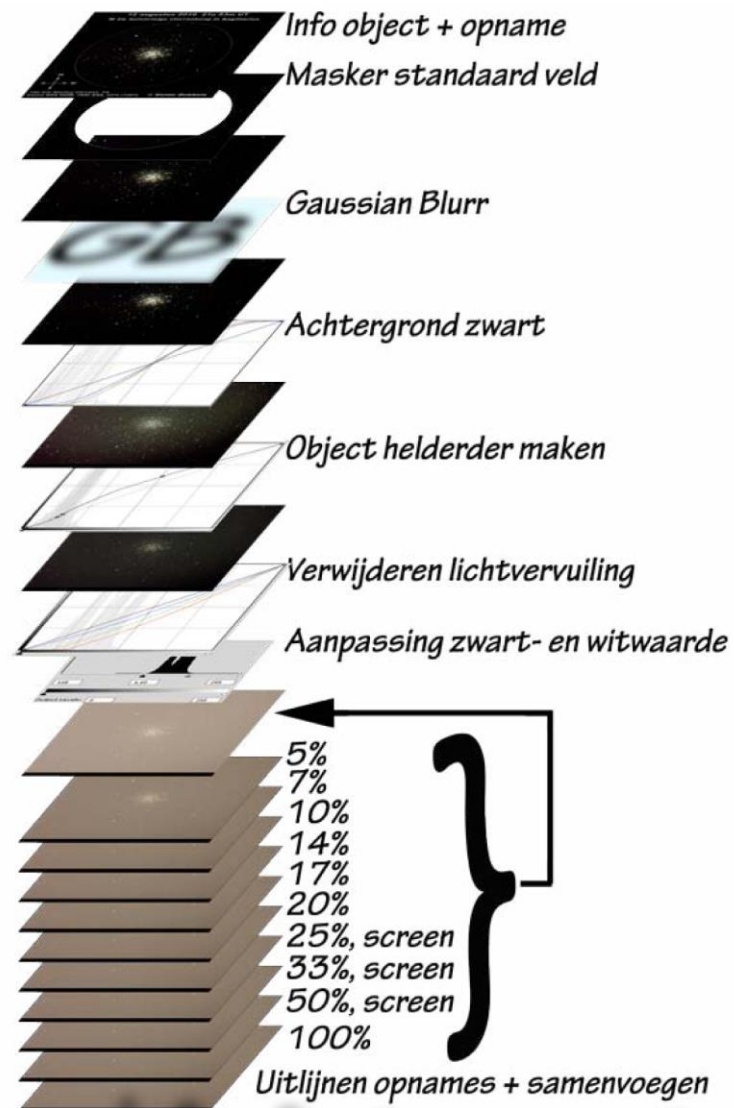


Pagina
367

12 augustus 2016 21u 53m UT
M 22, bolvormige sterrenhoop in Sagittarius

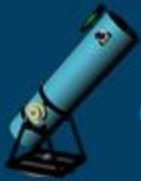


150 mm Ritchey-Chretien f/9
Canon EOS 500D, 1600 ASA, 337s (1201) © Guido Gubbels



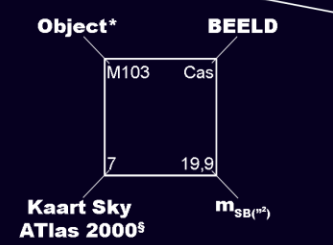
| |
|--------------------|
| IA |
| 1 H |
| Hydrogen 1.01 |
| 3 Li |
| Lithium 6.94 |
| 11 Na |
| Natrium 22.99 |
| 19 K |
| Potassium 39.10 |
| 37 Rb |
| Rubidium 85.47 |
| 55 Cs |
| Cesium 132.91 |
| 87 Fr |
| Francium (223) |

| | |
|---------------------|---------------------|
| VIIA | 2 He |
| | Helium 4.00 |
| VIIA | 10 Ne |
| | Neon 20.18 |
| 9 F | 18 Ar |
| Fluorine 19.00 | Argon 39.95 |
| 17 Cl | 36 Kr |
| Chlorine 35.45 | Krypton 83.80 |
| 35 Br | 54 Xe |
| Bromine 79.90 | Xenon 131.29 |
| 53 I | 86 Rn |
| Iodine 126.90 | Radon (222) |
| 85 At | 118 Og |
| Astatine (210) | Oganesson (294) |
| 117 Ts | |
| Tennessine (294) | |
| 70 Yb | 71 Lu |
| Ytterbium 173.05 | Lutetium 174.97 |
| 102 No | 103 Lr |
| Nobelium (259) | Lawrencium (262) |



Periodiek systeem voor amateurastronomen

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------------|----------------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|----------------------------------|------------------------------|---------------------------|------------------------------|--------------------------------|--------------------------------|-------------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|------------------------------|----------------------------|------------------------------|-----------------------------|----------------------------|---------------------------------|---------------------------|------------------------------|--------------------------------|--------------------------------|-------------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|--------------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|---------------------------|------------------------------|--------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|-------------------------------|--------------------------------|-----------------------------|--------------------------------|------------------------------|--------------------------------|--------------------------------|---------------------------------|-------------------------------|---------------------------------|------------------------------|-------------------------------|------------------------------|---------------------------|--------------------------------|----------------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|-----------------------------------|------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|-------------------------------|----------------------------------|-------------------------------|------------------------------|-------------------------------|---------------------------------|--------------------------------|-------------------------------|--------------------------------|------------------------------|-------------------------------|------------------------------|-------------------------------|---------------------------------|----------------------------|---------------------------------|-------------------------------|----------------------------|------------------------------|-------------------------------|-------------------------------|----------------------------|-------------------------------|-----------------------------|--------------------------------|------------------------------|-----------------------------------|-----------------------------|--------------------------------|---------------------------------|--------------------------------|-----------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|--------------------------------|----------------------------------|-------------------------------------|-------------------------------|----------------------------------|-------------------------------|-------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|---------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------|
| IA 1 H Hydrogen 1.01 | IA 3 Li Lithium 6.94 | 11 Na Natrium 22.99 | 19 K Kalium 39.10 | 37 Rb Rubidium 85.47 | 55 Cs Cesium 132.91 | 87 Fr Francium (223) | 8 Be Beryllium 9.01 | 9 B Boron 10.81 | 10 C Koolstof 12.01 | 12 Mg Magnesium 24.31 | 13 Al Aluminium 26.98 | 14 Si Silicium 28.09 | 15 P Fosfor 30.97 | 16 S Zwavel 32.06 | 17 Cl Chloor 35.45 | 18 Ar Argon 39.95 | 2 He Helium 4.00 | 10 Ne Neon 20.18 | 18 Ar Argon 39.95 | 36 Kr Krypton 83.80 | 54 Xe Xenon 131.29 | 86 Rn Radon (222) | 118 Og Oganesson (294) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IA 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 17 Cl Chloor 35.45 | 35 Br Bromine 79.90 | 53 I Jodium 126.90 | 85 At Astatine (210) | 117 Ts Tennessine (294) | 8 N Stikstof 14.01 | 7 O Oxygen 16.00 | 6 C Koolstof 12.01 | 5 B Boron 10.81 | 4 Be Beryllium 9.01 | 3 Li Lithium 6.94 | 2 He Helium 4.00 | 1 H Hydrogen 1.01 | 1 H Hydrogen 1.01 | 2 He Helium 4.00 | 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | 5 B Boron 10.81 | 6 C Koolstof 12.01 | 7 N Stikstof 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 | 13 Al Aluminium 26.98 | 14 Si Silicium 28.09 | 15 P Fosfor 30.97 | 16 S Zwavel 32.06 | 17 Cl Chloor 35.45 | 18 Ar Argon 39.95 | 19 K Kalium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | 22 Ti Titanium 47.87 | 23 V Vanadium 50.94 | 24 Cr Chromium 51.99 | 25 Mn Manganees 54.94 | 26 Fe Ijzer 55.85 | 27 Co Cobalt 58.93 | 28 Ni Nikkel 58.69 | 29 Cu Koper 63.55 | 30 Zn Zink 65.38 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.64 | 33 As Arsenic 74.92 | 34 Se Seleneem 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirkonium 91.22 | 41 Nb Niobium 92.91 | 42 Mo Molybdeen 95.94 | 43 Tc Technetium (98) | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Zilver 107.87 | 48 Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimoon 121.76 | 52 Te Telluurium 127.60 | 53 I Jodium 126.90 | 54 Xe Xenon 131.29 | 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 La Lanthaniden 138.91 | 58 Ce Ceraam 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Wolfram 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinaam 195.08 | 79 Au Goud 196.97 | 80 Hg Mercurium 200.59 | 81 Tl Thalium 204.38 | 82 Pb Lood 207.20 | 83 Bi Bismut 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | 87 Fr Francium (223) | 88 Ra Radium (226) | 89 Ac Actiniden (227) | 90 Th Thorium (232) | 91 Pa Protactinium (231) | 92 U Uranium (238) | 93 Np Neptunium (237) | 94 Pu Plutoonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) | 104 Rf Rutherfordium (261) | 105 Db Dubnium (262) | 106 Sg Seaborgium (263) | 107 Bh Bohrium (264) | 108 Hs Hassium (265) | 109 Mt Meitnerium (266) | 110 Ds Darmstadtium (271) | 111 Rg Roentgenium (272) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium (289) | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) |

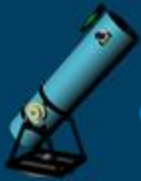


*M = Messier N = NGC
 §(7) = object staat niet vermeld op de kaart

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|------|-----|------|-----|------|-----|------|-----|------|------|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|
| M22 | Sgr | M71 | Sgr | M10 | Oph | M12 | Oph | M53 | Com | M107 | Oph | M55 | Ser | M72 | Ser | M78 | Aqr | M5 | Ser | M13 | Her | M30 | Cap | M92 | Her | M44 | Sgr | M34 | Oph |
| 22 | 20.6 | 16 | 21.1 | 15 | 21.1 | 15 | 21.1 | 17 | 23.4 | 15 | 21.5 | 15 | 18.8 | 16 | 20.3 | 15 | 19.8 | 15 | 20.4 | 23 | 21.6 | 8 | 20.3 | 22 | 19.3 | 22 | 20.6 | 16 | 20.6 |
| M80 | Ser | M56 | Lyr | M15 | Peg | M3 | Vir | M51 | Oph | M2 | Aqr | M59 | Lir | M66 | Oph | M46 | Bra | M34 | Vir | M63 | Vir | M62 | Her | M70 | Her | M24 | Lyr | M7 | Lyr |
| 22 | 20.7 | 8 | 21.2 | 17 | 20.3 | 17 | 20.8 | 15 | 19.2 | 17 | 22.0 | 15 | 19.8 | 17 | 22.8 | 16 | 22.6 | 17 | 21.7 | 14 | 21.8 | 8 | 21.2 | 16 | 21.7 | 5 | 21.7 | 5 | 23.3 |

De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.
 Aantal objecten per categorie: 3 dubbelsterren; 10 heldere nevels; 3 asterisms (opgenomen bij open sterrenhopen); 37 open sterrenhopen; 6 planetaire nevels; 1 supernova restant; 30 bolvormige sterrenhopen en 30 sterrenstelsels (2 dwerg elliptisch; 3 elliptisch; 1 lenticulaire; 3 balkspiraal; 15 gewone spiralen en 2 onregelmatige sterrenstelsels).

- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/ supernova rest
- Bolvormige sterrenhoop

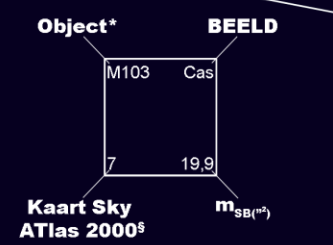


Periodiek systeem voor amateurastronomen



| Object* | BEELD | M | N | Other |
|---------|-------|---|------|-------|
| M103 | Cas | 7 | 19.9 | |

| Object* | BEELD | M | N | Other |
|---------|---------|---------|---------|---|
| M22 | Sgr M71 | Sgr M10 | Oph M12 | Oph N5053, Com M107, Oph N6535, Ser N6712, Ser N6760, Aql M5, Ser M13, Her M30, Cap M92, Her N6440, Sgr N6342, Oph |
| M80 | Ser M56 | Lyr M15 | Peg M3 | CVn N6517, Oph M2, Agr N5097, Lir N6366, Oph N3466, Bca N6934, Del M53, Gem N6634, Vir N6229, Her N7006, Del N2410, Lyr |



*M = Messier N = NGC
 §(7) = object staat niet vermeld op de kaart

De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.
 Aantal objecten per categorie: 3 dubbelsterren; 10 heldere nevels; 3 asterisms (opgenomen bij open sterrenhopen); 37 open sterrenhopen; 6 planetaire nevels; 1 supernova restant; 30 bolvormige sterrenhopen en 30 sterrenstelsels (2 dwerg elliptisch; 3 elliptisch; 1 lenticulaire; 3 balkspiraal; 15 gewone spiralen en 2 onregelmatige sterrenstelsels).

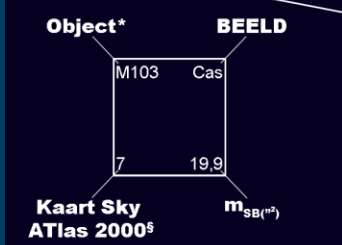
- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/ supernova rest
- Bolvormige sterrenhoop

Periodiek systeem voor amateurastronomen

Ikke nam waar met ene telescoop en zag...



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------------|----------------------------------|------------------------------------|----------------------------------|-------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|-------------------------------------|---------------------------------------|-------------------------------------|------------------------------------|----------------------------------|--|---------------------------------------|-------------------------------------|--------------------------------------|------------------------------------|--|---|------------------------------------|--------------------------------------|--------------------------------------|----------------------------------|--------------------------------------|--|--|-------------------------------------|------------------------------------|--------------------------------------|--|--------------------------------------|--|------------------------------------|------------------------------------|-------------------------------------|---------------------------------------|--------------------------------------|-------------------------------------|--|
| IA 1 H Hydrogen 1.01 | IA 3 Li Lithium 6.94 | IA 11 Na Natrium 22.99 | IA 19 K Kalium 39.10 | IA 37 Rb Rubidium 85.47 | IA 55 Cs Cesium 132.91 | IA 87 Fr Francium (223) | IIA 4 Be Beryllium 9.01 | IIA 12 Mg Magnesium 24.31 | IIA 20 Ca Calcium 40.08 | IIA 38 Sr Strontium 87.62 | IIA 56 Ba Barium 137.33 | IIA 88 Ra Radium (226) | IIIB 5 B Boron 10.81 | IIIB 13 Al Aluminium 26.98 | IIIB 21 Sc Scandium 44.96 | IIIB 29 Cu Copper 63.55 | IIIB 47 Ag Zilver 107.87 | IIIB 79 Au Goud 196.97 | IIIB 119 Tl Thalium 204.38 | IIIB 157 Lu Lutetium 174.97 | VIA 6 C Koolstof 12.01 | VIA 14 Si Silicium 28.09 | VIA 22 Ti Titanium 47.87 | VIA 30 Zn Zink 65.38 | VIA 48 Cd Cadmium 112.41 | VIA 80 Hg Mercurius 200.59 | VIA 120 Cn Copernicium (285) | VIIA 7 N Stikstof 14.01 | VIIA 15 P Fosfor 30.97 | VIIA 33 As Arsenic 74.92 | VIIA 51 Sb Antimoon 121.76 | VIIA 83 Bi Bismut 208.98 | VIIA 115 Nh Nihonium (284) | VIIIA 2 He Helium 4.00 | VIIIA 10 Ne Neon 20.18 | VIIIA 18 Ar Argon 39.95 | VIIIA 36 Kr Krypton 83.80 | VIIIA 54 Xe Xenon 131.29 | VIIIA 86 Rn Radon (222) | VIIIA 118 Og Oganesson (294) |
|----------------------------------|----------------------------------|------------------------------------|----------------------------------|-------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|-------------------------------------|---------------------------------------|-------------------------------------|------------------------------------|----------------------------------|--|---------------------------------------|-------------------------------------|--------------------------------------|------------------------------------|--|---|------------------------------------|--------------------------------------|--------------------------------------|----------------------------------|--------------------------------------|--|--|-------------------------------------|------------------------------------|--------------------------------------|--|--------------------------------------|--|------------------------------------|------------------------------------|-------------------------------------|---------------------------------------|--------------------------------------|-------------------------------------|--|



*M = Messier N = NGC
§(7) = object staat niet vermeld op de kaart

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|--------------------------|-------------------------|-------------------------|----------------------------|--------------------------|---------------------------|---------------------------|---------------------------|------------------------|--------------------------|-------------------------|-------------------------|----------------------------|---------------------------|-------------------------|-------------------------|-------------------------|------------------------|----------------------------|------------------------|-------------------------|-------------------------|--------------------------|---------------------------|---------------------------|-------------------------|---------------------------|--------------------------|----------------------------|---------------------------|-------------------------|
| M22 22 22 | Sgr M71 20.6 20.78 | Sgr M10 21.1 21.2 | Oph M12 21.1 20.8 | Oph N5053 21.17 20.8 | Com M107 23.4 20.7 | Oph N6535 21.5 20.7 | Ser M6712 18.8 22.8 | Ser M6780 20.3 22.8 | Aqr M5 19.8 22.8 | Ser M13 20.48 22.8 | Her M30 20.5 22.8 | Cap M92 21.6 21.8 | Her M6440 20.32 21.2 | Sgr M6342 19.3 21.7 | Oph M80 20.6 20.6 | Ser M56 21.1 21.2 | Lyr M15 21.1 21.2 | Peg M3 20.9 20.9 | CVn M517 21.17 21.17 | Oph M2 23.4 23.4 | Vir M59 21.5 21.5 | Lir M65 18.8 22.8 | Lir M655 20.3 20.3 | Oph M5465 19.8 22.8 | Bla M634 20.48 22.8 | Del M53 20.5 22.8 | Com M634 20.32 21.2 | Vir M229 21.6 21.6 | Her M7006 20.32 21.2 | Del M2410 19.3 21.7 | Lyr M57 20.6 20.6 |
|-----------------|--------------------------|-------------------------|-------------------------|----------------------------|--------------------------|---------------------------|---------------------------|---------------------------|------------------------|--------------------------|-------------------------|-------------------------|----------------------------|---------------------------|-------------------------|-------------------------|-------------------------|------------------------|----------------------------|------------------------|-------------------------|-------------------------|--------------------------|---------------------------|---------------------------|-------------------------|---------------------------|--------------------------|----------------------------|---------------------------|-------------------------|

De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.
Aantal objecten per categorie: 3 dubbelsterren; 10 heldere nevels; 3 asterisms (opgenomen bij open sterrenhopen); 37 open sterrenhopen; 6 planetaire nevels; 1 supernova restant; 30 bolvormige sterrenhopen en 30 sterrenstelsels (2 dwerg elliptisch; 3 elliptisch; 1 lenticulaire; 3 balkspiraal; 15 gewone spiralen en 2 onregelmatige sterrenstelsels).

- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/ supernova rest
- Bolvormige sterrenhoop

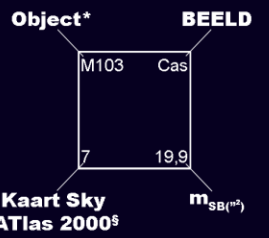
Periodiek systeem voor amateurastronomen

Ikke nam waar met ene telescoop en zag...



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------------|---------------------------|----------------------------|------------------------------|--------------------------|---------------------------|-----------------------------|---------------------------|-----------------------------|---------------------------|-----------------------------|--------------------------------|-------------------------------|------------------------------|--------------------------------|----------------------------|-------------------------------|----------------------------|-------------------------------|------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|--------------------------------|---------------------------|-----------------------------|-----------------------------|-----------------------------|---------------------------|------------------------------|--------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|-------------------------------|--------------------------------|-----------------------------|--------------------------------|------------------------------|---------------------------------|---------------------------------|---------------------------------|-------------------------------|---------------------------------|------------------------------|-------------------------------|------------------------------|---------------------------|--------------------------------|---------------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|-----------------------------------|------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|-------------------------------|----------------------------------|-------------------------------|------------------------------|-------------------------------|---------------------------------|--------------------------------|-------------------------------|--------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|--------------------------------|----------------------------|-------------------------------|--------------------------------|----------------------------|-------------------------------|-------------------------------|-------------------------------|----------------------------|-------------------------------|-----------------------------|--------------------------------|------------------------------|-----------------------------------|-----------------------------|--------------------------------|--------------------------------|--------------------------------|-----------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|--------------------------------|----------------------------------|-------------------------------------|-------------------------------|----------------------------------|-------------------------------|-------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|---------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------|
| IA 1 H Hydrogen 1.01 | 2 He Helium 4.00 | 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | 22 Ti Titanium 47.87 | 23 V Vanadium 50.94 | 24 Cr Chromium 51.99 | 25 Mn Manganese 54.94 | 26 Fe Iron 55.85 | 27 Co Cobalt 58.93 | 28 Ni Nickel 58.69 | 29 Cu Copper 63.55 | 30 Zn Zinc 65.38 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.64 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirconium 91.22 | 41 Nb Niobium 92.91 | 42 Mo Molybdenum 95.94 | 43 Tc Technetium 98.91 | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.87 | 48 Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 La Lanthanides 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Tungsten 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.97 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.38 | 82 Pb Lead 207.20 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | 87 Fr Francium (223) | 88 Ra Radium (226) | 89 Ac Actinides (227) | 90 Th Thorium (232) | 91 Pa Protactinium (231) | 92 U Uranium (238) | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) | 104 Rf Rutherfordium (261) | 105 Db Dubnium (262) | 106 Sg Seaborgium (263) | 107 Bh Bohrium (264) | 108 Hs Hassium (265) | 109 Mt Meitnerium (266) | 110 Ds Darmstadtium (271) | 111 Rg Roentgenium (272) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium (289) | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) |
|----------------------------------|---------------------------|----------------------------|------------------------------|--------------------------|---------------------------|-----------------------------|---------------------------|-----------------------------|---------------------------|-----------------------------|--------------------------------|-------------------------------|------------------------------|--------------------------------|----------------------------|-------------------------------|----------------------------|-------------------------------|------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|--------------------------------|---------------------------|-----------------------------|-----------------------------|-----------------------------|---------------------------|------------------------------|--------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|-------------------------------|--------------------------------|-----------------------------|--------------------------------|------------------------------|---------------------------------|---------------------------------|---------------------------------|-------------------------------|---------------------------------|------------------------------|-------------------------------|------------------------------|---------------------------|--------------------------------|---------------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|-----------------------------------|------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|-------------------------------|----------------------------------|-------------------------------|------------------------------|-------------------------------|---------------------------------|--------------------------------|-------------------------------|--------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|--------------------------------|----------------------------|-------------------------------|--------------------------------|----------------------------|-------------------------------|-------------------------------|-------------------------------|----------------------------|-------------------------------|-----------------------------|--------------------------------|------------------------------|-----------------------------------|-----------------------------|--------------------------------|--------------------------------|--------------------------------|-----------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|--------------------------------|----------------------------------|-------------------------------------|-------------------------------|----------------------------------|-------------------------------|-------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|---------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------|

M58



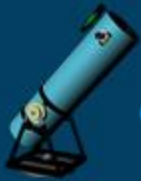
*M = Messier N = NGC
§(7) = object staat niet vermeld op de kaart

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|------|-----|------|-----|------|-----|------|-----|------|------|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|------|-----|
| M22 | Sgr | M71 | Sgr | M10 | Oph | M12 | Oph | M53 | Com | M107 | Oph | M55 | Sgr | M72 | Sgr | M78 | Aqr | M5 | Sgr | M13 | Her | M30 | Cap | M92 | Her | M44 | Sgr | M34 | Oph |
| 22 | 20.6 | 16 | 21.1 | 15 | 21.1 | 15 | 21.1 | 7 | 23.4 | 15 | 21.5 | 15 | 18.6 | 16 | 20.3 | 16 | 19.6 | 15 | 20.4 | 23 | 21.6 | 6 | 20.3 | 22 | 19.3 | 22 | 20.6 | 20.6 | |
| M80 | Sgr | M66 | Lyr | M15 | Peg | M3 | Cvn | M51 | Oph | M2 | Aqr | M59 | Lir | M65 | Oph | M46 | Bra | M34 | Del | M53 | Com | M63 | Vir | M29 | Her | M70 | Del | M24 | Lyr |
| 22 | 20.7 | 17 | 21.2 | 17 | 20.3 | 7 | 20.6 | 15 | 19.2 | 17 | 22.0 | 15 | 19.8 | 7 | 22.8 | 16 | 22.6 | 7 | 21.7 | 14 | 21.8 | 6 | 21.2 | 16 | 21.7 | 5 | 21.7 | 23.3 | |

De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.

Aantal objecten per categorie: 3 dubbelsterren; 10 heldere nevels; 3 asterisms (opgenomen bij open sterrenhopen); 37 open sterrenhopen; 6 planetaire nevels; 1 supernova restant; 30 bolvormige sterrenhopen en 30 sterrenstelsels (2 dwerg elliptisch; 3 elliptisch; 1 lenticulaire; 3 balkspiraal; 15 gewone spiralen en 2 onregelmatige sterrenstelsels).

- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/ supernova rest
- Bolvormige sterrenhoop

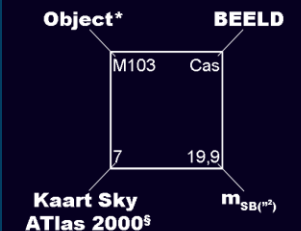


Periodiek systeem voor amateurastronomen

Ikke nam waar met ene telescoop en zag...



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------------|----------------------------------|------------------------------------|-------------------------------------|-------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|-------------------------------------|---------------------------------------|-------------------------------------|------------------------------------|----------------------------------|--|---------------------------------------|-------------------------------------|---------------------------------------|--------------------------------------|----------------------------------|-------------------------------------|--------------------------------------|----------------------------------|---------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|--|-------------------------------------|--|--------------------------------------|--------------------------------------|-------------------------------------|--|---|------------------------------------|-------------------------------------|--|---|---|--|--|--|--|--|--|--|
| IA 1 H Hydrogen 1.01 | IA 3 Li Lithium 6.94 | IA 11 Na Natrium 22.99 | IA 19 K Potassium 39.10 | IA 37 Rb Rubidium 85.47 | IA 55 Cs Cesium 132.91 | IA 87 Fr Francium (223) | IIA 4 Be Beryllium 9.01 | IIA 12 Mg Magnesium 24.31 | IIA 20 Ca Calcium 40.08 | IIA 38 Sr Strontium 87.62 | IIA 56 Ba Barium 137.33 | IIA 88 Ra Radium (226) | IIIB 5 B Boron 10.81 | IIIB 13 Al Aluminium 26.98 | IIIB 21 Sc Scandium 44.96 | IIIB 39 Y Yttrium 88.91 | IIIB 57-71 La-Lu Lanthanides | IIIB 89-103 Ac-Lr Actinides | VIA 6 C Carbon 12.01 | VIA 14 Si Silicon 28.09 | VIA 22 Ti Titanium 47.87 | VIA 30 Zn Zinc 65.38 | VIA 38 Sr Strontium 87.62 | VIA 46 Cd Cadmium 112.41 | VIA 54 Xe Xenon 131.29 | VIA 86 Rn Radon (222) | VIA 118 Og Oganesson (294) | VIIA 7 N Nitrogen 14.01 | VIIA 15 P Phosphorus 30.97 | VIIA 23 V Vanadium 50.94 | VIIA 31 Ga Gallium 69.72 | VIIA 39 Y Yttrium 88.91 | VIIA 47-49 Tm-Lu Terbium-Lutetium | VIIA 85-87 At-Lr Astatine-Lawrencium | VIIIA 8 O Oxygen 16.00 | VIIIA 16 S Sulfur 32.06 | VIIIA 24 Cr Chromium 51.99 | VIIIA 32 Ge Germanium 72.64 | VIIIA 40 Zr Zirconium 91.22 | VIIIA 48 Hf Hafnium 178.49 | VIIIA 56-58 Ce-Lu Cerium-Lutetium | VIIIA 84-86 Po-Lr Polonium-Lawrencium | VIIIA 112 Cn Copernicium (285) | VIIIA 114 Fl Flerovium (289) | VIIIA 116 Lv Livermorium (293) | VIIIA 118 Og Oganesson (294) |
|----------------------------------|----------------------------------|------------------------------------|-------------------------------------|-------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|-------------------------------------|---------------------------------------|-------------------------------------|------------------------------------|----------------------------------|--|---------------------------------------|-------------------------------------|---------------------------------------|--------------------------------------|----------------------------------|-------------------------------------|--------------------------------------|----------------------------------|---------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|--|-------------------------------------|--|--------------------------------------|--------------------------------------|-------------------------------------|--|---|------------------------------------|-------------------------------------|--|---|---|--|--|--|--|--|--|--|



*M = Messier N = NGC
§(7) = object staat niet vermeld op de kaart

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|------|-----|------|-----|------|-----|------|-----|------|------|------|-----|------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|------|
| M22 | Sgr | M71 | Sgr | M10 | Oph | M12 | Oph | M53 | Com | M107 | Oph | M55 | Ser | M72 | Ser | M78 | Aqr | M13 | Her | M30 | Cap | M92 | Her | M44 | Sgr | M34 | Oph |
| 22 | 20.6 | 16 | 21.1 | 15 | 21.1 | 15 | 21.1 | 17 | 23.4 | 15 | 21.5 | 15 | 18.8 | 16 | 20.3 | 16 | 19.5 | 20.5 | 23 | 21.6 | 8 | 20.3 | 22 | 19.3 | 22 | 20.6 | 20.6 |
| M80 | Ser | M66 | Lyr | M15 | Peg | M3 | Oph | M51 | Oph | M2 | Aqr | M59 | Lir | M65 | Oph | M46 | Bla | M34 | Del | M53 | Com | M64 | Vir | M29 | Her | M70 | Del |
| 22 | 20.7 | 8 | 21.2 | 17 | 20.3 | 17 | 20.6 | 15 | 19.2 | 17 | 22.0 | 15 | 18.7 | 16 | 22.8 | 16 | 22.6 | 17 | 21.7 | 14 | 21.8 | 6 | 21.2 | 16 | 21.7 | 5 | 23.3 |

De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.

Aantal objecten per categorie: 3 dubbelsterren; 10 heldere nevels; 3 asterisms (opgenomen bij open sterrenhopen); 37 open sterrenhopen; 6 planetaire nevels; 1 supernova restant; 30 bolvormige sterrenhopen en 30 sterrenstelsels (2 dwerg elliptisch; 3 elliptisch; 1 lenticulaire; 3 balkspiraal; 15 gewone spiralen en 2 onregelmatige sterrenstelsels).

- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/ supernova rest
- Bolvormige sterrenhoop

Periodiek systeem voor amateurastronomen

Ikke nam waar met ene telescoop en zag...



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|---------------------------------------|---------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|----------------------------------|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|-------------------------------------|---------------------------------------|--------------------------------------|-------------------------------------|--|-----------------------------------|------------------------------------|-------------------------------------|----------------------------------|----------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|--------------------------------------|------------------------------------|--------------------------------------|-----------------------------------|------------------------------------|-----------------------------------|--------------------------------|------------------------------------|------------------------------------|----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|------------------------------|-------------------------|----------------------------|----------------------------|-----------------------------|---------------------------|---------------------------|-----------------------------|--------------------------|-----------------------------|--------------------------|-------------------------|--------------------------|----------------------------|---------------------------|--------------------------|---------------------------|-------------------------|--------------------------|-------------------------|--------------------------|----------------------------|-----------------------|------------------------------|---------------------------|-----------------------|-------------------------|---------------------------|---------------------------|------------------------|---------------------------|-------------------------|----------------------------|--------------------------|-------------------------------|-------------------------|----------------------------|-----------------------------|----------------------------|-------------------------|----------------------------|------------------------------|------------------------------|---------------------------|-------------------------------|----------------------------|------------------------------|
| IA 1 H Hydrogen 1.01 | IIA 3 Li Lithium 6.94 | IIIB 11 Na Natrium 22.99 | IIA 8 Be Beryllium 9.01 | IIIA 9 B Boron 10.81 | IIIB 10 C Koolstof 12.01 | IIIV 12 N Stikstof 14.01 | IIIV 13 O Zwavel 16.00 | VIA 15 F Fluor 18.99 | VIA 16 Ne Neon 20.18 | VIIA 17 Cl Chloor 35.45 | VIIA 18 Ar Argon 39.95 | VIIIA 2 He Helium 4.00 | VIIIA 10 Ne Neon 20.18 | VIIIA 18 Ar Argon 39.95 | VIIIA 36 Kr Krypton 83.80 | VIIIA 54 Xe Xenon 131.29 | VIIIA 86 Rn Radon (222) | VIIIA 118 Og Oganesson (294) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IA 19 K Kalium 39.10 | IIA 37 Rb Rubidium 85.47 | IIIB 55 Cs Cesium 132.91 | IIA 20 Ca Calcium 40.08 | IIIA 21 Sc Scandium 44.96 | IIIV 22 Ti Titanium 47.87 | IIIV 23 V Vanadium 50.94 | V 24 Cr Chrom 51.99 | V 25 Mn Mangaan 54.94 | V 26 Fe Ijzer 55.85 | V 27 Co Cobalt 58.93 | V 28 Ni Nikkel 58.69 | V 29 Cu Koper 63.55 | V 30 Zn Zink 65.38 | V 31 Ga Gallium 69.72 | V 32 Ge Germanium 72.64 | V 33 As Arsenic 74.92 | V 34 Se Seleneum 78.97 | V 35 Br Bromine 79.90 | V 36 Kr Krypton 83.80 | V 37 Rb Rubidium 85.47 | V 38 Sr Strontium 87.62 | V 39 Y Yttrium 88.91 | V 40 Zr Zirkon 91.22 | V 41 Nb Niobium 92.91 | V 42 Mo Molybdeen 95.94 | V 43 Tc Technetium 98 | V 44 Ru Ruthenium 101.07 | V 45 Rh Rhodium 102.91 | V 46 Pd Palladium 106.42 | V 47 Ag Zilver 107.87 | V 48 Cd Cadmium 112.41 | V 49 In Indium 114.82 | V 50 Sn Tin 118.71 | V 51 Sb Antimon 121.76 | V 52 Te Telluur 127.60 | V 53 I Jodium 126.90 | V 54 Xe Xenon 131.29 | V 55 Cs Cesium 132.91 | V 56 Ba Barium 137.33 | V 57 La Lanthaniden | V 58 Ce Ceraam | V 59 Pr Praseodym | V 60 Nd Neodymium | V 61 Pm Promethium | V 62 Sm Samarium | V 63 Eu Europium | V 64 Gd Gadolinium | V 65 Tb Terbium | V 66 Dy Dysprosium | V 67 Ho Holmium | V 68 Er Erbium | V 69 Tm Thulium | V 70 Yb Ytterbium | V 71 Lu Lutetium | V 72 Hf Hafnium | V 73 Ta Tantalum | V 74 W Wolfram | V 75 Re Rhenium | V 76 Os Osmium | V 77 Ir Iridium | V 78 Pt Platinaam | V 79 Au Goud | V 80 Hg Quecksilber | V 81 Tl Thallium | V 82 Pb Lood | V 83 Bi Bismut | V 84 Po Polonium | V 85 At Astatine | V 86 Rn Radon | V 87 Fr Francium | V 88 Ra Radium | V 89 Ac Actiniden | V 90 Th Thorium | V 91 Pa Protactinium | V 92 U Uranium | V 93 Np Neptunium | V 94 Pu Plutoonium | V 95 Am Americium | V 96 Cm Curium | V 97 Bk Berkelium | V 98 Cf Californium | V 99 Es Einsteinium | V 100 Fm Fermium | V 101 Md Mendelevium | V 102 No Nobelium | V 103 Lr Lawrencium |

Object* **BEELD**

| | |
|------|------|
| M103 | Cas |
| 7 | 19,9 |

Kaart Sky Atlas 2000^s **m_{SB}(*)**

*M = Messier N = NGC
§(7) = object staat niet vermeld op de kaart

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|
| M22 | Sgr | M71 | Sgr | M10 | Oph | M12 | Oph | M53 | Com | M107 | Oph | M55 | Ser | M72 | Ser | M78 | Aqr | M13 | Her | M30 | Cap | M92 | Her | M44 | Sgr | M34 | Oph |
| 22 | 20,6 | 16 | 21,1 | 15 | 21,1 | 15 | 21,1 | 17 | 23,4 | 15 | 21,5 | 15 | 18,8 | 16 | 20,3 | 16 | 19,5 | 20,5 | 23 | 21,6 | 2 | 20,3 | 22 | 19,3 | 22 | 20,6 | 20,6 |
| M80 | Ser | M66 | Lyr | M15 | Peg | M3 | Oph | M51 | Oph | M2 | Aqr | M59 | Lyr | M65 | Oph | M46 | Bla | M34 | Del | M53 | Oem | M64 | Vir | M29 | Her | M106 | Del |
| 22 | 20,7 | 21,2 | 17 | 20,3 | 7 | 20,8 | 15 | 18,2 | 17 | 20,7 | 21 | 22,6 | 15 | 18,7 | 22,8 | 16 | 22,6 | 7 | 21,7 | 14 | 21,6 | 6 | 21,2 | 16 | 21,7 | 5 | 23,3 |

De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.

Aantal objecten per categorie: 3 dubbelsterren; 10 heldere nevels; 3 asterisms (opgenomen bij open sterrenhopen); 37 open sterrenhopen; 6 planetaire nevels; 1 supernova restant; 30 bolvormige sterrenhopen en 30 sterrenstelsels (2 dwerg elliptisch; 3 elliptisch; 1 lenticulaire; 3 balkspiraalen; 15 gewone spiralen en 2 onregelmatige sterrenstelsels.

- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/ supernova rest
- Bolvormige sterrenhoop

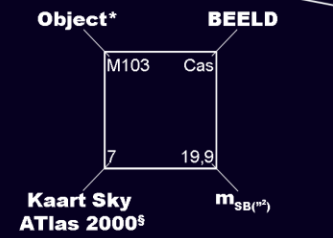
Periodiek systeem voor amateurastronomen

Ikke nam waar met ene telescoop en zag...



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------------|---------------------------------|----------------------------------|------------------------------------|--------------------------------|---------------------------------|-----------------------------------|---------------------------------|-----------------------------------|--------------------------------|----------------------------------|-------------------------------------|------------------------------------|-----------------------------------|-------------------------------------|---------------------------------|------------------------------------|---------------------------------|------------------------------------|-----------------------------------|------------------------------------|------------------------------------|-----------------------------------|------------------------------------|-------------------------------------|--------------------------------|----------------------------------|----------------------------------|----------------------------------|--------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|------------------------------------|-------------------------------------|----------------------------------|-------------------------------------|-----------------------------------|--------------------------------------|-----------------------------------|--------------------------------------|------------------------------------|--------------------------------------|-----------------------------------|------------------------------------|--------------------------------|-------------------------------------|--------------------------------------|----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|------------------------------|------------------------------------|-------------------------------------|------------------------------------|------------------------------------|-----------------------------------|------------------------------------|-------------------------------------|---------------------------------|------------------------------------|-------------------------------------|--------------------------------|------------------------------------|------------------------------------|------------------------------------|---------------------------------|------------------------------------|----------------------------------|----------------------------|---|-----------------------------------|--------------------------------------|-----------------------------------|-----------------------------------|--------------------------------------|--|---------------------------------------|---------------------------------------|------------------------------------|-------------------------------------|---------------------------------------|--------------------------------------|-------------------------------------|----------------------------------|-------------------------------------|--------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--|
| 8 IA H Hydrogen 1.01 | 8 IA He Helium 4.00 | 8 IA Li Lithium 6.94 | 8 IA Be Beryllium 9.01 | 8 IA B Boron 10.81 | 8 IA C Carbon 12.01 | 8 IA N Nitrogen 14.01 | 8 IA O Oxygen 16.00 | 8 IA F Fluorine 19.00 | 8 IA Ne Neon 20.18 | 8 IA Na Sodium 22.99 | 8 IA Mg Magnesium 24.31 | 8 IA Al Aluminum 26.98 | 8 IA Si Silicon 28.09 | 8 IA P Phosphorus 30.97 | 8 IA S Sulfur 32.06 | 8 IA Cl Chlorine 35.45 | 8 IA Ar Argon 39.95 | 8 IA K Potassium 39.10 | 8 IA Ca Calcium 40.08 | 8 IA Sc Scandium 44.96 | 8 IA Ti Titanium 47.87 | 8 IA V Vanadium 50.94 | 8 IA Cr Chromium 51.99 | 8 IA Mn Manganese 54.94 | 8 IA Fe Iron 55.85 | 8 IA Co Cobalt 58.93 | 8 IA Ni Nickel 58.69 | 8 IA Cu Copper 63.55 | 8 IA Zn Zinc 65.38 | 8 IA Ga Gallium 69.72 | 8 IA Ge Germanium 72.64 | 8 IA As Arsenic 74.92 | 8 IA Se Selenium 78.97 | 8 IA Br Bromine 79.90 | 8 IA Kr Krypton 83.80 | 8 IA Rb Rubidium 85.47 | 8 IA Sr Strontium 87.62 | 8 IA Y Yttrium 88.91 | 8 IA Zr Zirconium 91.22 | 8 IA Nb Niobium 92.91 | 8 IA Mo Molybdenum 95.94 | 8 IA Tc Technetium 98 | 8 IA Ru Ruthenium 101.07 | 8 IA Rh Rhodium 102.91 | 8 IA Pd Palladium 106.42 | 8 IA Ag Silver 107.87 | 8 IA Cd Cadmium 112.41 | 8 IA Sn Tin 118.71 | 8 IA Sb Antimony 121.76 | 8 IA Te Tellurium 127.60 | 8 IA I Iodine 126.90 | 8 IA Xe Xenon 131.29 | 8 IA Cs Cesium 132.91 | 8 IA Ba Barium 137.33 | 8 IA La Lanthanides | 8 IA Hf Hafnium 178.49 | 8 IA Ta Tantalum 180.95 | 8 IA W Tungsten 183.84 | 8 IA Re Rhenium 186.21 | 8 IA Os Osmium 190.23 | 8 IA Ir Iridium 192.22 | 8 IA Pt Platinum 195.08 | 8 IA Au Gold 196.97 | 8 IA Hg Mercury 200.59 | 8 IA Tl Thallium 204.38 | 8 IA Pb Lead 207.2 | 8 IA Bi Bismuth 208.98 | 8 IA Po Polonium (209) | 8 IA At Astatine (210) | 8 IA Rn Radon (222) | 8 IA Fr Francium (223) | 8 IA Ra Radium (226) | 8 IA Ac Actinides | 8 IA Rf Rutherfordium (261) | 8 IA Db Dubnium (262) | 8 IA Sg Seaborgium (263) | 8 IA Bh Bohrium (264) | 8 IA Hs Hassium (265) | 8 IA Mt Meitnerium (266) | 8 IA Ds Darmstadtium (267) | 8 IA Rg Roentgenium (268) | 8 IA Cn Copernicium (269) | 8 IA Nh Nihonium (270) | 8 IA Fl Flerovium (271) | 8 IA Lv Livermorium (272) | 8 IA Ts Tennessine (274) | 8 IA Og Oganesson (274) | 8 IA IA Iodine (274) | 8 IA VIA Vanadium (274) | 8 IA VIIA Chlorine (274) | 8 IA VIIIA Argon (274) | 8 IA VIIIA Krypton (274) | 8 IA VIIIA Xenon (274) | 8 IA VIIIA Radon (274) | 8 IA VIIIA Oganesson (274) |
|----------------------------------|---------------------------------|----------------------------------|------------------------------------|--------------------------------|---------------------------------|-----------------------------------|---------------------------------|-----------------------------------|--------------------------------|----------------------------------|-------------------------------------|------------------------------------|-----------------------------------|-------------------------------------|---------------------------------|------------------------------------|---------------------------------|------------------------------------|-----------------------------------|------------------------------------|------------------------------------|-----------------------------------|------------------------------------|-------------------------------------|--------------------------------|----------------------------------|----------------------------------|----------------------------------|--------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|------------------------------------|-------------------------------------|----------------------------------|-------------------------------------|-----------------------------------|--------------------------------------|-----------------------------------|--------------------------------------|------------------------------------|--------------------------------------|-----------------------------------|------------------------------------|--------------------------------|-------------------------------------|--------------------------------------|----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|------------------------------|------------------------------------|-------------------------------------|------------------------------------|------------------------------------|-----------------------------------|------------------------------------|-------------------------------------|---------------------------------|------------------------------------|-------------------------------------|--------------------------------|------------------------------------|------------------------------------|------------------------------------|---------------------------------|------------------------------------|----------------------------------|----------------------------|---|-----------------------------------|--------------------------------------|-----------------------------------|-----------------------------------|--------------------------------------|--|---------------------------------------|---------------------------------------|------------------------------------|-------------------------------------|---------------------------------------|--------------------------------------|-------------------------------------|----------------------------------|-------------------------------------|--------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--|

| | | | | | |
|---|--|--|---|--|---|
| M32 And M110 And M105 Leo M87 Vir N1023 Per M57 Lyr | M102 Dra M84 Vir N3115 Sex M86 Vir M95 Leo N2392 Gem | M2024 Ori M42 M88 M57 M31 M51 M33 M82 UMa N4449 CVn M116 Tau | M22 Sgr M71 Sgr M10 Oph M12 Oph N5053 Com M107 Oph M555 Ser M6712 Ser M6780 Aps M13 Her M30 Cap M92 Her M6440 Sgr M6342 Oph | M58 M51/Whirlpool Galaxy CVn M51 CVn N2683 Lyn M31 And M98 Com M97 UMa | M5 M55 M56 M57 M58 M59 M60 M61 M62 M63 M64 M65 M66 M67 M68 M69 M70 M71 M72 M73 M74 M75 M76 M77 M78 M79 M80 M81 M82 M83 M84 M85 M86 M87 M88 M89 M90 M91 M92 M93 M94 M95 M96 M97 M98 M99 M100 M101 M102 M103 M104 M105 M106 M107 M108 M109 M110 M111 M112 M113 M114 M115 M116 M117 M118 M119 M120 |
|---|--|--|---|--|---|



*M = Messier N = NGC
§(7) = object staat niet vermeld op de kaart

| | | | |
|---|---|--|--|
| M22 Sgr M71 Sgr M10 Oph M12 Oph N5053 Com M107 Oph M555 Ser M6712 Ser M6780 Aps M13 Her M30 Cap M92 Her M6440 Sgr M6342 Oph | M23 Sgr M72 Sgr M11 Oph M13 Her M30 Cap M92 Her M6440 Sgr M6342 Oph | M24 Lyn M81 And M82 UMa N4449 CVn M116 Tau | M25 Sgr M73 Sgr M14 Oph M15 Per M64 And M65 And M66 And M67 And M68 And M69 And M70 And M71 And M72 And M73 And M74 And M75 And M76 And M77 And M78 And M79 And M80 And M81 And M82 And M83 And M84 And M85 And M86 And M87 And M88 And M89 And M90 And M91 And M92 And M93 And M94 And M95 And M96 And M97 And M98 And M99 And M100 And M101 And M102 And M103 And M104 And M105 And M106 And M107 And M108 And M109 And M110 And M111 And M112 And M113 And M114 And M115 And M116 And M117 And M118 And M119 And M120 |
|---|---|--|--|

De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.

Aantal objecten per categorie: 3 dubbelsterren; 10 heldere nevels; 3 asterisms (opgenomen bij open sterrenhopen); 37 open sterrenhopen; 6 planetaire nevels; 1 supernova restant; 30 bolvormige sterrenhopen en 30 sterrenstelsels (2 dwerg elliptisch; 3 elliptisch; 1 lenticulaire; 3 balkspiraalen; 15 gewone spiralen en 2 onregelmatige sterrenstelsels.

- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/ supernova rest
- Bolvormige sterrenhoop

Periodiek systeem voor amateurastronomen

Ikke nam waar met ene telescoop en zag...

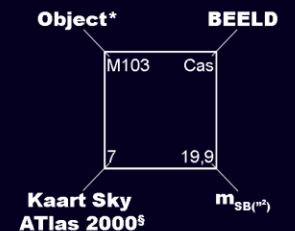


| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------------|----------------------------------|------------------------------------|----------------------------------|-------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|-------------------------------------|---------------------------------------|-------------------------------------|------------------------------------|----------------------------------|--|---------------------------------------|-------------------------------------|--|---|--------------------------------------|--|---|---|--|--|--|---------------------------------------|--|---------------------------------------|---------------------------------------|--|--|---|-----------------------------------|--------------------------------------|---------------------------------------|-----------------------------------|--------------------------------------|--|-----------------------------------|--------------------------------------|--|--|-----------------------------------|---------------------------------------|--|--|-------------------------------------|------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|--|--|------------------------------------|---------------------------------------|--------------------------------------|--|--|--|--|--|---|---|---|----------------------------------|-----------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|--------------------------------------|--|--------------------------------------|-----------------------------------|------------------------------------|----------------------------------|--|--|--|---------------------------------------|--|--|--|-------------------------------------|-------------------------------------|--|--------------------------------------|---------------------------------------|---------------------------------------|--|--|---------------------------------------|---------------------------------------|-------------------------------------|--------------------------------------|--|--|---|--|---|---|---|------------------------------------|------------------------------------|-------------------------------------|---------------------------------------|--------------------------------------|-------------------------------------|--|
| IA 1 H Hydrogen 1.01 | IA 3 Li Lithium 6.94 | IA 11 Na Natrium 22.99 | IA 19 K Kalium 39.10 | IA 37 Rb Rubidium 85.47 | IA 55 Cs Cesium 132.91 | IA 87 Fr Francium (223) | IIA 4 Be Beryllium 9.01 | IIA 12 Mg Magnesium 24.31 | IIA 20 Ca Calcium 40.08 | IIA 38 Sr Strontium 87.62 | IIA 56 Ba Barium 137.33 | IIA 88 Ra Radium (226) | IIIB 5 B Boron 10.81 | IIIB 13 Al Aluminium 26.98 | IIIB 21 Sc Scandium 44.96 | IIIB 39 Y Yttrium 88.91 | IIIB 71 Lu Lutetium 174.97 | IIIB 89 La Lanthanum 138.91 | IIIB 90 Ce Cetium 140.12 | IIIB 91 Pr Praseodymium 140.91 | IIIB 92 Nd Neodymium 144.24 | IIIB 93 Pm Promethium (145) | IIIB 94 Sm Samarium 150.36 | IIIB 95 Eu Europium 151.96 | IIIB 96 Gd Gadolinium 157.25 | IIIB 97 Tb Terbium 158.93 | IIIB 98 Dy Dysprosium 162.50 | IIIB 99 Ho Holmium 164.93 | IIIB 100 Er Erbium 167.26 | IIIB 101 Tm Thulium 168.93 | IIIB 102 Yb Ytterbium 173.05 | IIIB 103 Lu Lutetium 174.97 | IIIA 6 C Carbon 12.01 | IIIA 14 Si Silicon 28.09 | IIIA 22 Ti Titanium 47.87 | IIIA 30 Zn Zink 65.38 | IIIA 36 Kr Krypton 83.80 | IIIA 42 Mo Molibdeen 95.94 | IIIA 50 Sn Tin 118.71 | IIIA 58 Ce Cetium 140.12 | IIIA 66 Dy Dysprosium 162.50 | IIIA 74 Ta Tantalum 180.95 | IIIA 82 Pb Lood 207.2 | IIIA 90 Th Thorium 232.04 | IIIA 98 Cf Californium 251 | IIIA 106 Lr Lawrencium (262) | IIIV 7 N Stikstof 14.01 | IIIV 15 P Fosfor 30.97 | IIIV 23 V Vanadium 50.94 | IIIV 31 Ga Gallium 69.72 | IIIV 39 Y Yttrium 88.91 | IIIV 47 Ag Zilver 107.87 | IIIV 55 Cs Cesium 132.91 | IIIV 63 Eu Europium 151.96 | IIIV 71 Lu Lutetium 174.97 | IIIV 79 Au Goud 196.97 | IIIV 87 Fr Francium (223) | IIIV 95 Am Americium 243 | IIIV 103 Lr Lawrencium (262) | IIIV 111 Tl Thalium 204.38 | IIIV 119 Ts Tennessine (294) | IIIV 127 Nh Nihonium (284) | IIIV 135 Nh Nihonium (284) | IIIV 151 Mc Moscovium (288) | IIIV 169 Lv Livermorium (293) | IIIV 187 Og Oganesson (294) | VIA 8 O Oxygen 16.00 | VIA 16 S Zwavel 32.06 | VIA 24 Cr Chroom 51.996 | VIA 32 Ge Germanium 72.64 | VIA 40 Zr Zirkonium 91.224 | VIA 48 Cd Cadmium 112.411 | VIA 56 Ba Barium 137.327 | VIA 64 Gd Gadolinium 157.254 | VIA 72 Hf Hafnium 178.49 | VIA 80 Hg Kwik 200.59 | VIA 88 Ra Radium (226) | VIA 96 Cm Curium 247 | VIA 104 Fl Flerovium (287) | VIA 112 Cn Copernicium (285) | VIA 120 Lv Livermorium (293) | VIA 138 Nh Nihonium (284) | VIA 154 Mc Moscovium (288) | VIA 172 Lv Livermorium (293) | VIA 188 Og Oganesson (294) | VIIA 9 F Fluorine 19.00 | VIIA 17 Cl Chloor 35.45 | VIIA 25 Mn Manganees 54.94 | VIIA 33 As Arsenic 74.92 | VIIA 41 Nb Niobium 92.906 | VIIA 49 In Indium 114.818 | VIIA 57 La Lanthanum 138.905 | VIIA 65 Tm Thulium 168.934 | VIIA 73 Tl Thalium 204.38 | VIIA 81 Tl Thalium 204.38 | VIIA 89 Ac Actinium 227 | VIIA 97 Bk Berkelium 247 | VIIA 105 Nh Nihonium (284) | VIIA 113 Nh Nihonium (284) | VIIA 121 Lv Livermorium (293) | VIIA 139 Nh Nihonium (284) | VIIA 155 Mc Moscovium (288) | VIIA 173 Lv Livermorium (293) | VIIA 189 Og Oganesson (294) | VIIIA 2 He Helium 4.00 | VIIIA 10 Ne Neon 20.18 | VIIIA 18 Ar Argon 39.95 | VIIIA 36 Kr Krypton 83.80 | VIIIA 54 Xe Xenon 131.29 | VIIIA 86 Rn Radon (222) | VIIIA 118 Og Oganesson (294) |
|----------------------------------|----------------------------------|------------------------------------|----------------------------------|-------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|-------------------------------------|---------------------------------------|-------------------------------------|------------------------------------|----------------------------------|--|---------------------------------------|-------------------------------------|--|---|--------------------------------------|--|---|---|--|--|--|---------------------------------------|--|---------------------------------------|---------------------------------------|--|--|---|-----------------------------------|--------------------------------------|---------------------------------------|-----------------------------------|--------------------------------------|--|-----------------------------------|--------------------------------------|--|--|-----------------------------------|---------------------------------------|--|--|-------------------------------------|------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|--|--|------------------------------------|---------------------------------------|--------------------------------------|--|--|--|--|--|---|---|---|----------------------------------|-----------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|--------------------------------------|--|--------------------------------------|-----------------------------------|------------------------------------|----------------------------------|--|--|--|---------------------------------------|--|--|--|-------------------------------------|-------------------------------------|--|--------------------------------------|---------------------------------------|---------------------------------------|--|--|---------------------------------------|---------------------------------------|-------------------------------------|--------------------------------------|--|--|---|--|---|---|---|------------------------------------|------------------------------------|-------------------------------------|---------------------------------------|--------------------------------------|-------------------------------------|--|

M16

M58

M5

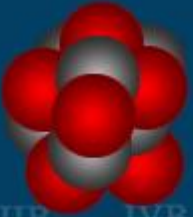


*M = Messier N = NGC
^s(7) = object staat niet vermeld op de kaart

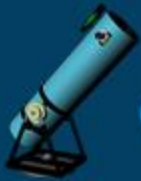
De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.

Aantal objecten per categorie: 3 dubbelsterren; 10 heldere nevels; 3 asterisms (opgenomen bij open sterrenhopen); 37 open sterrenhopen; 6 planetaire nevels; 1 supernova restant; 30 bolvormige sterrenhopen en 30 sterrenstelsels (2 dwerg elliptisch; 3 elliptisch; 4 lenticulaire; 3 balkspiraalen; 15 gewone spiralen en 2 onregelmatige sterrenstelsels.

