

Central Coast Astronomy Virtual Star Party

January 16th 7pm Pacific

Welcome to our Virtual Star Gazing session! We'll be focusing 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. CentralCoastAstronomy.org/stargaze

Before our session starts:

Step 1: Download your free map of the night sky:

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 3 days past new, which is really good for star gazing. Be sure to look at the moon tonight with your naked eyes and/or binoculars!

Mercury is rising into the western sky and may be a good target near the end of the month. Mars is up high but is shrinking in size as the weeks progress.

Main Focus for the Session:

1. Fornax (the Furnace)
2. Eridanus, (The River)
3. Taurus (The Bull)
4. Auriga (The Charioteer)

Notes:

Fornax, (The Furnace)

Fornax is a modern constellation created by Lacaille in 1763.

NGC 1360, planetary nebula, called the Robin's Egg Nebula, see APOD for May 11, 2018. This is a large planetary nebula with a size of 460" x 320" which is about 3 light years across at its distance of about 1500 light years.

The Robin's Egg Nebula has a visual magnitude of 9.6 with a central star of magnitude 11.4 and was discovered by Friedrich Winnecke in January of 1868. NGC 1360 is in the NE corner of Fornax. It can be seen in an 8" scope.

NGC 1365, a beautiful barred Spiral galaxy, called the Fornax Propeller in one of my atlases. It was discovered by James Dunlop on September 2, 1826. The Fornax Propeller has a visual magnitude of 8.6 and a size of 11' x 6'. It is about 60 million light years away in the SE corner of Fornax and is a member of the Fornax galaxy cluster. The bar of NGC 1365 is about 94,000 light years across while the length is 160,000 light years across. This galaxy is tilted 27 degrees from edge on. There is a supermassive black hole (~2 million solar masses) at the center of NGC 1365 which is spinning near the speed of light. NGC 1365 is visible in a moderate sized scope.

Eridanus (The River)

Eridanus (The River) is an ancient Greek constellation

Achernar, a star, whose name means "End of the River" in Arabic. It is the ninth brightest star in the sky with a visual magnitude of 0.45 and a distance of 144 light years. Achernar is a blue giant about 650 times brighter than our sun.

This star is extremely flattened, spinning so fast that the equatorial diameter is 50% longer than its polar diameter. Achernar, also known as Alpha Eridani, is at a southern declination of -57 degrees which makes it visible only from southern Texas or southern Florida.

Omicron 2 or 40 Eridani, a triple star system whose stars will be referred to as "A", "B" and "C". A main sequence orange star, "A" is about 0.9 the mass of our sun and has a visual magnitude of 4.5 which makes it a naked eye star.

Being the burnt out core of a star, "B" is called a white dwarf. With a visual magnitude of 9.5 "B" is 0.5 the mass of our sun yet only 1.5 times the diameter of the earth. The "C" star is a red dwarf with a visual magnitude of 11.0, a mass of 0.2 that of our sun and a diameter 25% of our sun.

All three stars are 16.5 light years from our sun and have a large common proper motion of 4.08" per year. "A" and "B" as a double system were discovered by William Herschel on January 31, 1783. "C" orbiting around "B" was discovered by Otto Struve in 1851, making it a triple system of stars. "C" orbits "B" with a period of 248 years and currently have a separation of 7.9".

The "B"/"C" components are currently about 82" from the "A" component which give a period of 6,100 years of "B"/"C" to go around "A". The "B" component is the easiest white dwarf star to view in a small telescope. I remember seeing the white and red pair of "B" and "C" while the orange component "A" was some distance away, in the eyepiece of my 8" scope.

For Star Trek fans, Mr. Spock's home planet of Vulcan is supposed to orbit 40 Eridani. In 2018 a super Earth was discovered orbiting 40 Eridani with a mass greater than 8 times the mass of the Earth. Unfortunately, the planet is too close to its star and receives 9 times the light that Earth gets. So you would get crushed by the gravity and burnt by the sun.

NGC 1535 is a planetary nebula called Cleopatra's Eye. It's a bright planetary nebula with a visual magnitude of 9.4, a size of 48"x 42" and a magnitude 12.2 central star. It was discovered by William Herschel on February 1, 1785. NGC 1535 can be blinked through an 8 X 50 finder scope using an O-III filter. My 8" scope shows a small bright disk with a strong response to the O-III filter at 62.5X. NGC 1535 is about 5 degrees South of Omicron 2 Eridani.

