

# Kitt Peak Nightly Observing Program

## Splendors of the Universe on YOUR Night!

Many pictures are links to larger versions.

Click here for the ["Best images of the OTOP" Gallery](#) and more information.



### M8 Lagoon Nebula

**M8:** The "Lagoon Nebula." A huge cloud of gas and dust beside an open cluster of stars (NGC 6530). The Lagoon is a stellar nursery, 4,100 lightyears away, towards the galactic core.

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### M51 Whirlpool Galaxy

**M51,** the **Whirlpool Galaxy**, gets its name from its bright and prominent spiral arms. It lies at a distance of 23 million light-years away. It also has a smaller, companion galaxy (NGC 5195). The two galaxies are one of the best examples of interacting galaxies.

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### M64 Black Eye Galaxy

**M64,** the **Black Eye Galaxy**, gets its name from a large dust lane which makes it appear as if the galaxy has a black eye. It lies about 24 million light-years away.

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### M81 Bode's Galaxy

**M81** is a small spiral galaxy, 12 million lightyears away. It is a disk of 50 billion solar masses, only a stone's throw (150,000 lightyears) from M82.

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## M82 Cigar Galaxy

**M82**, the "**Cigar Galaxy**" is an edge-on spiral galaxy, 12 million light-years away, and perhaps 37,000 light-years across. There are vast gas clouds in this galaxy, where stars are being born at an incredible rate.

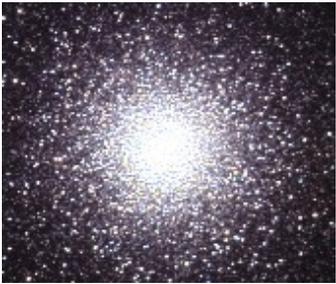
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## M104 (Sombrero Galaxy)

**M104**: A spiral galaxy like the Milky Way, nicknamed the "Sombrero Galaxy" because the lane of dust in the disk looks like the brim of such a hat. It is about 50,000 lightyears across and about 29 million lightyears away.

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## M3

**M3** is a globular cluster with a half of a million stars. It orbits the core of our Milky Way Galaxy almost perpendicular to the galactic disk. It is currently 33,900 light-years away, and approaching our Solar System at 100 miles per second.

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## M13 Hercules Globular

**M13**, the "**Great Globular Cluster in Hercules**" was first discovered by Edmund Halley in 1714, and later catalogued by Charles Messier in 1764. It contains 300,000 stars, and is 22,000 light-years away. Light would need over a century to traverse its diameter.

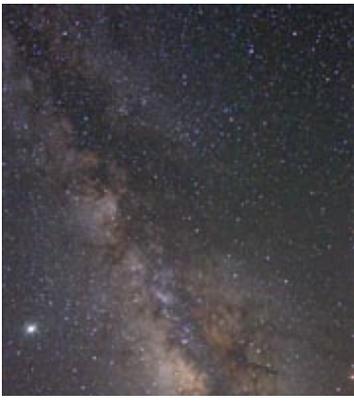
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## Meteors

Quick streaks of light in the sky called meteors, shooting stars, or falling stars are not stars at all: they are small bits of rock or iron that heat up, glow, and vaporize upon entering the Earth's atmosphere. When the Earth encounters a clump of many of these particles, we see a meteor shower lasting hours or days.

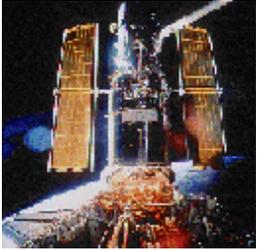
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## Milky Way

That clumpy band of light is evidence that we live in a disk-shaped galaxy. Its pale glow is light from about 200 billion suns!

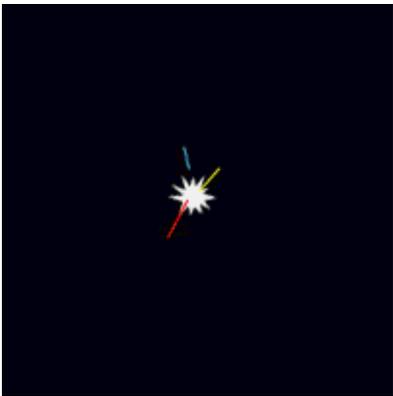
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## Satellites

Human technology! There are almost 500 of these in Low Earth Orbit (we can't see the higher ones). We see these little "moving stars" because they reflect sunlight.