- **Dubbelsterren**
- **Difuse nevel**
- **Open sterrenhoop/Asterism**
- **Sterrenstelsel**
- **Planetaire nevels/ supernova rest**
- **Bolvormige sterrenhoop**

| | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------------|---|-------------------------------------|--------------------------------|----------------------------------|-------------------------------|-------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|--------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|--|--|---------------------------|
| IA | | | | | | | | | | VIIIA | | | | | | | | | | | |
| 1 H Hydrogen 1.01 | IIA | | | | | | | | | | IIIA | | | | | | | | | | 2 He Helium 4.00 |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |  | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | | | | |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | IIIB | IVB | VB | VIB | VII B | VIII B | VIII B | VIII B | IB | IIB | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | | | | |
| 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | 22 Ti Titanium 47.87 | 3 L | 69 E | 119 V | 69 E | 10 N | 28 Ni Nickel 58.69 | 29 Cu Copper 63.55 | 10 N | 13 A | 32 Ge Germanium 72.63 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | | | | |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirconium 91.22 | Nb Niobium 92.91 | Mo Molybdenum 95.95 | Tc Technetium (98) | Ru Ruthenium 101.07 | Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.87 | Cd Cadmium 112.41 | In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | | | | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Lanthanides | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Tungsten 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.97 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.38 | 82 Pb Lead 207.20 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | | | | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actinides | 104 Rf Rutherfordium (261) | 105 Db Dubnium (268) | 106 Sg Seaborgium (271) | 107 Bh Bohrium (270) | 108 Hs Hassium (277) | 109 Mt Meitnerium (276) | 110 Ds Darmstadtium (281) | 111 Rg Roentgenium (290) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium 289 | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) | | | | |

| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



Periodiek systeem voor amateur astronomen

| | | | | | | | | | | | | | | | |
|-----------|--------|-----------|--------|----------|-------------|---------------|--------|----------|--------|------------|--------|------------|--------|-----------|--------|
| IA | | | | | | | | | | | | VIIIA | | | |
| 1 | H | | | | | | | | | | | 2 | He | | |
| Hydrogen | 1.01 | | | | | | | | | | | Helium | 4.00 | | |
| 3 | Li | 4 | Be | | | | | | | | | 10 | Ne | | |
| Lithium | 6.94 | Boron | 10.81 | | | | | | | | | Neon | 20.18 | | |
| 11 | Na | 12 | Mg | IIIB | IVB | VB | VIB | VII B | VIIIB | 18 | Ar | | | | |
| Sodium | 22.99 | Magnesium | 24.31 | | | | | | | Argon | 39.95 | | | | |
| 19 | K | 20 | Ca | 21 | Sc | 22 | Ti | 23 | V | 24 | Cr | 25 | Mn | 26 | Fe |
| Potassium | 39.10 | Calcium | 40.08 | Scandium | 44.96 | Titanium | 47.87 | Vanadium | 50.94 | Chromium | 52.00 | Manganese | 54.94 | Iron | 55.85 |
| 37 | Rb | 38 | Sr | 39 | Y | 40 | Zr | 41 | Nb | 42 | Mo | 43 | Tc | 44 | Ru |
| Rubidium | 85.47 | Strontium | 87.62 | Yttrium | 88.91 | Zirconium | 91.22 | Niobium | 92.91 | Molybdenum | 95.95 | Technetium | (98) | Ruthenium | 101.07 |
| 55 | Cs | 56 | Ba | 57-71 | Lanthanides | 72 | Hf | 73 | Ta | 74 | W | 75 | Re | 76 | Os |
| Cesium | 132.91 | Barium | 137.33 | | | Hafnium | 178.49 | Tantalum | 180.95 | Tungsten | 183.84 | Rhenium | 186.21 | Osmium | 190.23 |
| 87 | Fr | 88 | Ra | 89-103 | Actinides | 104 | Rf | 105 | Db | 106 | Sg | 107 | Bh | 108 | Hs |
| Francium | (223) | Radium | (226) | | | Rutherfordium | (261) | Dubnium | (268) | Seaborgium | (271) | Bohrium | (270) | Hassium | (277) |

2018 The Beast

40 cm Newton f/4.4

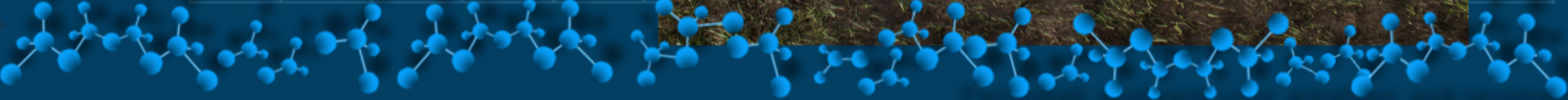
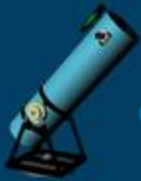
F = 1800 mm

Goto dobson montering

| | | | | | | | | | |
|-----------|--------|---------|--------|--------------|--------|-----------|--------|------------|-------|
| 57 | La | 58 | Ce | 59 | Pr | 60 | Nd | 61 | Pm |
| Lanthanum | 138.91 | Cerium | 140.12 | Praseodymium | 140.91 | Neodymium | 144.24 | Promethium | (145) |
| 89 | Ac | 90 | Th | 91 | Pa | 92 | U | 93 | Np |
| Actinium | (227) | Thorium | 232.04 | Protactinium | 231.04 | Uranium | 238.03 | Neptunium | (237) |



| | |
|-------------|--------|
| 71 | Lu |
| Lutetium | 174.97 |
| 103 | Lr |
| Livermorium | (262) |



IA

VIII A

2020

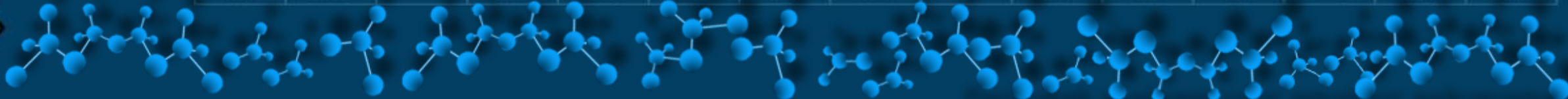
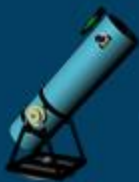
De kluis van het beest

Budget verplaatsbare
sterrenwacht

| | | | | | | | | |
|-------------------------------|--------------------------------|---------------------------------------|--------------------------------------|------------------------------------|--------------------------------------|---|--------------------------------------|--|
| 1 H Hydrogen 1.01 | | | | | | | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | | | | | | | |
| 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 | | | | | | | |
| 19 K Kalium 39.10 | 20 Ca Calcium 40.08 | IIIB 21 Sc Scandium 44.96 | IVB 22 Ti Titanium 47.87 | VB 23 V Vanadium 50.94 | VIB 24 Cr Chromium 52.00 | VII B 25 Mn Manganese 54.94 | VIII B 26 Fe Ijzer 55.85 | |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirkonium 91.22 | 41 Nb Niobium 92.91 | 42 Mo Molybdenum 95.95 | 43 Tc Technetium (98) | 44 Ru Ruthenium 101.07 | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Lanthanides | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Wolfram 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actinides | 104 Rf Rutherfordium (261) | 105 Db Dubnium (268) | 106 Sg Seaborgium (271) | 107 Bh Bohrium (270) | 108 Hs Hassium (277) | |



| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



Periodiek systeem voor amateur astronomen

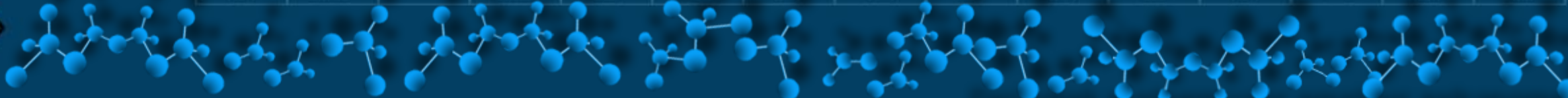
2020

De kluis van het beest

Budget verplaatsbare sterrenwacht



| | | | | | | | | | | | | | | |
|--------------------------------------|--|---|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|------------------------------------|---------------------------------------|---|---|--------------------------------------|--|---------------------------------------|---|
| 138.91 | 140.12 | 140.91 | 144.24 | (145) | 150.36 | 151.96 | 157.25 | 158.93 | 162.50 | 164.93 | 167.26 | 168.93 | 173.05 | |
| 89 Ac Actinium (227) | 90 Th Thorium (232.04) | 91 Pa Protactinium (231.04) | 92 U Uranium (238.03) | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |

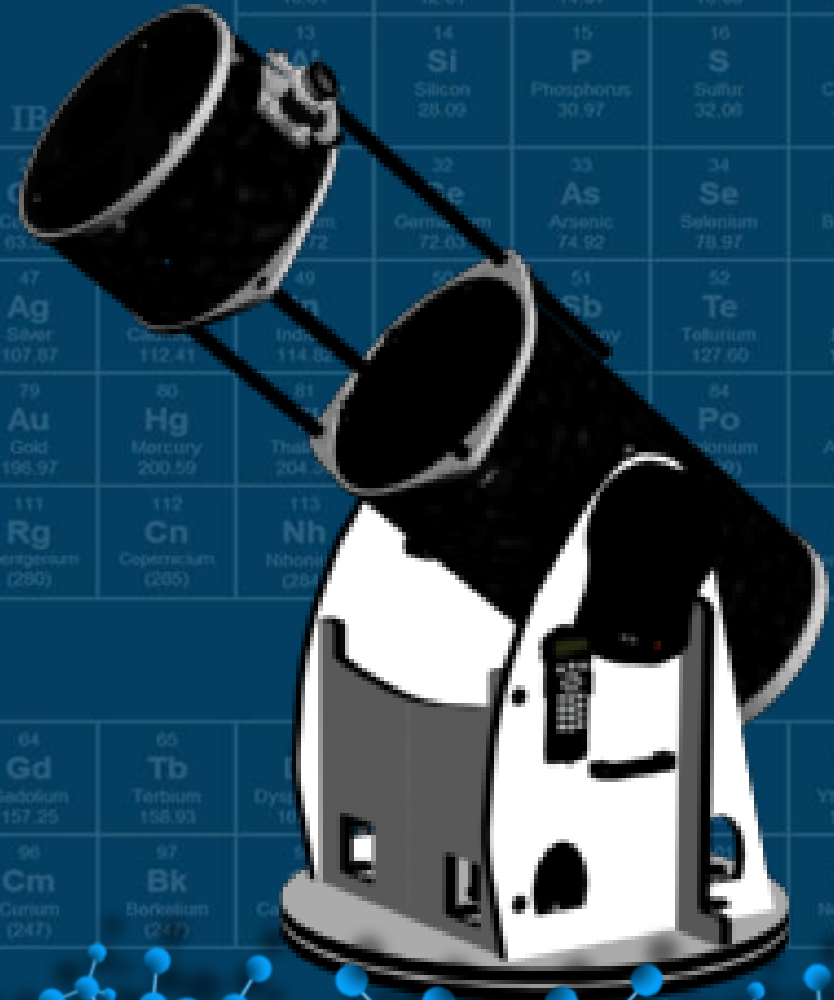


| | | | | | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------------|-------------------------------|-------------------------------------|--------------------------------|----------------------------------|--------------------------------|---------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|---------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------|------------------------------|------------------------------|
| IA | | | | | | | | | | VIII A | | | | | | | | | |
| 1 H Hydrogen 1.01 | IIA | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | | | | | | | | | | | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | | |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | 22 Ti Titanium 47.88 | 23 V Vanadium 50.94 | 24 Cr Chromium 52.00 | 25 Mn Manganese 54.94 | 26 Fe Iron 55.85 | 27 Co Cobalt 58.93 | 28 Ni Nickel 58.69 | 29 Cu Copper 63.55 | 30 Zn Zinc 65.39 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.64 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirconium 91.22 | 41 Nb Niobium 92.91 | 42 Mo Molybdenum 95.95 | 43 Tc Technetium (98) | 44 Ru Ruthenium 101.07 | 45 Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.87 | 48 Cd Cadmium 112.41 | 49 In Indium 114.82 | 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Actinides | 72 Hf Hafnium 178.49 | 73 Ta Tantalum 180.95 | 74 W Tungsten 183.84 | 75 Re Rhenium 186.21 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.08 | 79 Au Gold 196.97 | 80 Hg Mercury 200.59 | 81 Tl Thallium 204.38 | 82 Pb Lead 207.2 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actinides | 104 Rf Rutherfordium (261) | 105 Db Dubnium (268) | 106 Sg Seaborgium (271) | 107 Bh Bohrium (270) | 108 Hs Hassium (277) | 109 Mt Meitnerium (276) | 110 Ds Darmstadtium (281) | 111 Rg Roentgenium (280) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium (289) | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) | | |

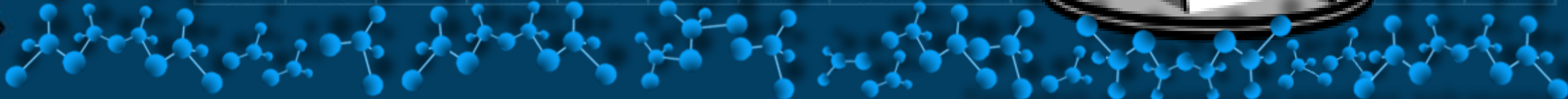
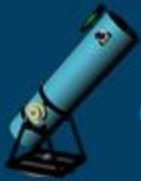
Terug interesse voor tekenen

Eerst PSA objecten

Fotografie bijzaak



| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



2018

Periodiek systeem voor amateurastronomen

| | |
|-------------------------------|--------------------------------|
| IA | IIA |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |
| 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 |
| 19 K Kalium 39.10 | 20 Ca Calcium 40.08 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 |
| 87 Fr Francium (223) | 88 Ra Radium (226) |

| | |
|-------|---------------------------------|
| VIIIA | 2 He Helium 4.00 |
| | 10 Ne Neon 20.18 |
| | 18 Ar Argon 39.95 |
| | 36 Kr Krypton 83.80 |
| | 54 Xe Xenon 131.29 |
| | 86 Rn Radon (222) |
| | 118 Og Oganesson (294) |

| | | |
|----|-----|-----|
| 0 | Cyg | |
| 8 | Lyr | Cap |
| 6 | Mon | Cap |
| 11 | Ors | |
| 11 | Ors | |
| 11 | Sgr | |
| 16 | Sgr | |
| 22 | Ors | |
| 11 | | |

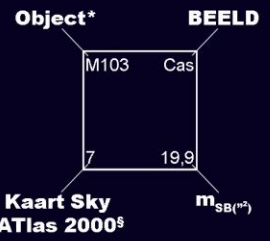


De objecten zijn verdeeld per categorie waarbij de volgorde afhankelijk is per categorie:
 Dubbelsterren: volgens bekendheid; diffuse nevels: oplopend volgens diameter; open sterrenhopen: oplopend volgens aantal sterren; bolvormige sterrenhopen oplopend volgens afstand tot de aarde; planetaire nevels (en 1 supernova restant): oplopend volgens werkelijke diameter van het object.
 De sterrenstelsels werden eerst verdeeld per subgroep: dwerg elliptische stelsels; gewone elliptische stelsels; lenticulaire stelsels; balkspiraal, gewone spiralen en tot slot onregelmatige sterrenstelsels. In elke subgroep staan de stelsels oplopend volgens oppervlakte helderheid.
 Objecten die gelijk zijn wat betreft het gehanteerde criterium werden vervolgens oplopend gesorteerd volgens alfabetische volgorde van het gebruikte catalogusnummer.
 De tekeningen werden vervaardigd door een telescoop met een objectief diameter van 406 mm. De intensiteit van objecten is overdreven en de schaal voor de afbeeldingen is verschillend. Deze keuze werd gemaakt opdat zoveel mogelijk van het object in het beeld past. Volgende objecten zijn te groot om in het beeldveld van een telescoop te passen: M44, M45, M31 en M33.



Guido Gubbels, december 2016

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|------|------|------|-------|------|--------|------|-------|------|--------|------|---------|------|-------|------|--------|------|-------|------|-------|------|-------|------|------|------|-------|------|-------|------|------|------|-------|------|------|------|
| M78 | Ors | M18 | Sgr | Ploc1 | Boo | STAR25 | Dra | M39 | Cyg | STAR27 | Del | Stock23 | Cam | N2169 | Ors | N1662 | Ors | M36 | Aur | M34 | Per | N1545 | Per | M58 | Vir | N2903 | Leo | M104 | Vir | M65 | Leo | M66 | Leo | M76 | Per |
| 21.1 | 16 | 19.5 | (7) | (3) | 9 | 20.8 | (16) | 1 | 11 | 19.0 | (11) | 21.8 | 5 | 20.3 | 4 | 21.8 | 4 | 21.4 | 13 | 21.8 | 6 | 22.5 | 14 | 20.5 | 13 | 20.6 | 5 | 20.8 | 4 | 20.4 | | | | | |
| M17 | Sgr | M43 | Ors | N6910 | Cyg | N2129 | Gem | N2301 | Mon | N7686 | And | M50 | Mon | M41 | CMa | M29 | Cyg | N2360 | CMa | N1342 | Per | M45 | Tau | M108 | UMa | M96 | Leo | M81 | UMa | M64 | Com | M77 | Cet | M27 | Vul |
| 20.8 | 11 | 23.8 | 8 | 20.8 | 5 | 19.8 | 12 | 20.3 | 4 | 20.4 | 12 | 20.9 | 19 | 21.1 | 9 | 20.0 | 12 | 21.7 | 4 | 21.3 | 4 | 20.4 | 2 | 20.9 | 13 | 21.3 | 2 | 21.3 | 7 | 21.4 | 10 | 21.6 | 7 | 20.2 | |
| M20 | Sgr | M8 | Sgr | N6709 | Aql | M47 | Pup | N7380 | Cep | N6633 | Oph | M38 | Aur | M48 | Hya | M103 | Cas | M52 | Cas | M46 | Pup | N1647 | Tau | M63 | CVn | M51 | CVn | N2683 | Lyr | M31 | And | M98 | Com | M97 | UMa |
| 20.8 | 11 | 23.8 | 8 | 20.8 | 5 | 19.8 | 12 | 20.3 | 4 | 20.4 | 12 | 20.9 | 19 | 21.1 | 9 | 20.0 | 12 | 21.7 | 4 | 21.3 | 4 | 20.4 | 2 | 20.9 | 13 | 21.3 | 2 | 21.3 | 7 | 21.4 | 10 | 21.6 | 7 | 20.2 | |
| N2024 | Ors | M42 | Ors | N6802 | Vul | N457 | Cas | N884 | Per | N869 | Per | M44 | Cnc | M35 | Gem | IC4756 | Ser | M67 | Cnc | M11 | Set | M37 | Aur | M106 | CVn | N891 | And | M33 | Tri | M82 | UMa | N4449 | CVn | M1 | Tau |
| 22 | 24.9 | 22 | 23.5 | 16 | 21.2 | 12 | 21.2 | 3 | 21.5 | 15 | 20.7 | 5 | 22.6 | 12 | 22.8 | 1 | 19.9 | 3 | 21.5 | 12 | 21.8 | 5 | 23.6 | 7 | 21.7 | 7 | 21.7 | 6 | 22.1 | 4 | 22.2 | 13 | 22.2 | 2 | 21.2 |
| 11 | 11 | 21.9 | 6 | 20.2 | 1 | 20.9 | 1 | 22.4 | 1 | 21.6 | 6 | 22.2 | 5 | 21.2 | 15 | 21.5 | 12 | 22.1 | 16 | 20.7 | 5 | 21.7 | 7 | 22.5 | 4 | 22.7 | 4 | 23.1 | 2 | 20.9 | 7 | 22.2 | 5 | 20.5 | |



*M = Messier N = NGC
 §(7) = object staat niet vermeld op de kaart

De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.