39 Eridani, binary star, consisting of a bright orange magnitude 5.0 star separated by 6.3" from a magnitude 8.5 white star. This is a good pair for a moderate sized scope. It is roughly between Omicron 2 and NGC 1535.

Taurus (The Bull)

Taurus (The Bull) is an ancient Greek constellation.

Aldebaran, a star whose name means “The Follower” in Arabic, since it follows the Pleiades. This star is considered the eye of the bull in the constellation since ancient times. At a visual magnitude of 0.86 it is the 13th brightest star in the sky. Aldebaran is an orange giant star about 40 times the diameter of our sun and about 125 times brighter. It is 68 light years from us.

Hyades, open cluster, it is the second nearest open cluster to our sun at 140 light years distant. It can be seen as a roughly “V” shaped group pointing at Aldebaran which is a foreground star to this group since it is only 68 light years away. The Hyades forms the nucleus of a larger group of stars referred to as the Taurus Moving Group which all seem to be moving toward a point near Betelgeuse. This is a nice cluster for binoculars. There are 25 stars between magnitude 3.3 and 6.0 in the Hyades and a lot fainter ones.

NGC 1647, open cluster. Roughly 3 degrees NE of Aldebaran is a magnitude 6.2 open cluster, 40 arcminutes in diameter and about 1,700 light distant. This cluster can easily be found by sweeping the area with 7X50 binoculars. NGC 1647 contains about 200 stars in an area a little larger than a full moon. William Herschel discovered NGC 1647 on February 15, 1784.

M 1, supernova remnant, called the Crab Nebula. It is 1.1 degrees NW of Zeta Tauri, which is the southern horn of the bull. The Crab Nebula has a visual magnitude of 8.4, a size of 6' x 4' is about 6,200 light years distant and was found by John Bevis in 1731.

On July 4, 1054 a new star appeared in the sky. It was magnitude -4.0 or brighter and was visible even in daylight. The Chinese astronomers were able to observe it until April 17, 1056. This was the beginning of M 1.

In the center of the Crab Nebula is a rapidly spinning neutron star, called a pulsar. Lord Rosse gave M 1 the nickname “Crab Nebula” due to its appearance in his 60” scope. M 1 is barely visible with 10x50 binoculars under dark steady skies. In my 8” scope it looks like an “S” shaped blob.

M 45, open cluster, known as the Pleiades or the Seven Sisters. It can easily be seen with the naked eye, appearing like a little short handled dipper. (Before I studied the constellations I thought it was the Little Dipper. Lots of people make this mistake!)

M 45 has a visual magnitude of 1.5, is about 425 light years distant and has an age of about 100 million years. It is a beautiful object in binoculars. The blue reflection nebula

seen in photographs of M 45 does not originate with M 45 but is a dust cloud which it is passing through.

Auriga (The Charioteer)

Auriga (The Charioteer) is an ancient Greek constellation

Capella, spectroscopic binary star, known as the “Goat Star”. With a visual magnitude of 0.08, Capella is the 6th brightest star in the sky. It is 41 light years away and 133 times brighter than our sun. Capella consists of a close pair of yellow giants only 70 million miles apart. One is 2.7 solar masses and 14 times the diameter of the sun. The other is 2.6 solar masses and 11 times the diameter of our sun. They orbit each other every 104 days.

M 37, rich open cluster. This cluster has a visual magnitude of 5.6, a diameter of 25' and a distance of 4,500 light years. It was discovered by Hodierna in 1654. M 37 has about 2,000 member stars and is about 500 million years old. It can be seen in binoculars but is really nice in a telescope.

Who is Hodierna? Giovanni Hodierna (1597 – 1660) was a Sicilian astronomer who published a paper in 1654 containing 46 nebulous objects of which at least 10 are original discoveries of deep sky objects. His paper was lost until 1984.

M 36, open cluster. This cluster has a visual magnitude of 6.0, is about 12' across and about 4,300 light years distant. Like M 37, M 36 was discovered by Hodierna in 1654. This is a young cluster only 30 million years old. It is visible in 7x50 binoculars. M 36 shows how the Pleiades would look at ten times the distance.

M 38, open cluster. This cluster has a visual magnitude of 6.4, is about 15' across and about 3,500 light years distant. It was also discovered by Hodierna in 1654. This cluster is about 175 million years old. It is visible in 7x50 binoculars.

NGC 1907, open cluster. This small compact cluster of around 40 stars is only 30' SW of M 38. NGC 1907 has a visual magnitude of 8.2, is about 6' across and is about 4,300 light years distant. This cluster is twice the age of M 38 or about 350 million years old.

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)