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## Scintillation

The twinkling of star light is a beautiful effect of the Earth's atmosphere. As light passes through our atmosphere, its path is deviated (refracted) multiple times before reaching the ground. Stars that are near to the horizon will scintillate much more than stars high overhead since you are looking through more air (often the refracted light will display individual colors). In space, stars would not twinkle at all. Astronomers would like it if they could control the effects of this troubling twinkle.

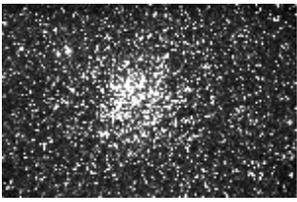
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## M16 Eagle Nebula

**M16** is a cluster of very young stars located within the "**Eagle Nebula**" (NGC 6611, also known as the "Star Queen Nebula" or "The Spire"). The nebula itself is generally too faint to see without taking a long exposure photograph. In the constellation Serpens, this cluster was discovered by Jean-Philippe de Cheseaux in 1745-46. The nebula contains several active star-forming gas and dust regions, including the Pillars of Creation made famous by the Hubble Space Telescope.

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## M11 Wild Duck Cluster

**M11** is an open star cluster also known as the "**Wild Duck Cluster**," due to its purported prominent V-shape, reminiscent of a flock of wild ducks in flight. This open cluster is 20 light-years in diameter and 6,200 light-years away.

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## M57 (Ring Nebula)

**M57**: The Ring Nebula. This remnant of a dead star looks exactly as its name says - a ring or doughnut shape cloud of gas. The nebula is about 2.6 lightyears across and lies about 2,300 lightyears away.

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## Jupiter

Jupiter is the largest planet in the Solar System, a "gas giant" 11 Earth-diameters across. Its atmosphere contains the Great Red Spot, a long-lived storm 2-3 times the size of the Earth. The 4 large Galilean satellites and at least 63 smaller moons orbit Jupiter.

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## Saturn

Saturn, the second-largest planet in the Solar System, is known for its showy but thin rings made of ice chunks as small as dust and as large as buildings. Its largest moon, Titan, has an atmosphere and hydrocarbon lakes; at least 61 smaller moons orbit Saturn.

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## Moon

The same side of the Moon always faces Earth because the lunar periods of rotation and revolution are the same. The surface of the moon is covered with impact craters and lava-filled basins. The Moon is about a fourth of Earth's diameter and is about 30 Earth-diameters away.

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## Comets

Comets were once harbingers of doom—unpredictable and terrifying celestial sights. We now know that comets are balls of ice, rock, and dust tens of kilometers across. As comets approach the Sun, the ices vaporize and sometimes form long, spectacular tails. We observed comet C/2015 V2 Johnson.

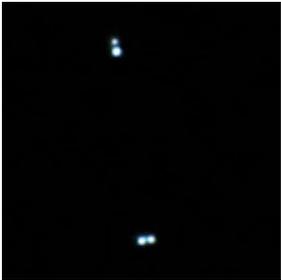
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## Albireo ( $\beta$ Cyg)

Named long before anyone knew it was more than one star, **Albireo** ( $\beta$  Cygni) comprises of a set of stars marking the beak of Cygnus, the swan. Through a telescope, we see two components shining in pale, but noticeably contrasting colors: orange and blue. The difference in color is due to the stars' difference in temperature of over 9000°C! The brighter orange component, Albireo A, is actually a true binary system, though we can't resolve two stars in the telescope. The fainter blue component, Albireo B, may be only passing by, and not gravitationally interacting with Albireo A at all. Albireo is about 430 light-years away.

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## Double Double ( $\epsilon$ Lyr)

The **Double-Double** ( $\epsilon$  Lyrae) looks like two stars in binoculars, but a good telescope shows that both of these two are themselves binaries. However, there may be as many as ten stars in this system! The distant pairs are about 0.16 light-year apart and take about half a million years to orbit one another. The Double-Double is about 160 light-years from Earth.

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## Mu Cephei ( $\mu$ Cep)

**Mu Cephei** ( $\mu$  Cephei), also known as **Herschels Garnet Star**, is a red supergiant star in the constellation Cepheus. It is one of the largest and most luminous stars known in the Milky Way. It appears garnet red and is given the spectral class of M2 Ia. Since 1943, the spectrum of this star has served as one of the stable anchor points by which other stars are classified.

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*Sara Thompson*

Your Telescope Operator and Guide. Thank you for joining me this evening! See you soon!!

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The web page for the program in which you just participated is at [Nightly Observing Program](#). Most of the above images were taken as part of the Overnight Telescope Observing Program. For more information on this unique experience please visit [Overnight Telescope Observing Program](#).

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