



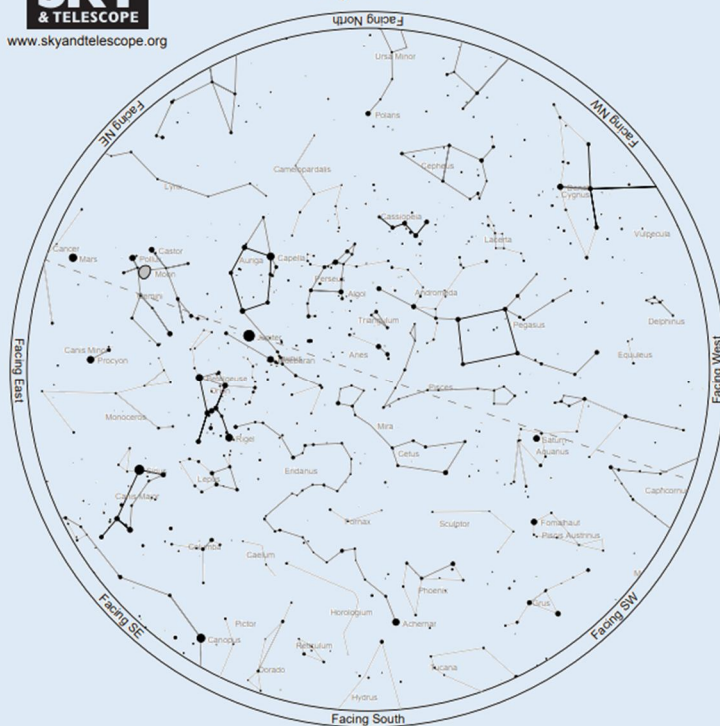
ASTRONOMY OF THE MONTH

November NIGHT SKY



www.skyandtelescope.org

Sky Chart



Location: Panaji
 Latitude: 15° 29' N, longitude: 73° 49' E
 Time: 2024 November 19, 23:00 (UTC +05:30)

Powered by: Heavens-Above.com

In month of November, we can see core of the milky way setting in west direction in early evening and Orion arm of milky way rising later in Night.

Rainy season gets over in this month so this marks beginning of clear skies for astronomers in Goa.

Throughout the month you will be able to see **Jupiter** and **Saturn** in Night Sky.

For astrophotographers this is time to click some object in and around Cygnus constellation.

1. Andromeda Galaxy
2. North America Nebula
3. Elephant Trunk Nebula
4. Triangulum Galaxy
5. Double cluster in Perseus

New Moon : 1st November

Full Moon : 15th November

ASTRONOMICAL EVENTS

Taurids Meteor Shower: The Taurids is a long-running minor meteor shower producing only about 5-10 meteors per hour. It consists of two separate streams. The first is produced by dust grains left behind by Asteroid 2004 TG10. The second stream is produced by debris left behind by Comet 2P Encke. The shower runs annually from September 7 to December 10. It peaks this year on the night of November 4 and the morning of the 5th. Meteors will radiate from the constellation Taurus

Mercury at Greatest Eastern Elongation: The planet Mercury reaches greatest eastern elongation of 22.5 degrees from the Sun. This is the best time to view Mercury since it will be at its highest point above the horizon in the evening sky. Look for the planet low in the western sky just after sunset.

Leonids Meteor Showers: The Leonids is an average shower, producing up to 15 meteors per hour at its peak. The Leonids is produced by dust grains left behind by comet Tempel-Tuttle, which was discovered in 1865. The shower runs annually from November 6-30. It peaks this year on the night of the 17th and morning of the 18th. The crescent moon will set before midnight leaving dark skies for what should be a great early morning show. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Leo



IMPORTANT EVENTS OF AFA GOA

14th November :

- Reopening of Public Astronomical observatory at Junta House, **Panaji** Goa.
- Reopening of AFA Center at **Porvorim** Goa.

16th November :

- Reopening of Public Astronomical observatory at Ravindra Bhavan, **Margao** Goa.
- Inauguration of Astrokid Club at Panaji Observatory.

15th November : (त्रिपुरारी पौर्णिमा)

- Beach walk and observation at Miramar Beach.
- Beach walk and observation at Benaulim Beach.
- Reopening of AFA Center at 1930 Vasco, **Vasco-Da-Gama** Goa.

30th November :

- Annual winter Star party of AFA Goa.

Visibility of Planets for the month of November.

