

Central Coast Astronomy Virtual Star Party

October 8th , 2021 at 7pm Pacific

Welcome to our Virtual Star Gazing session! FALL is full of star clusters, galaxies, gas giant planets and interesting star systems! We are going to focus on objects you can see with binoculars or a small telescope, so after our session, you can simply walk outside, look up, and understand what you're looking at.

CCAS President Aurora Lipper and astronomer Kent Wallace will bring you a virtual "tour of the night sky" where you can discover, learn, and ask questions as we go along! All you need is an internet connection. You can use an iPad, laptop, computer or cell phone. When 7pm on Saturday night rolls around, click the link on our website to join our class. www.CentralCoastAstronomy.org/stargaze

Before our session starts:

Step 1: Download your free map of the night sky:
www.SkyMaps.com

They have it available for Northern and Southern hemispheres.

Step 2: Print out this document and use it to take notes during our time on Saturday. This document highlights the objects we will focus on in our session together.

Celestial Objects:

Moon: The moon is two days after new, which is really good for star gazing!

Planets:

Sept 22: Equinox. The sun will be shining right on the equator and the amount of time for both day and night will be just about equal throughout the world.

Venus will be low in the west in the early evening with a half Moon phase.

Jupiter and Saturn are both in Capricornus, which is about straight south. With a pair of binoculars, you should be able to see the moons of Jupiter, all lined up with a brighter center dot (Jupiter). Saturn's moons will be all over the place, except when the rings are viewed edge-on from Earth, which happens about every 15 years, and our next one is in 2025.

Main Focus for the Session:

1. Perseus (Hero, Son of Zeus)
2. Pegasus (Hero's Steed, Flying Horse)

Asterisms: These are patterns or groups of stars that have a popular name, but they're not a constellation (usually they are smaller than a constellation). For this month, we have an asterism: the Great Square, which is part of Andromeda and Pegasus.

1. Perseus (Hero, Son of Zeus)

Alpha Persei, Mirphak, there are different spellings for this name and different names for this star. Mirphak is used in the major atlases used by amateur astronomers. This star has visual magnitude of 1.79 and is a bright naked eye star. Mirphak is a white supergiant about 5500 times brighter than our sun and is about 620 light years distant. It is the brightest member of a widely dispersed open cluster known as the Alpha Persei Cluster or Melotte 20. This cluster is spread out over five degrees of the sky with a visual magnitude of 2.3, containing over a hundred members. Besides Alpha, several stars of this cluster are visible to the naked eye, mainly to the southeast of Alpha. In binoculars many more stars can be seen stretching southeast from Alpha.

Beta Persei, Algol, the Demon Star, variable eclipsing binary star. Its variability may have been known by Arab astronomers in the middle ages due to its name, the Demon Star. Italian astronomer Gerinimano Montanari has the first known written account of Algol's variability around 1667.

Algol is about 93 light years distant. Every 69 hours the star dims from a visual magnitude of 2.1 to a visual magnitude of 3.4 over five hours and returns to a visual magnitude of 2.1 over the next five hours. The variability in brightness is caused by a brighter star being eclipsed by a dimmer star. It is just by chance that this binary system is lined up so that we can see one star eclipse another from the Earth.

The brightest component is a class B8, blue-white dwarf, with a diameter 2.74 times that of our sun, a mass 3.7 times that of our sun and a brightness about 100 times that of our sun. The fainter component is a class K, orange subgiant, with a diameter of 3.6 times that of our sun, a mass 0.8 that of our sun and a brightness about 4 times that of our sun. These two stars are only separated by 6.5 million miles, which is only 20% the distance from Mercury to our Sun.

Double Cluster in Perseus, close pair of open clusters, NGC 869 and NGC 884. This pair of open clusters appear as a small cloudy patch midway between Perseus and Cassiopeia. Some sharp-eyed individuals have been able to split the Double Cluster into two small patches of nebulosity under excellent conditions. The Double Cluster has been known since ancient times and was first catalogued by Hipparchus as a nebula in 130 BC.

This object was shown as stars “h” (NGC 869) and Chi “x” (NGC 884) in the handle of Perseus’ sword in Johann Bayer’s 1603 Uranometria Star Atlas. It is also shown as a pair of nebulae on Bayer’s chart of Cassiopeia. Giovanni Batista Hodierna first resolved this object into two star clusters using a telescope in 1654 or before. These two clusters are aligned roughly west-east, with NGC 869 to the west and NGC 884 to the east. NGC 869 has a visual magnitude of 5.3, a diameter of 30’, a distance of 7275 light years and an age of 5.6 million years. NGC 884 has a visual magnitude of 6.1, a diameter of 30’, a distance of 7243 light years and an age of 3.2 million years. These two clusters are about 27” apart. A small telescope at low power should have a wide enough field (greater or equal to one degree) to show both clusters very well. The Double Cluster is located in the northwestern corner of Pegasus.