Aantal objecten per categorie: 3 dubbelsterren, 70 heldere nevels, 3 asterismen (negenomarmen bij open sterrenhopen); 7 open sterrenhopen, 6 planetaire nevels, 1 supernova restant; 30 bolvormige sterrenhopen, 30 sterrenstelsels (2 dwerg elliptisch, 4 elliptisch, 4 lenticulaire; 3 balkspiraal; 15 gewone spiralen en 2 onregelmatige sterrenstelsels).

- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/supernova rest
- Bolvormige sterrenhoop

| |
|----------------------------------|
| 71 Lu Lutetium 174.97 |
| 103 Lr Lawrencium (262) |

2019

Periodiek systeem voor amateurastronomen

| | | |
|-------|-----------|-----------|
| 0 | Cyg | |
| 8 | Lyr | Cep |
| 6 | N2261 Mon | N7023 Cep |
| 11 | Or | 11 |
| M78 | Or | M16 Ser |
| 11 | 21,1 | 16 |
| M17 | Sgr | M43 Ori |
| 16 | 20,8 | 11 |
| M20 | Sgr | M8 Sgr |
| 22 | 24,9 | 22 |
| N2024 | Or | M42 Ori |
| 11 | 21,9 | 16 |

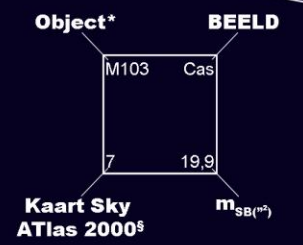


De objecten zijn verdeeld per categorie waarbij de volgorde afhankelijk is per categorie:
 Dubbelsterren: volgens bekendheid; diffuse nevels: oplopend volgens diameter; open sterrenhopen: oplopend volgens aantal sterren; bolvormige sterrenhopen oplopend volgens afstand tot de aarde; planetaire nevels (en 1 supernova restant): oplopend volgens werkelijke diameter van het object. De sterrenstelsels werden eerst verdeeld per subgroep: dwerg elliptische stelsels; gewone elliptische stelsels; lenticulaire stelsels; balkspiraal, gewone spiralen en tot slot onregelmatige sterrenstelsels. In elke subgroep staan de stelsels oplopend volgens oppervlakte helderheid. Objecten die gelijk zijn wat betreft het gehanteerde criterium werden vervolgens oplopend gesorteerd volgens alfabetische volgorde van het gebruikte catalogusnummer.

De tekeningen werden vervaardigd door een telescoop met een objectief diameter van 406 mm. De intensiteit van objecten is overdreven en de schaal voor de afbeeldingen is verschillend. Deze keuze werd gemaakt opdat zoveel mogelijk van het object in het beeld past. Volgende objecten zijn te groot om in het beeldveld van een telescoop te passen: M44, M45, M31 en M33.



Guido Gubbels, december 2016



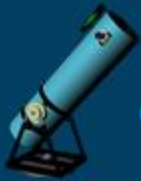
*M = Messier N = NGC
 §(7) = object staat niet vermeld op de kaart

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|------|-----|------|-----|------|-----|------|-------|------|------|------|-------|------|-------|------|-------|------|-------|------|-----|------|-------|------|-------|------|-------|------|-------|------|
| M22 | Sgr | M71 | Sge | M10 | Oph | M12 | Oph | N5053 | Com | M107 | Oph | N6535 | Ser | N6712 | Sct | N6760 | Aqr | M5 | Ser | M13 | Her | M30 | Cap | M92 | Her | N6440 | Sgr | N6342 | Oph |
| 22 | 20,6 | 16 | 21,1 | 15 | 21,1 | 15 | 21,1 | 17 | 23,4 | 15 | 21,5 | 15 | 18,8 | 16 | 20,3 | 16 | 19,9 | 15 | 20,4 | 16 | 20,5 | 23 | 21,0 | 16 | 20,3 | 22 | 19,3 | 22 | 20,8 |
| M30 | Sco | M56 | Lyr | M15 | Peg | M3 | CVn | N6517 | Oph | M2 | Aqr | N5897 | Lib | N6356 | Oph | N5466 | Boo | N6934 | Dra | M53 | Com | N5634 | Vir | N6229 | Her | N7006 | Del | N2419 | Lyr |
| 32 | 20,7 | 8 | 21,2 | 17 | 20,3 | 7 | 20,9 | 15 | 19,2 | 17 | 20,7 | 21 | 22,0 | 15 | 19,5 | 17 | 22,8 | 16 | 22,0 | 7 | 21,7 | 14 | 21,8 | 16 | 21,2 | 16 | 21,7 | 5 | 23,3 |

De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.

Aantal objecten per categorie: 3 dubbelsterren, 10 heldere nevels, 3 asterismen (ongenomen bij open sterrenhopen), 7 open sterrenhopen, 6 planetaire nevels, 1 supernova restant; 30 bolvormige sterrenhopen, 30 sterrenstelsels (2 dwerg elliptisch, 4 elliptisch, 4 lenticulaire, 3 balkspiraal, 15 gewone spiralen en 2 onregelmatige sterrenstelsels).

- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/supernova rest
- Bolvormige sterrenhoop



2020

Periodiek systeem voor amateurastronomen

| | |
|-------------------------------|--------------------------------|
| IA 1.01 | IIA |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 |
| 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 |
| 19 K Kalium 39.10 | 20 Ca Calcium 40.08 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 |
| 87 Fr Francium (223) | 88 Ra Radium (226) |

| |
|------------------------------------|
| VIIIA 2 He Helium 4.00 |
| 10 Ne Neon 20.18 |
| 18 Ar Argon 39.95 |
| 36 Kr Krypton 83.80 |
| 54 Xe Xenon 131.29 |
| 86 Rn Radon (222) |
| 118 Og Oganesson (294) |

| | | |
|--------------|--------------|-----------|
| 8 Cyg | 8 Lyr | 3 Cep |
| N2261 Mon | N7023 Cep | |
| 11 Ori | 11 Sgr | 11 Sgr |
| M78 | M16 | M17 |
| 11 Sgr | M43 | M20 |
| 11 Sgr | M8 | M22 |
| N2024 Ori | M42 | N2024 |

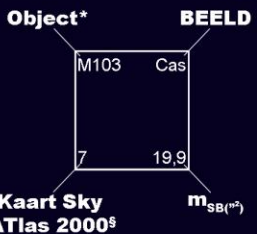


De objecten zijn verdeeld per categorie waarbij de volgorde afhankelijk is per categorie:
 Dubbelsterren: volgens bekendheid; diffuse nevels: oplopend volgens diameter; open sterrenhopen: oplopend volgens aantal sterren; bolvormige sterrenhopen oplopend volgens afstand tot de aarde; planetaire nevels (en 1 supernova restant): oplopend volgens werkelijke diameter van het object.
 De sterrenstelsels werden eerst verdeeld per subgroep: dwerg elliptische stelsels; gewone elliptische stelsels; lenticulaire stelsels; balkspiraal, gewone spiralen en tot slot onregelmatige sterrenstelsels. In elke subgroep staan de stelsels oplopend volgens oppervlakte helderheid.
 Objecten die gelijk zijn wat betreft het gehanteerde criterium werden vervolgens oplopend gesorteerd volgens alfabetische volgorde van het gebruikte catalogusnummer.
 De tekeningen werden vervaardigd door een telescoop met een objectief diameter van 406 mm. De intensiteit van objecten is overdreven en de schaal voor de afbeeldingen is verschillend. Deze keuze werd gemaakt opdat zoveel mogelijk van het object in het beeld past. Volgende objecten zijn te groot om in het beeldveld van een telescoop te passen: M44, M45, M31 en M33.



Guido Gubbels, december 2016

| | | | | | | | | | | | |
|------|------|-------|------|-------|------|-----|------|-------|------|-------|------|
| M32 | And | M110 | And | M105 | Leo | M87 | Vir | N1023 | Per | M57 | Lyr |
| 4 | 20,9 | 4 | 22,7 | 13 | 19,4 | 13 | 21,5 | 4 | 21,9 | 8 | 17,8 |
| M102 | Dra | M84 | Vir | N3115 | Sex | M86 | Vir | M95 | Leo | N2392 | Gem |
| 2 | 21,2 | 13 | 21,2 | 15 | 21,3 | 13 | 21,6 | 13 | 21,2 | 5 | 18,8 |
| M58 | Vir | N2903 | Leo | M104 | Vir | M65 | Leo | M66 | Leo | M76 | Per |
| 2 | 21,8 | 6 | 22,5 | 14 | 20,5 | 13 | 20,6 | 5 | 20,8 | 4 | 20,4 |
| M108 | UMa | M96 | Leo | M81 | UMa | M64 | Com | M77 | Cet | M27 | Vul |
| 2 | 20,9 | 13 | 21,3 | 2 | 21,3 | 7 | 21,4 | 10 | 21,6 | 7 | 20,2 |
| M63 | CVn | M51 | CVn | N2683 | Lyn | M31 | And | M98 | Com | M97 | UMa |
| 2 | 21,7 | 7 | 21,7 | 6 | 22,1 | 4 | 22,2 | 13 | 22,4 | 2 | 21,2 |
| M106 | CVn | N891 | And | M33 | Tri | M82 | UMa | N4449 | CVn | M1 | Tau |
| 2 | 22,5 | 4 | 22,7 | 4 | 23,1 | 2 | 20,9 | 7 | 22,2 | 5 | 20,5 |



*M = Messier N = NGC
 §(7) = object staat niet vermeld op de kaart

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|------|-----|------|-----|------|-----|------|-------|------|------|------|-------|------|-------|------|-------|------|-------|------|-----|------|-------|------|-------|------|-------|------|-------|------|
| M22 | Sgr | M71 | Sgr | M10 | Oph | M12 | Oph | N5053 | Com | M107 | Oph | N6535 | Ser | N6712 | Sct | N6760 | Aqr | M5 | Ser | M13 | Her | M30 | Cap | M92 | Her | N6440 | Sgr | N6342 | Oph |
| 2 | 20,6 | 16 | 21,1 | 15 | 21,1 | 15 | 21,1 | 7 | 23,4 | 15 | 21,5 | 15 | 18,8 | 16 | 20,3 | 16 | 19,9 | 15 | 20,4 | 8 | 20,5 | 23 | 21,0 | 6 | 20,3 | 22 | 19,3 | 22 | 20,8 |
| M80 | Sco | M56 | Lyr | M15 | Peg | M3 | CVn | N6517 | Oph | M2 | Aqr | N5897 | Lib | N6356 | Oph | N5466 | Boo | N6934 | Dra | M53 | Com | N5634 | Vir | N6229 | Her | N7006 | Del | N2419 | Lyr |
| 2 | 20,7 | 8 | 21,2 | 17 | 20,3 | 7 | 20,6 | 15 | 19,2 | 17 | 20,7 | 21 | 22,0 | 15 | 19,5 | 7 | 22,8 | 16 | 22,0 | 7 | 21,7 | 14 | 21,8 | 8 | 21,2 | 16 | 21,7 | 5 | 23,3 |

De lijst bevat 120 objecten die zichtbaar zijn in kleine telescopen en die 20° boven de Belgische horizon komen. Uitzondering: M22, M30, M8 en M20. Deze werden toch opgenomen aangezien ze helder genoeg zijn om zelfs op en lagere hoogte waargenomen te worden.
 Aantal objecten per categorie: 3 dubbelsterren, 10 heldere nevels, 3 asterismen (ongenomen bij open sterrenhopen), 17 open sterrenhopen, 6 planetaire nevels, 1 supernova restant; 30 bolvormige sterrenhopen, 30 sterrenstelsels (2 dwerg elliptisch, 4 elliptisch, 4 lenticulaire, 3 balkspiraal, 15 gewone spiralen en 2 onregelmatige sterrenstelsels).

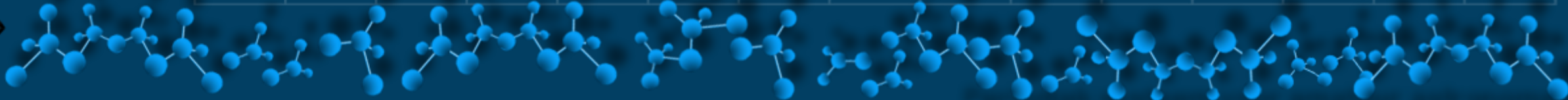
- Dubbelsterren
- Diffuse nevel
- Open sterrenhoop/Asterism
- Sterrenstelsel
- Planetaire nevels/supernova rest
- Bolvormige sterrenhoop

| |
|----------------------------------|
| 71 Lu Lutetium 174.97 |
| 103 Lr Lawrencium (262) |

| | | | | | | | | | | | | | | | | | | | |
|-------------------------------|--------------------------------|-------------------------------|-------------------------------------|-------------------------------|----------------------------------|-------------------------------|-------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|--------------------------------|---------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|--|
| IA | | | | | | | | | | VIIIA | | | | | | | | | |
| 1 H Hydrogen 1.01 | IIA | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | | | | | | | | | | | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | | |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | IVB | VB | VIB | VII B | VIII B | VIII B | VIII B | IB | IIB | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.63 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | | | |
| 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 22 Ti Titanium 47.87 | 23 V Vanadium 50.94 | 24 Cr Chromium 52.00 | 25 Mn Manganese 54.94 | 26 Fe Iron 55.85 | 27 Co Cobalt 58.93 | 28 Ni Nickel 58.69 | 29 Cu Copper 63.55 | 30 Zn Zinc 65.38 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.63 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | | | |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 1 H 8 O 0 G T E P U N T E N | | | | | | | | | | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | | | | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Lanthanides | Hf Hafnium 178.49 | Ta Tantalum 180.95 | W Tungsten 183.84 | Re Rhenium 186.21 | Os Osmium 190.23 | Ir Iridium 192.22 | Pt Platinum 195.08 | Au Gold 196.97 | Hg Mercury 200.59 | Tl Thallium 204.38 | Pb Lead 207.20 | Bi Bismuth 208.98 | Po Polonium (209) | At Astatine (210) | Rn Radon (222) | | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actinides | 104 Rf Rutherfordium (265) | 105 Db Dubnium (268) | 106 Sg Seaborgium (271) | 107 Bh Bohrium (270) | 108 Hs Hassium (277) | 109 Mt Meitnerium (276) | 110 Ds Darmstadtium (281) | 111 Rg Roentgenium (280) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium 289 | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) | | |

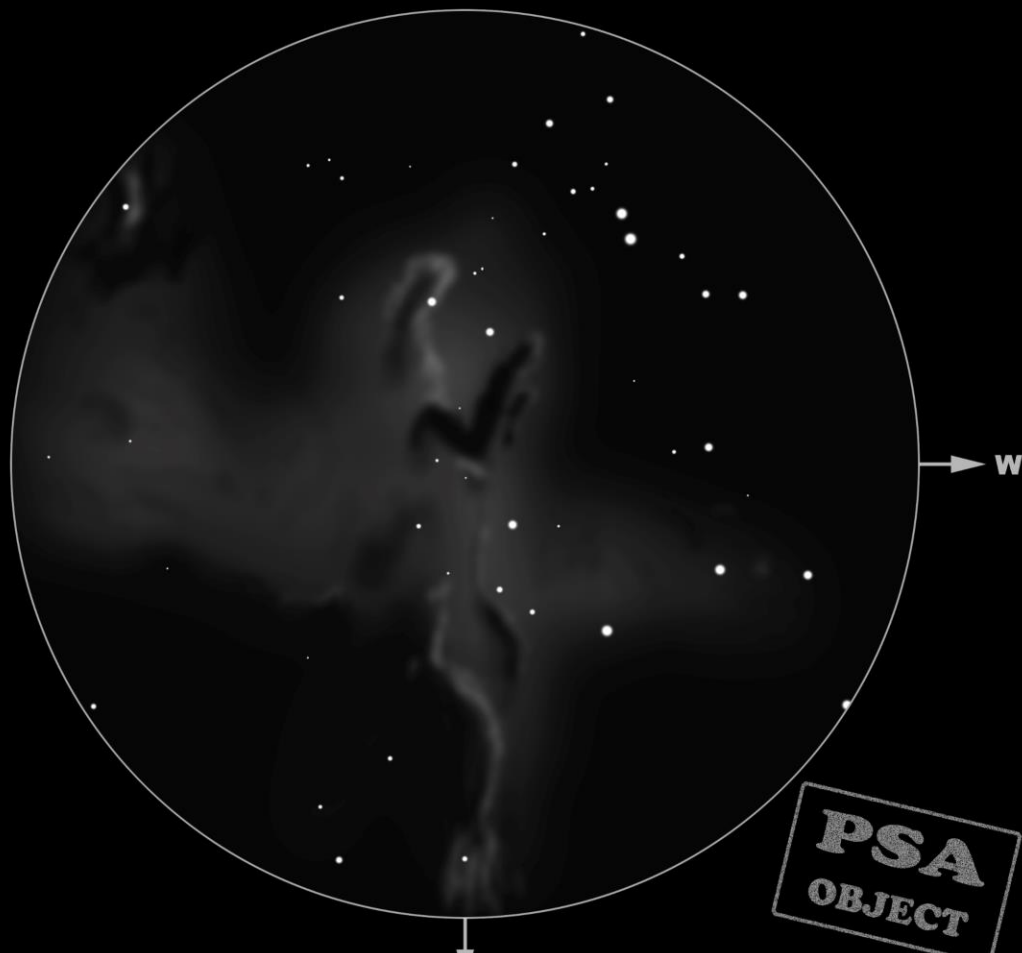


| | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



24 juli 2019 22h 28m UT

M 16, Arendnevel, open sterrenhoop in Serpens

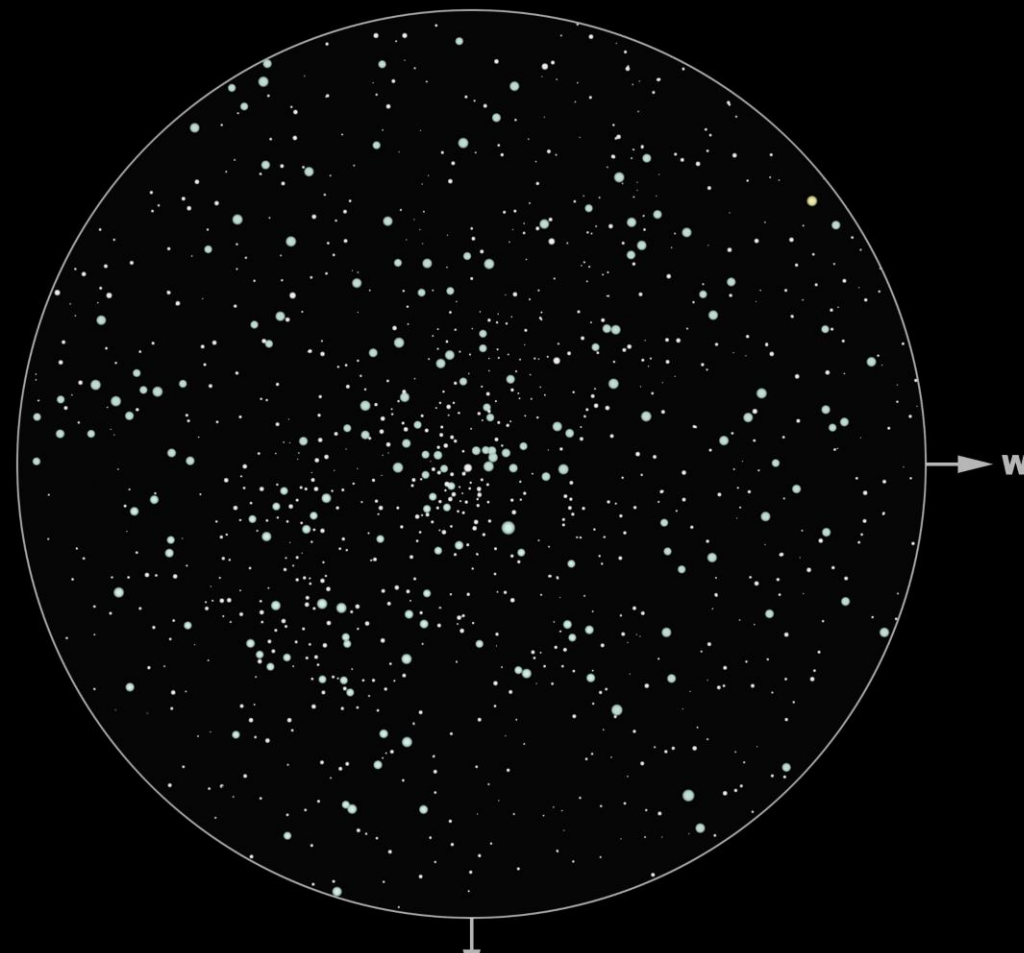


406 mm (16") Newton f/4.5
90 x (OIII filter) FOV 35'

