Stellar Data

Identifiers

Greek Name: Typically a Greek letter, starting with Alpha for the brightest star, followed by a Latin form of the Constellation. So “ALF UMA” would actually be “Alpha Ursa Majoris,” or the brightest star in Ursa Major.

SAO Number: Listing of the star in the Smithsonian Astrophysical Observatory star catalog.

Henry Draper: Catalog named after the “Father of Astrophotography and the first large scale attempt to catalog the spectral type of stars, created in the early 20th century.

Skymap: NASA catalog used for this database of all stars down to magnitude 8.0.

Binary Data

Binary stars are systems of two or more stars that either orbit around each other or just look close. Separation is the angle between the two brightest stars in arc seconds (3600 arc seconds are in a degree). After that is given the difference in magnitude between the two brightest components.

Brightness and Luminosity

Magnitude: The brightness of a star, the smaller the number the brighter. The brightest star after the sun is Sirius at magnitude -1.4. Venus can outshine that at about -4 for its brightest. The dimmest star the eye can perceive is about magnitude 6.5 under the darkest skies.

Abs. Magnitude: The absolute or “true” magnitude of a star when compared to all others placed at the distance of 32 light years.

B-V Magnitude: This is the measure of the stars color, termed “color index.” The lower the number the hotter and bluer a star is, the higher, the redder and cooler it will be. The star Rigel is very hot with a B-V (“B minus V”) of -.02, while our own sun is about .66. The coolest stars will be about 2.

Luminosity Class: Specifies the luminosity of a star as a result of their size and temperature. Type I stars are the supergiants such as Betelgeuse, while type VII are white dwarfs. Our sun is actually a “dwarf” or a class of “V”. Classes can then be broken into subclasses such as “Ia” or “IVb.”

Variable Data

Variable stars are objects that can vary their brightness for many different reasons. Cataclysmic variables such as supernova are the most extreme. Other more sedate varieties may vary in due to having a dim orbiting companion (binary stars), or by physically pulsing in size.

Variable Class: One of the most important types is the Cepheid, which pulse at a rate that is directly linked to their luminosity. One can figure out their luminosity very accurately and as such, their distance. Cepheids are very important when determining distances to nearby galaxies.

Eclipse variables are those that change brightness due to being eclipsed by a dimmer companion, such as the Algol, Beta Lyrae or Ellipsoidal varieties. The Mira types are red supergiants that can change up to 11 magnitudes over the course of a year. RR Tauri are usually yellow supergiants that vary with periods up to 100 days, by 3 or 4 magnitudes. RR Lyrae are similar to Cephieds. Semi-regular stars such as Betelgeuse usually vary with a regular period but sometimes go into irregular changes as well. The RR Cor. Borealis class stay bright and then periodically dim by dust formation in the star. When the dust clears and moves away, the star brightens back up.

Mag. Diff.: The change in magnitude between the minimum and maximum.

Period: The number of days between the minimum and maximum.

Class

Spectral Class: Broken down into 7 main types: O, B, A, F, G, K and M. The O stars are the hottest and bluest, while the M stars are the reddest and coolest. O and B stars are very rare with O stars such as Mintaka in Orion, shining at over a million times the sun's luminosity with a surface temperature of 50,000 degrees. Stars classified as A, are very common of the naked eye stars and are white or bluish white and are made up of hydrogen and some ionized metals. They range in temperature from 7,500 to 10,000 degrees. Sirius is a class A. Class F stars are white, cooler and are similar in make up to A stars, with the addition of calcium and iron. Our own sun is a yellow G star, which makes up about 8% of the local stars and fall between 5,000 and 6,000 degrees. Type K stars such as Arcturus are orange in color and made up of neutral metals. Class M stars are the red such as Antares, primarily made of ionized helium. They include supergiants and red dwarfs, are among the most common type and can be as cool as 2,500 degrees.

Peculiarities: This captures any oddities known about the star such as composition or physical attributes. A "rapid rotator" for example will be rotating at a speed of several hundred kilometers/hour such as Vega, compared to our sun

which spins at a stately 2 km/hour. Variable stars will vary their brightness due to many factors. Some stars may be listed as a “central star to a planetary nebula.”. Planetaries such as M57, are round nebula caused when a star casts off its outer layers.