Messier 34, open cluster. Charles Messier discovered this open cluster on August 25, 1764. It has a visual magnitude of 5.2, a diameter of 35’, and a distance of 1630 light years. Messier 34 can easily be seen in binoculars and some sharp-eyed individuals can see it with the naked eye under good conditions. It is located near the western border of Perseus.

Messier 76, planetary nebula, the Little Dumbbell Nebula. Pierre Mechain discovered this object on September 5, 1780. It has a visual magnitude of 10.1, a size of 95” x 42” and a distance of 2550 light years. Messier 76 is in the northwestern part of Perseus, about a degree north-northwest of Phi Persei. This planetary nebula is directly visible in an 8” telescope.

NGC 1499, an emission nebula, the California Nebula. It has a visual magnitude of 6.0 and a size of 160’ x 40’. Due to its size, it is classified as a low surface brightness object. The California Nebula was discovered by E. E. Barnard on November 3, 1885 using a 6” refractor. The nickname, California Nebula, probably came from photographs of this object. NGC 1499 is in the southern area of Perseus.

The southern edge of the California Nebula is about one-half degree north of the fourth magnitude star Xi Persei or Menkib. This object has been seen naked eye through an O-III filter. Also, it has been seen through a small telescope using an H-beta filter. Dark and transparent skies are important for observing the California Nebula.

2. Pegasus (Hero's Steed, Flying Horse)

NGC 7331, bright spiral galaxy. This galaxy was discovered by William Herschel on September 5, 1784. It has a visual magnitude of 9.5, a size of 9.7' x 4.5' and a distance of 45 million light years. NGC 7331 is close to the northern edge of Pegasus, about 4 degrees north of Eta Pegasi and a degree west. There are four small faint galaxies just to the east of NGC 7331 which are referred to as the fleas. Under dark skies, NGC 7331 has been seen in 7x35 binoculars.

Stephan's Quintet, close group of five galaxies. It was discovered by Edouard Stephan on September 23, 1876. This quintet of galaxies is about one half degree south-southwest of NGC 7331 and is composed of NGC 7317, NGC 7318A, NGC 7318B, NGC 7319 and NGC 7320. Stephan's Quintet lies about 293 million light years distant except for NGC 7320 which is a foreground galaxy at a distance of only 42 million light years. NGC 7320 has a visual magnitude of 12.6 while the other members are around the 13th magnitude. Stephan's Quintet can be seen in an 8" telescope under dark skies.

Messier 15, globular cluster. This globular cluster has a visual magnitude of 6.0, a diameter of 18', has over 450,000 stars and a distance of 39,000 light years. Jean-Dominique Maraldi discovered Messier 15 on September 7, 1746. This globular cluster has a very dense core. It can be seen with the naked eye as a close double star since there is a magnitude 6 star only 20' to the east. Binoculars will show its fuzzy nature. In a telescope it is a beautiful object.

Messier 15 is on the western side of Pegasus about 4.1 degrees northwest of Epsilon Pegasi. This globular cluster is one of only four globular clusters known to contain a planetary nebula. Pease 1 is the name given to Messier 15's planetary nebula which was originally catalogued as a magnitude 13.8 star by Kustner in 1921. Francis Pease identified it as a planetary nebula in 1928. Pease 1 is only 30" northeast from the center of Messier 15. This planetary nebula has a visual magnitude of 15.1 which makes it the brightest such object in a globular cluster. Observing Pease 1 will require a detailed finder chart, a large telescope (10" or more) and an O-III filter.

NGC 7094, planetary nebula. It has a visual magnitude of 13.7 and a size of 98" x 88". Lewis Swift discovered NGC 7094 on October 10, 1884. This planetary nebula is located 1.8 degrees east-northeast of M 15. NGC 7094 can be seen in an 8" telescope as a faint disk requiring the use of an O-III filter.

**Image credit: all astrophotography images are courtesy of NASA unless otherwise noted. All planetarium images are courtesy of Stellarium.*

Equipment Recommendations:

Binoculars for Astronomy:

Celestron Cometron 7x50 Binoculars (\$35)

Orion's UltraViews 10x50 (\$140)

Cell phone mount:

These grab hold of the eyepiece and keep the lens of your camera steady for imaging on a spotting scope, binoculars, or small telescope. You can find these for about \$15 on Amazon: <https://amzn.to/3h3GjE6>

Beginner telescopes:

For kids: 8" Dobsonian Telescope: <https://bit.ly/2XEFaeK>

or build it yourself: <https://bit.ly/3h4UkS8>

For adults: (it's going to depend what you want to look at)

8" Newtonian Reflector <https://bit.ly/3f3C0qS> (easy to use, good all-around scope for deep sky objects, planets, moon)

8" Schmidt-Cassegrain <https://bit.ly/3dJKG59> (more compact, good all-around scope for planets, galaxies, nebulae, astrophotography)

90mm Refractor <https://bit.ly/37aG8lX> (harder to use, best for planets and moon observing)