© Guido Gubbels

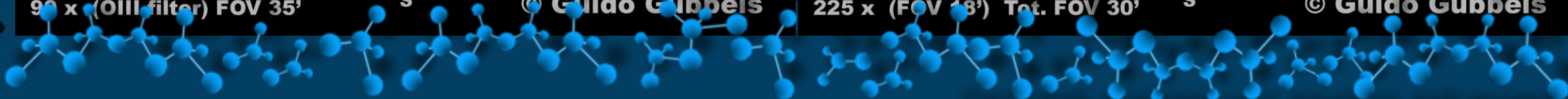
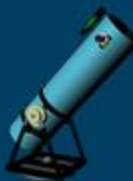
26 maart 2020 20h 08m UT

NGC 869, 'h' Persei, open sterrenhoop in Perseus



406 mm (16") Newton f/4.5
225 x (FOV 18') Tot. FOV 30'

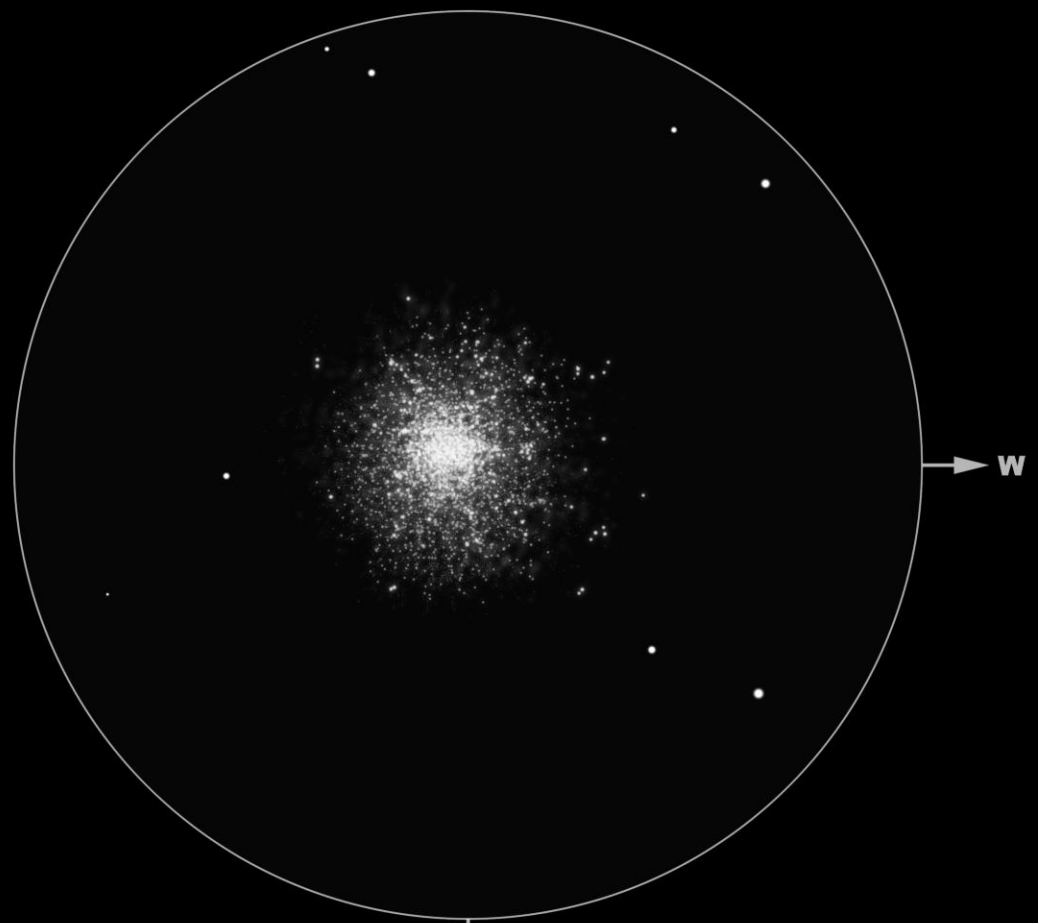
© Guido Gubbels



| |
|-------------------------------|
| IA |
| 1 H Hydrogen 1.01 |
| 3 Li Lithium 6.94 |
| 11 Na Natrium 22.99 |
| 19 K Kalium 39.10 |
| 37 Rb Rubidium 85.47 |
| 55 Cs Cesium 132.91 |
| 87 Fr Francium (223) |

| |
|-------|
| VIIIA |
| 2 |
| 10 |
| 18 |
| 36 |
| 54 |
| 86 |
| 118 |

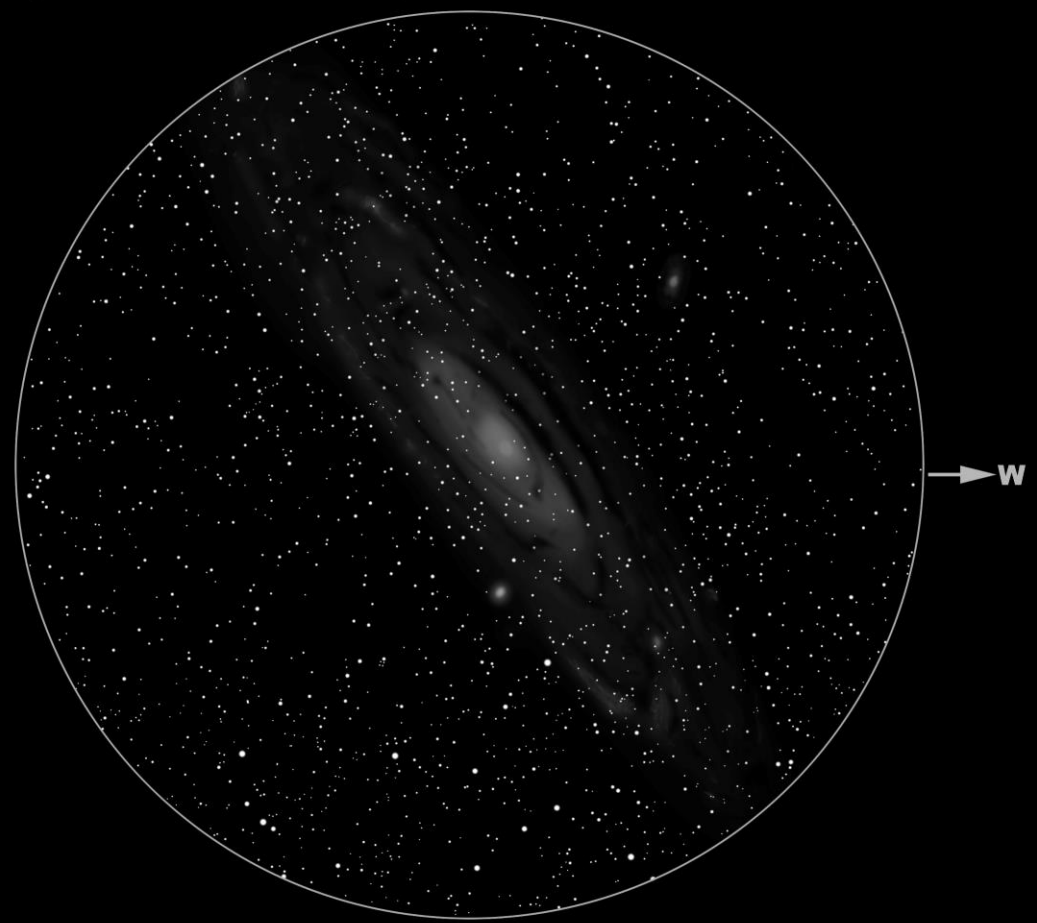
9 augustus 2024 22h 53m UT
M 72, bolvormige sterrenhoop is Aquarius



406 mm (16") Newton f/4.5
514 x FOV 9.6'

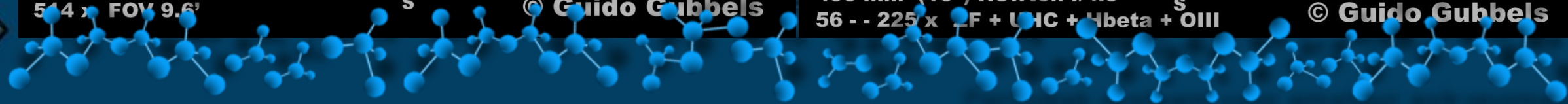
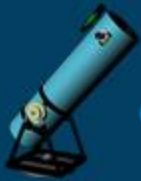
© Guido Gubbels

10 + 13 + 20 + 21 september 2020
M31, Andromedanevel, sterrenstelsel in Andromeda

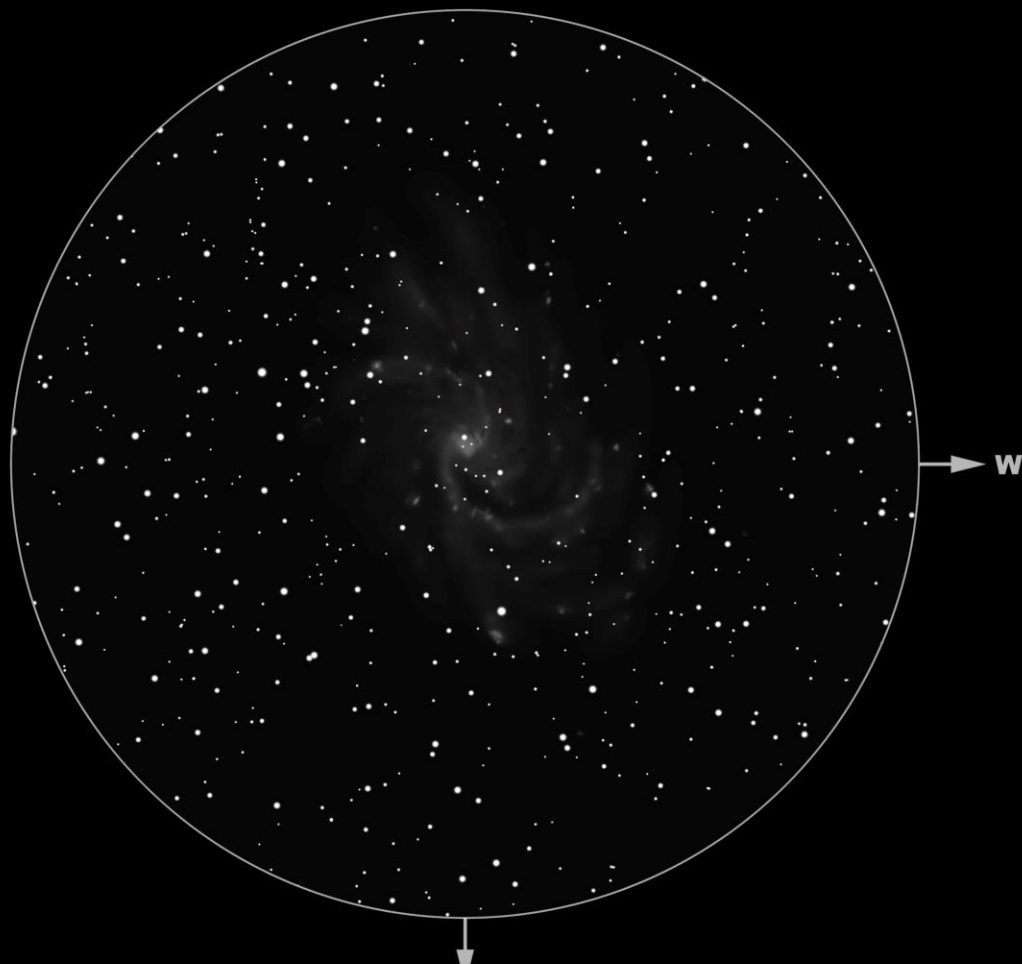


406 mm (16") Newton f/4.5
56 - - 225 x F + UHC + Hbeta + OIII

© Guido Gubbels



4 -> 12 november 2020 **Ttot = ca 9h**
M 33, reuzenrad, sterrenstelsel in Triangulum

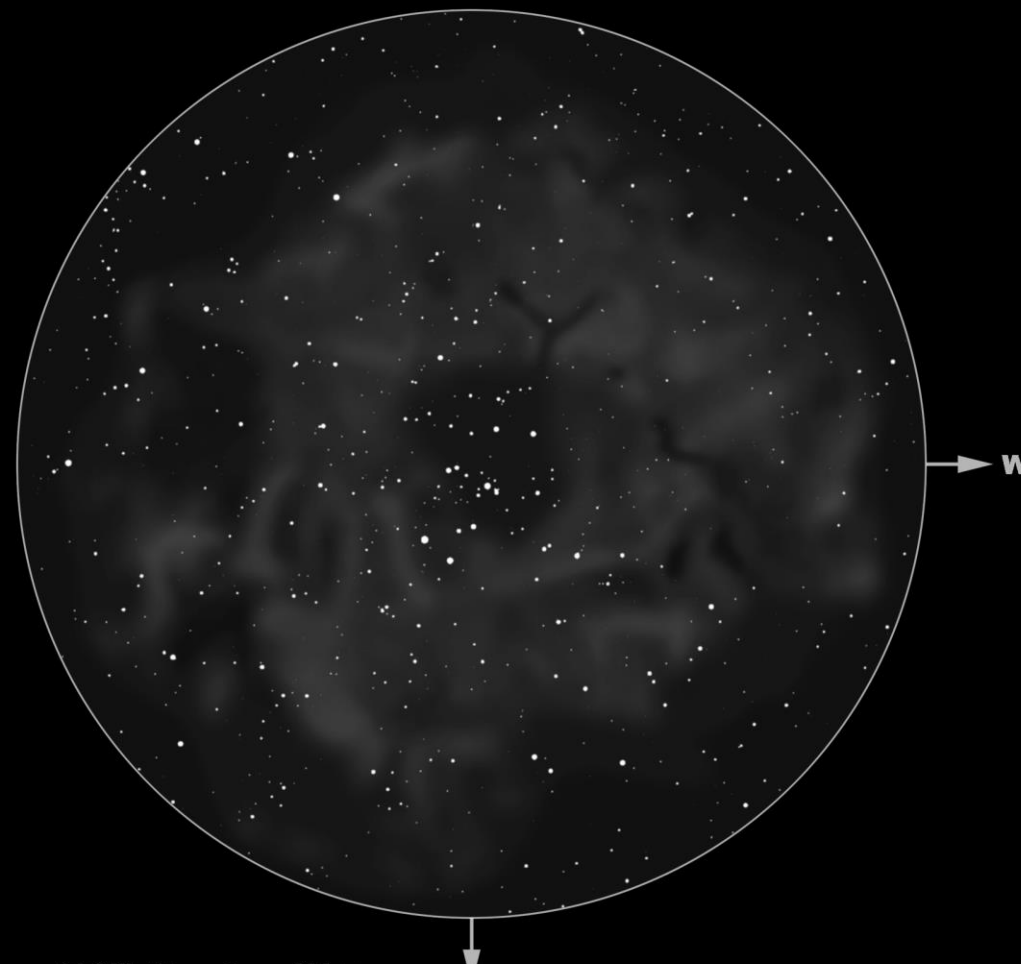


406 mm (16") Newton f/4.5

50 x - 225x FOV 90' Filters UHC - H α eta

© **Guido Gubbels**

1 maart 2021 **20h 20m UT**
NGC 2244 en 2237/8, Rosettenevel in Monoceros



406 mm (16") Newton f/4.5

56 x FOV 88' UHC H β OIII

© **Guido Gubbels**

| | | | |
|-------------------------------|--|--------------------------------|--|
| IA | | IIA | |
| 1 H Hydrogen 1.01 | | | |
| 3 Li Lithium 6.94 | | 4 Be Beryllium 9.01 | |
| 11 Na Natrium 22.99 | | 12 Mg Magnesium 24.31 | |
| 19 K Kalium 39.10 | | 20 Ca Calcium 40.08 | |
| 37 Rb Rubidium 85.47 | | 38 Sr Strontium 87.62 | |
| 55 Cs Cesium 132.91 | | 56 Ba Barium 137.33 | |
| 87 Fr Francium (223) | | 88 Ra Radium (226) | |