Deep-Sky Wonders

Using the preference “Galaxies, etc” selection, you can toggle on the locations of 110 of the most common objects. These form the “Messier Catalog.” Compiled by the 18th century astronomer Charles Messier as a guide to be used by comet hunters of fuzzy things that sort of looked like comets but that were a not comet. This, the most famous of all celestial catalogs, contains the best-known objects in the sky such as the Great Nebula in Orion (“M42”) and the Andromeda Galaxy (“M31”). These objects are color coded: yellow for galaxies, blue for “planetary nebula”, red for “diffuse nebula” and green for star clusters. Zooming in close will turn on the object’s identifier.

The galaxies are cities of stars, typically swirling disks of hundreds of millions of stars hundreds of thousands of light years across. While galaxies lie outside our own home galaxy of the Milky Way, the other objects lie within. Nebulae are clouds of dust and gas, usually the raw stuff that can eventually condense to form new stars. Diffuse nebulae, shown with the red dots, are formless in their nature. While Planetary nebula are rounded such as the famous Ring Nebula, M57, in the constellation of Lyra. Planetary nebulae are usually the results of a star having gone super nova, exploding and casting off its material in an ever-expanding sphere of dust and gases.

Star clusters come in two major varieties. Open clusters are loose collections of stars typically numbering no more then a few dozen such as M57, otherwise known as The Pleiades. Globular Clusters are spherical condensations of tens of thousands of stars looking much like someone splatted a glob of diamond dust on the black velvet sky. M13 in the constellation of Hercules is one of the best examples of these.

Using Distant Sun’s search function you can locate each of the Messier objects, read up on what makes each unique and see numerous spectacular photos.

.

Messier Objects Data

ID: All Messier catalog objects have a unique catalog number, For example, the Orion Nebula is otherwise known by the decidedly less romantic name of “M42”.

Common Name: Some of the objects have a more commonly used name. M57 is “The Ring Nebula“ while M45 is better known as “The Pleiades.”

Constellation: The host constellation.

RA/Declination: The location of the object in the sky.

Rise/Set: Times when it will be visible.

Magnitude: The overall brightness of the object, the higher numbers, the dimmer the object. Magnitude 6.5 is about the limit of the unaided eye.

Type: Open star clusters are a loose arrangement of stars. Globular clusters are tight knows of stars, usually in orbit around galaxies. And Galaxies, well, duh. Diffuse Nebulae are loose clouds of gas, while Planetary Nebulae are round or ring shaped clouds typically caused by a star casting off its outer shell.

Class: Many objects have their own subtypes or “class.” For nebula, you might find “E” or “R.” E means this is “emissive”, while R suggests this is a reflection nebula, made visible by reflected light. For planetary nebulae, you will find them described by at least one and maybe two classes. Class 1 is a star like image, while 2 is a “regular disc.” Class of 3 is an irregular disc, class 4 the classic ring structure, while 5 and 6 tend towards randomness. Galaxies are E for elliptical and appear as fairly smooth discs, while S types are for the classic spiral shapes. There are a few irregular galaxies, or “I” types, which have no defined structures. Some galaxies have a number for the angle; a 1 is face on up to a 7, meaning “edge on.”

Size: The angular dimensions of the object usually in seconds or minutes. For example, The Ring Nebula is 86” by 62” in size. In other words, 86 arc-seconds by 62 arc-seconds. There are 60 arc minutes in a degree and 60 arc-seconds in an arc-minute. By comparison, the moon is about 30’, (30 arc-minutes) across, or about 20 to 30 times the size of The Ring Nebula.

NGC id: After the Messier catalog came the New General Catalog of deep-sky objects. The NGC number is the corresponding NGC catalog entry for the supplied Messier object.

Planetary Data

Distance from Earth: Given in millions of miles (km at some point)

Distance from Sun: This is measured in “Astronomical Units” (AU). One AU is roughly the average distance between the earth and the sun, or about 93 million miles (155 million km). Two distances are given, the closest the planet comes to the sun and the furthest point from the sun.

Length of the day: Given in earth-based units.

Length of the year: Given in earth days or years.

Light Time: The time it takes for light to travel one way.

Orbital inclination: The tilt of the planet’s orbit relative to the earth’s.