6 september 2023 21h 23m UT
Sluiernevel, supernova restant in Cygnus

POC
SEP 2023

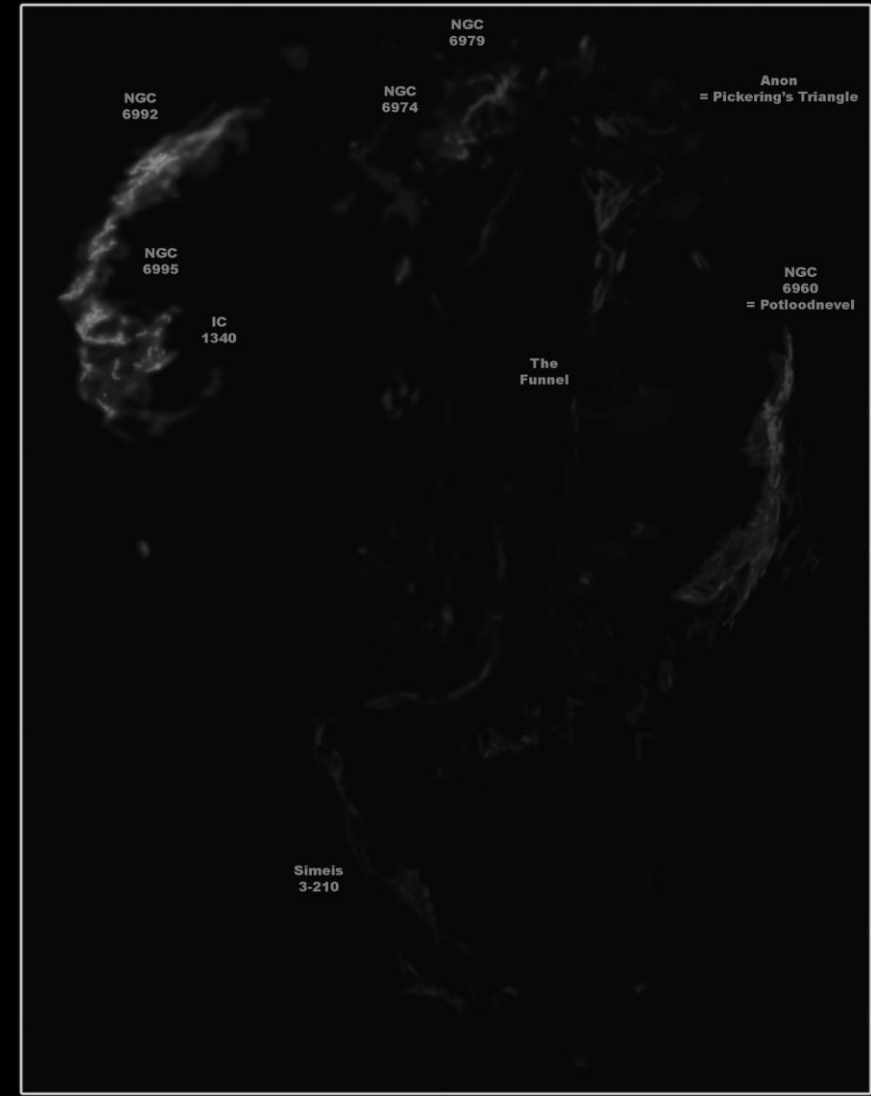


W

406 mm (16") Newton f/4.5
Vergroting: 56x - 150x
© Guido Gubbels

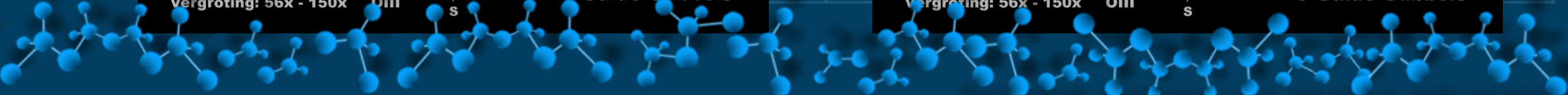
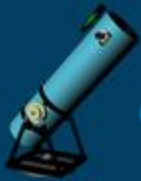
6 september 2023 21h 23m UT
Sluiernevel, supernova restant in Cygnus

POC
SEP 2023



W

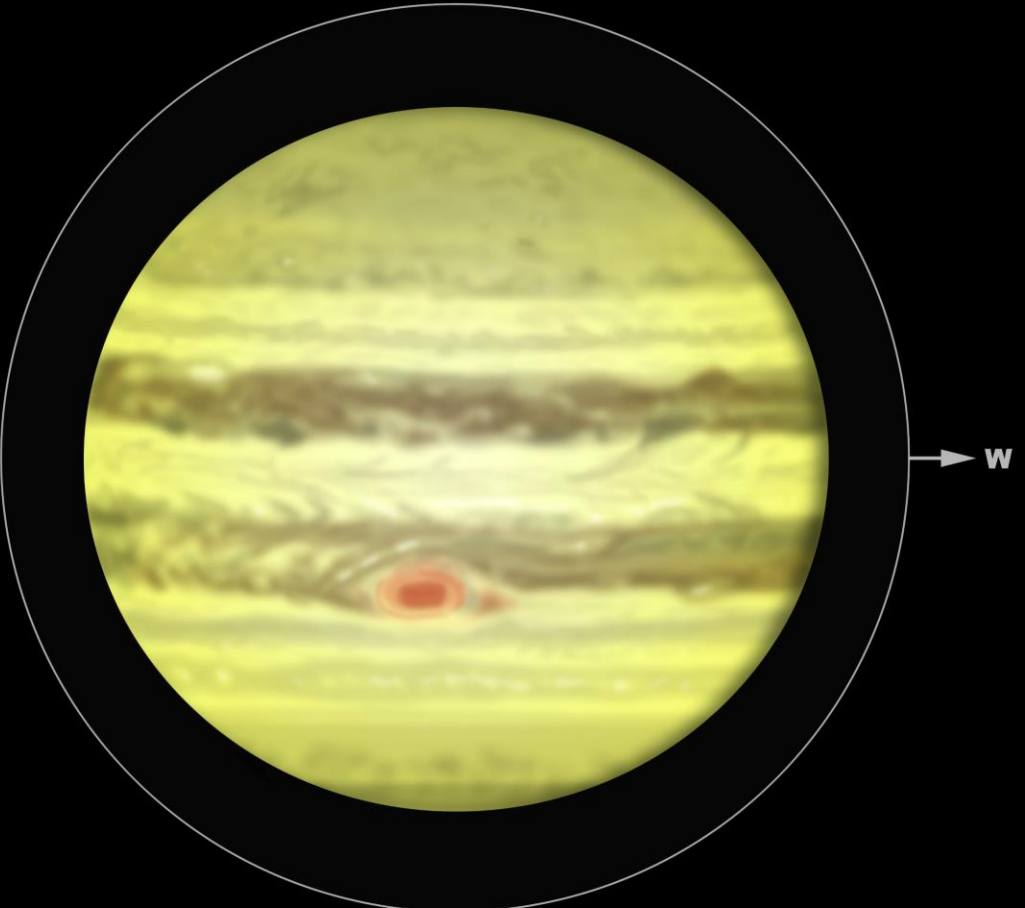
406 mm (16") Newton f/4.5
Vergroting: 56x - 150x
© Guido Gubbels



| | | | |
|----|----|-----------|--------|
| 1 | H | Hydrogen | 1.01 |
| 3 | Li | Lithium | 6.94 |
| 11 | Na | Natrium | 22.99 |
| 19 | K | Potassium | 39.10 |
| 37 | Rb | Rubidium | 85.47 |
| 55 | Cs | Cesium | 132.91 |
| 87 | Fr | Francium | (223) |

VIIIA
?

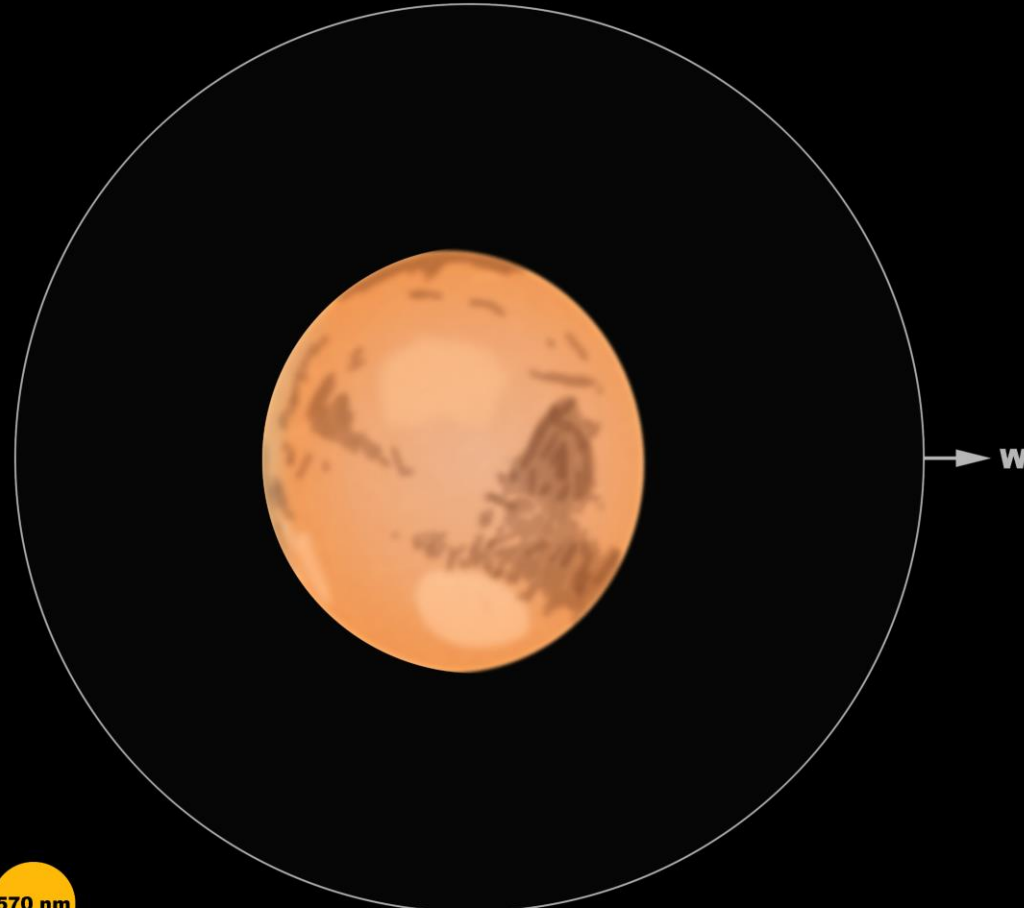
14 september 2023 **3h 05m UT**
Jupiter, CM: I = 102.17 II = 146.67



495 nm
406 mm (16") Newton f/4.5
680 x

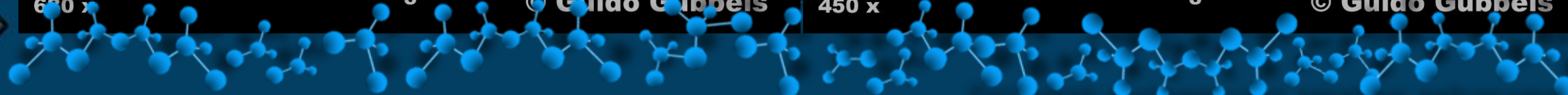
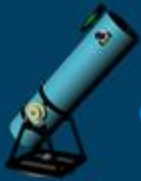
© Guido Gubbels

21 augustus 2024 **3h 46m UT**
Mars, 88.2% verlicht, CM 312°



570 nm
406 mm (16") Newton f/4.5
450 x

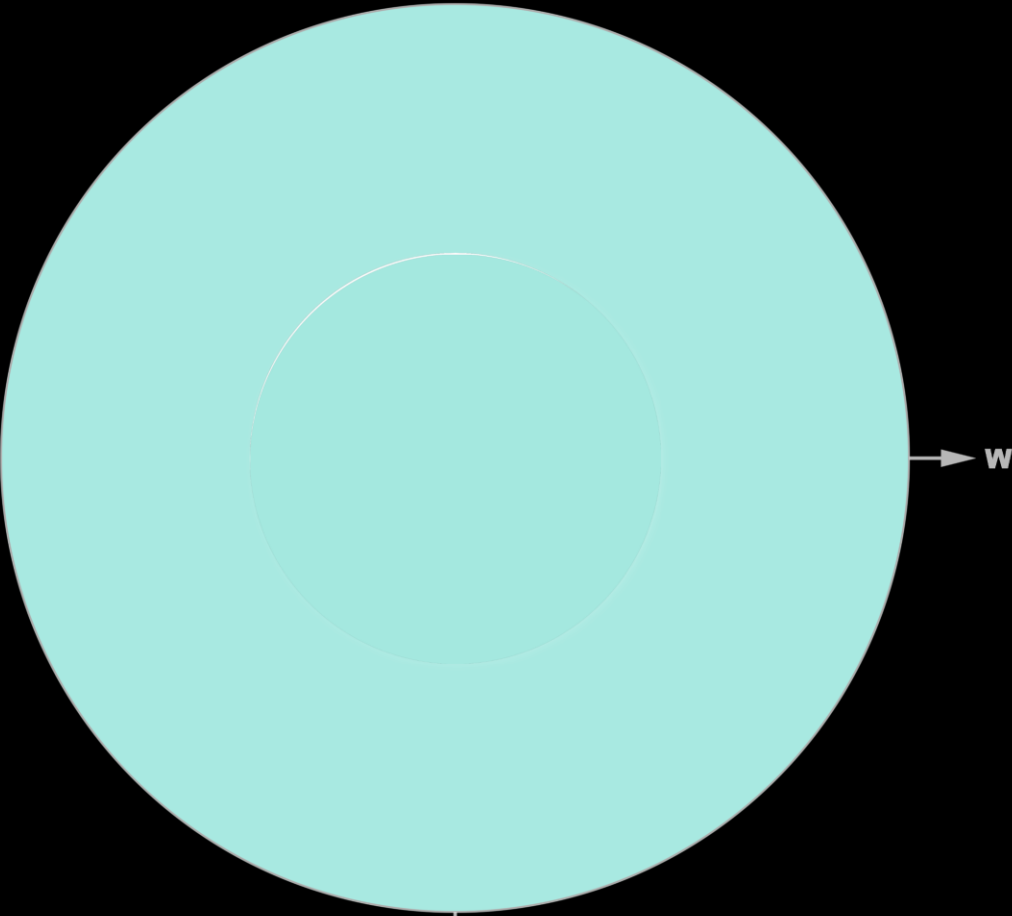
© Guido Gubbels



| |
|-------------------------------|
| IA |
| 1 H Hydrogen 1.01 |
| 3 Li Lithium 6.94 |
| 11 Na Natrium 22.99 |
| 19 K Potassium 39.10 |
| 37 Rb Rubidium 85.47 |
| 55 Cs Cesium 132.91 |
| 87 Fr Francium (223) |

VIIIA
?

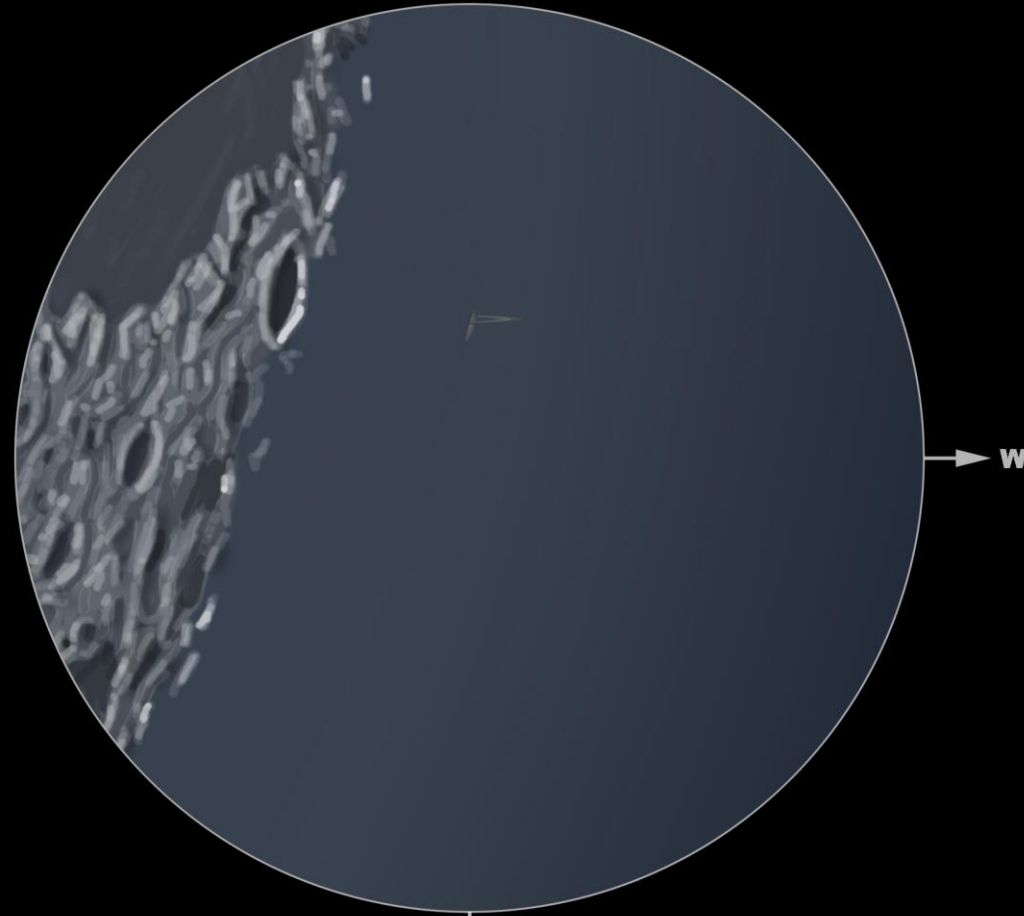
14 augustus 2023 10h 30m UT
Venus 0,9%verlicht (SD = 57,79")



406 mm (16") Newton f/4.5
257 x

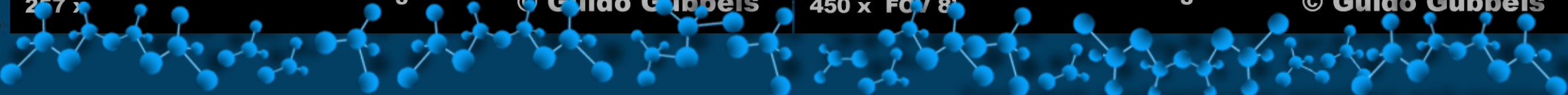
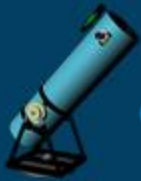
© Guido Gubbels

21 augustus 2024 4h 25m49s UT
Saturnus terugkeer



406 mm (16") Newton f/4.5
450 x FOV 8'

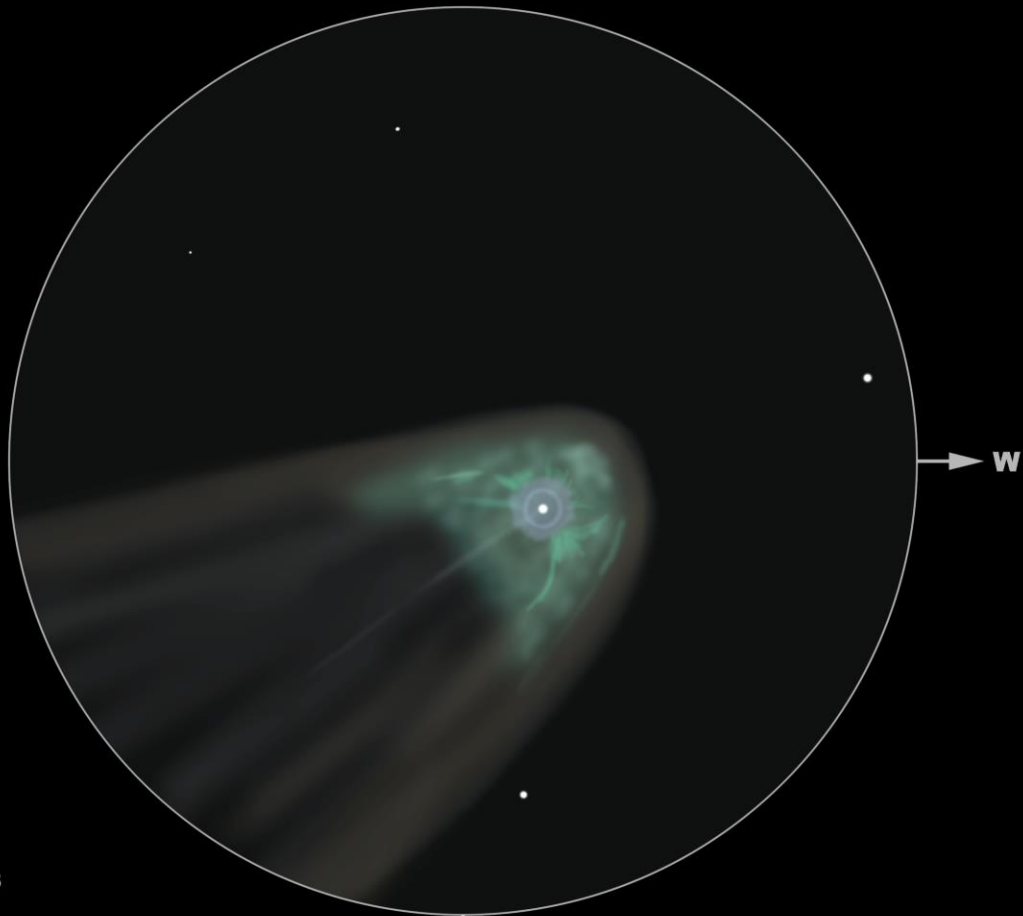
© Guido Gubbels



| |
|-------------------------------|
| IA |
| 1 H Hydrogen 1.01 |
| 3 Li Lithium 6.94 |
| 11 Na Natrium 22.99 |
| 19 K Potassium 39.10 |
| 37 Rb Rubidium 85.47 |
| 55 Cs Cesium 132.91 |
| 87 Fr Francium (223) |

VIIIA
2

27 oktober 2024 17h 55m UT
Komeet C/2023 A3 Tsuchinshan-ATLAS

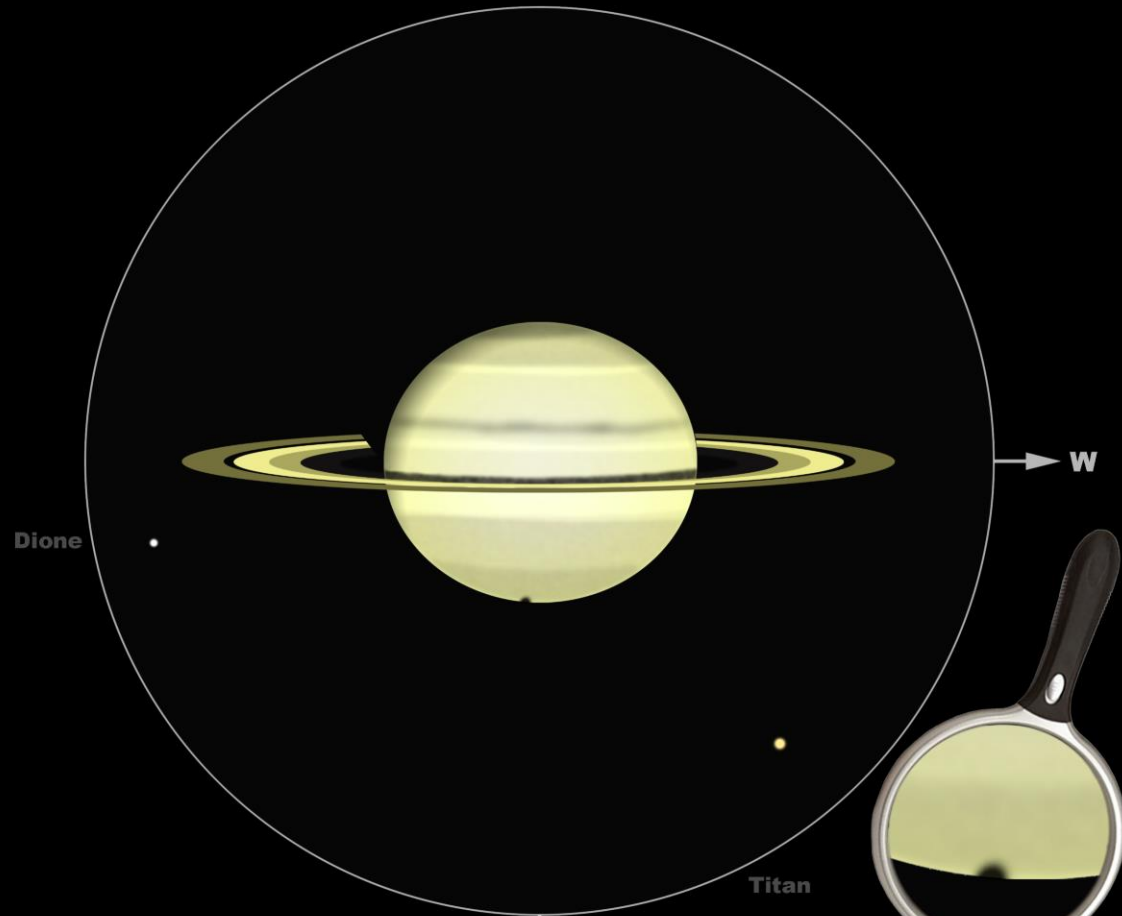


$m_v = 5.8$
 DC7
 $m_k = 9.1$

406 mm (16") Newton f/4.5
680 x

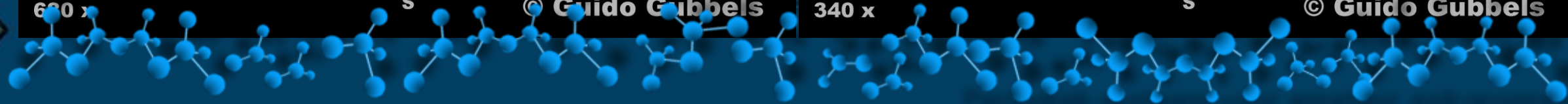
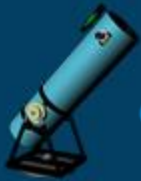
© Guido Gubbels

4 november 2024 21h 41m UT
Saturnus met schaduw Titan



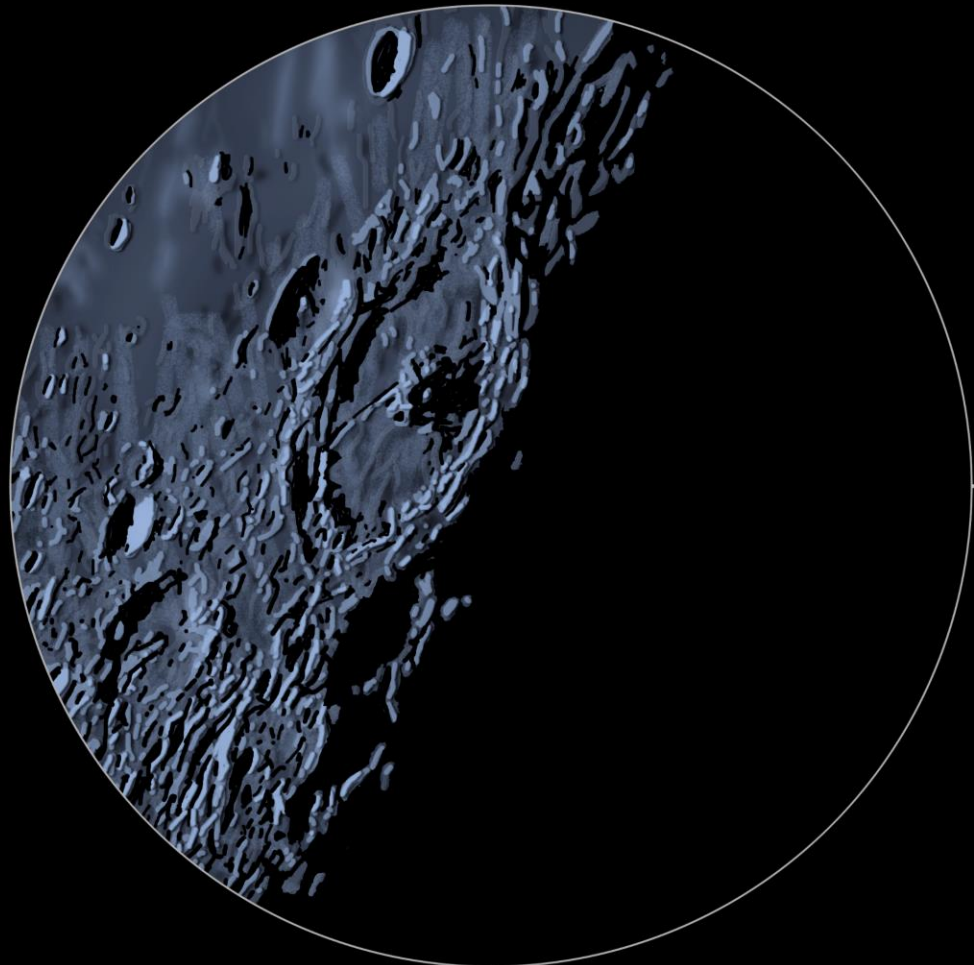
406 mm (16") Newton f/4.5
340 x

© Guido Gubbels



| | | | |
|----------------------------------|--------------------------------|-------------------------------|-------------------------------------|
| IA 1 H Hydrogen 1.01 | IIA | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | | |
| 11 Na Natrium 22.99 | 12 Mg Magnesium 24.31 | IIIB | IVB |
| 19 K Kalium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | 22 Ti Titanium 47.87 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | 40 Zr Zirkon 91.22 |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Lanthaniden | 72 Hf Hafnium 178.49 |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actiniden | 104 Rf Rutherfordium (261) |

20 september 2024 3h 20m UT
 Petavius en omgeving (maan = 94% verlicht)



W

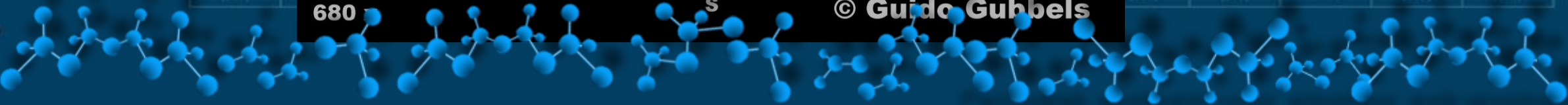
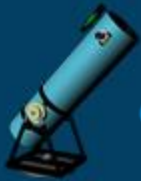
W80A

406 mm (16") Newton f/4.5
 680

© Guido Gubbels

| | | | | |
|----------------------------------|-----------------------------------|-----------------------------------|-------------------------------------|------------------------------------|
| | | | | VIIIA 2 He Helium 4.00 |
| IVA 6 C Carbon 12.01 | VA 7 N Nitrogen 14.01 | VIA 8 O Oxygen 16.00 | VIIA 9 F Fluorine 19.00 | 10 Ne Neon 20.18 |
| 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chloor 35.45 | 18 Ar Argon 39.95 |
| 32 Ge Germanium 72.63 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 |
| 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Jodium 126.90 | 54 Xe Xenon 131.29 |
| 82 Pb Lood 207.20 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) |
| 114 Fl Flerovium 289 | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) |

| | | | | |
|----------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------------------------|
| 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |



Astronomie in beweging

<https://www.youtube.com/watch?v=Uo878xho7aw>

ASTRONOMIE IN BEWEGING
2020



KRIEGER
OBSERVATORIUM



| | | | | | | | | | | | | | | | | | | | |
|--------------------------------------|---------------------------------------|--------------------------------------|--|--------------------------------------|---|---------------------------------------|--------------------------------------|---|---|--|--|---------------------------------------|---------------------------------------|--|--|---|--|--|--|
| IA | | | | | | | | | | VIIIA | | | | | | | | | |
| 1 H Hydrogen 1.01 | IIA | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 | | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | | | | | | | | | | | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 | | |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | IIIB | IVB | VB | VIB | VIIB | VIIIB | VIIIB | VIIIB | IB | IIB | | | | | | | | |
| 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 21 Sc Scandium 44.96 | 22 Ti Titanium 47.87 | 23 V Vanadium 50.94 | 24 Cr Chromium 52.00 | 25 Mn Manganese 54.94 | 26 Fe Iron 55.85 | 27 Co Cobalt 58.93 | 28 Ni Nickel 58.69 | 29 Cu Copper 63.55 | 30 Zn Zinc 65.38 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.63 | 33 As Arsenic 74.92 | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 | | |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.91 | <div style="border: 2px solid black; padding: 5px; text-align: center;"> 119 V </div> <div style="border: 2px solid black; padding: 5px; text-align: center;"> 37 R </div> <div style="border: 2px solid black; padding: 5px; text-align: center;"> 13 A </div> <div style="border: 2px solid black; padding: 5px; text-align: center;"> 31 G </div> <div style="border: 2px solid black; padding: 5px; text-align: center;"> 69 E </div> <div style="border: 2px solid black; padding: 5px; text-align: center;"> 10 N </div> | | | | | | | | | | 50 Sn Tin 118.71 | 51 Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 | | |
| 55 Cs Cesium 132.91 | 56 Ba Barium 137.33 | 57 - 71 Lanthanides | | | | | | | | | | | 82 Pb Lead 207.20 | 83 Bi Bismuth 208.98 | 84 Po Polonium (209) | 85 At Astatine (210) | 86 Rn Radon (222) | | |
| 87 Fr Francium (223) | 88 Ra Radium (226) | 89 - 103 Actinides | 104 Rf Rutherfordium (261) | 105 Db Dubnium (268) | 106 Sg Seaborgium (271) | 107 Bh Bohrium (270) | 108 Hs Hassium (277) | 109 Mt Meitnerium (276) | 110 Ds Darmstadtium (281) | 111 Rg Roentgenium (280) | 112 Cn Copernicium (285) | 113 Nh Nihonium (284) | 114 Fl Flerovium 289 | 115 Mc Moscovium (288) | 116 Lv Livermorium (293) | 117 Ts Tennessine (294) | 118 Og Oganesson (294) | | |

| | | | | | | | | | | | | | | |
|--|--------------------------------------|---|--|--|---------------------------------------|---------------------------------------|---|---------------------------------------|---|---|--------------------------------------|--|--|---|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |

| | | | | | | | | | | | | | | | | | |
|--------------------------------------|---------------------------------------|-----------------------|------------------------------|------------------------|---------------------------|--------------------------|-------------------------------------|--------------------------------------|--|-------------------------------------|----------------------------------|--------------------------------------|-------------------------------------|---------------------------------------|--|--------------------------------------|--|
| IA | | | | | | | | | | | VIIIA | | | | | | |
| 1 H Hydrogen 1.01 | IIA | | | | | | | | | | 2 He Helium 4.00 | | | | | | |
| 3 Li Lithium 6.94 | 4 Be Beryllium 9.01 | | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12.01 | 7 N Nitrogen 14.01 | 8 O Oxygen 16.00 | 9 F Fluorine 19.00 | 10 Ne Neon 20.18 |
| 11 Na Sodium 22.99 | 12 Mg Magnesium 24.31 | III B | IV B | V B | VI B | VII B | VIII B | VIII B | VIII B | IB | IIB | 13 Al Aluminum 26.98 | 14 Si Silicon 28.09 | 15 P Phosphorus 30.97 | 16 S Sulfur 32.06 | 17 Cl Chlorine 35.45 | 18 Ar Argon 39.95 |
| 19 K Potassium 39.10 | 20 Ca Calcium 40.08 | 5 B | 69 E | 105 D | 13 A | 10 N | 19 K | 52 T | 28 Ni Nickel 58.69 | 29 Cu Copper 63.55 | 119 V | 8 O | 8 O | 37 R | 34 Se Selenium 78.97 | 35 Br Bromine 79.90 | 36 Kr Krypton 83.80 |
| 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | Y Yttrium 88.91 | Zr Zirconium 91.22 | Nb Niobium 92.91 | Mo Molybdenum 95.95 | Tc Technetium (98) | Ru Ruthenium 101.07 | Rh Rhodium 102.91 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.87 | Cd Cadmium 112.41 | In Indium 114.82 | Sn Tin 118.71 | Sb Antimony 121.76 | 52 Te Tellurium 127.60 | 53 I Iodine 126.90 | 54 Xe Xenon 131.29 |
| 55 Cs Cesium 132.91 | 120 J | 92 U | 3 L | 3 L | 53 I | 69 E | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 13 A | 13 A | 10 N | 105 D | 13 A | 6 C | 1 H | 52 T | 86 Rn Radon (222) |
| 87 Fr Francium (223) | 88 Ra Radium (226) | Actinides | Rf Rutherfordium (265) | Db Dubnium (268) | Sg Seaborgium (271) | Bh Bohrium (270) | Hs Hassium (277) | Mt Meitnerium (276) | Ds Darmstadtium (281) | Rg Roentgenium (280) | Cn Copernicium (285) | Nh Nihonium (284) | Fl Flerovium 289 | Mc Moscovium (288) | Lv Livermorium (293) | Ts Tennessine (294) | 118 Og Oganesson (294) |

| | | | | | | | | | | | | | | |
|--|--------------------------------------|---|--|--|---------------------------------------|---------------------------------------|---|---------------------------------------|---|---|--------------------------------------|--|--|---|
| 57 La Lanthanum 138.91 | 58 Ce Cerium 140.12 | 59 Pr Praseodymium 140.91 | 60 Nd Neodymium 144.24 | 61 Pm Promethium (145) | 62 Sm Samarium 150.36 | 63 Eu Europium 151.96 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.93 | 66 Dy Dysprosium 162.50 | 67 Ho Holmium 164.93 | 68 Er Erbium 167.26 | 69 Tm Thulium 168.93 | 70 Yb Ytterbium 173.05 | 71 Lu Lutetium 174.97 |
| 89 Ac Actinium (227) | 90 Th Thorium 232.04 | 91 Pa Protactinium 231.04 | 92 U Uranium 238.03 | 93 Np Neptunium (237) | 94 Pu Plutonium (244) | 95 Am Americium (243) | 96 Cm Curium (247) | 97 Bk Berkelium (247) | 98 Cf Californium (251) | 99 Es Einsteinium (252) | 100 Fm Fermium (257) | 101 Md Mendelevium (258) | 102 No Nobelium (259) | 103 Lr Lawrencium (262) |