Planet Name	Visibility Start	Visibility Ends
Venus	After Sunset	Till about 8:15PM
Saturn	After Sunset	Till 1:30AM
Jupiter	After 8:15 PM	Till Sunrise
Mars	After 11:00PM	Till Sunrise


PAO Panaji : Public Astronomical Observatory at Junta House, Panjim will be open for public on all weekdays (Monday to Saturday) from 14th November onwards at 7:00PM to 9:00 PM


PAO Margao : Public Astronomical Observatory at Ravindra Bhavan, Margao will be open for public on Tuesdays and Saturdays from 16th November onwards at 7:00PM to 9:00 PM

For more information about PAO and AFA you can contact
Satish Nayak (9518502404) or
Gaurav Dhumatker (9923544025)

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TELESCOPES AND MOUNTS (PART 1)

Evolution Of Telescope

The story begins in 1608 with the invention of the refracting telescope by Hans Lippershey, a Dutch spectacle maker. Although Lippershey's device was relatively simple, it marked the beginning of a new era in astronomy. The following year, Galileo Galilei built his own version of the refracting telescope and made groundbreaking observations, including the discovery of Jupiter's four largest moons, the phases of Venus, and the detailed observation of the Moon's surface. These observations provided strong evidence for the heliocentric model of the solar system, challenging the long-standing geocentric model.



The next significant advancement came with Isaac Newton in 1668 as he developed the reflecting telescope. Instead of lenses, this design used a curved mirror to gather and focus light. Newton's reflector eliminated chromatic aberration and allowed for larger apertures, leading to clearer and more detailed images. In the 18th and 19th centuries, telescope technology continued to improve. William Herschel, an English astronomer, built a series of large reflecting telescopes, including the 40-foot telescope completed in 1789. The era also saw the development of achromatic lenses by John Dollond, which significantly reduced chromatic aberration in refracting telescopes.



The 20th century heralded a new era of telescopic advancements with the advent of large reflecting telescopes. The 100-inch Hooker Telescope at Mount Wilson Observatory, allowed Edwin Hubble to discover the expanding universe and identify galaxies beyond the Milky Way. Later, the 200-inch Hale Telescope at Palomar Observatory, further extended our observational capabilities.



The space age introduced a new frontier for telescopes. The Hubble Space Telescope, launched in 1990, revolutionized astronomy by providing clear images from above Earth's atmosphere. Hubble's observations have led to numerous discoveries, from determining the rate of expansion of the universe to observing distant galaxies and nebulae in unprecedented detail.

Radio telescopes too are in race to see beyond the limitation of optical telescope and enrich our knowledge of universe.



By Gaurav Dhumatker



WHEN THE NIGHT SKY DAZZLES

To chase any astronomical phenomenon like a Total Solar Eclipse, Comet or a Transit of a Planet, it is not uncommon for an amateur astronomer to track the path of the event wherever those events are visible. Many won't miss a single opportunity to witness rare astronomical events, travelling distances across the globe, and record them. On the other hand, some events may be less spectacular but quite a common occurrence like a meteor shower, which one can observe from any dark location, but preferably from a higher altitude. Many meteor showers are visible from the Earth around the year and they are best observed when it is a moonless night. Some of the well-known meteor showers are Orionids, Draconids, Lyrids, Leonids and Quadrantids which are visible to an observer when debris from a comet intersects the orbit of Earth which leads to the sparkling phenomenon of a meteor shower.

When you observe a single meteor during any night, it is just an oh-and-wow reaction from any onlooker, but have you imagined a starry night when many meteors pierce the sky from all sides? That is what amateur astronomers and stargazers love to experience. Month of November offers a great opportunity for amateurs to observe one such event, the Leonid Meteor Shower that peaks up on the night of November 16-17 or 17-18, perhaps the best time of the year to observe meteors unless spoilt by the presence of the moon during that critical phase. They are named Leonid as the meteors appear to radiate from the Sickle in Leo constellation.

Leonid meteors are the result of cometary debris ejected by short period Comet 55P/ Temple-Tuttle that comes close to the Sun every 33 years. When comet approaches the Sun, gases and dust in the nucleus get vaporized by solar radiation causing gas and dust tail which are blown millions of km away into space. When this tiny dust particles enter Earth's upper atmosphere it create friction with atmospheric gases and catches fire leaving a long trail of light and smoke. Meteors enter the Earth's atmosphere at a very high speed of almost 70 km/s. A bright meteor leaves a longer trail forming a brilliant fireball or bolides that results in an explosive sound for a few seconds.

Historically, Leonids are considered to be one of the best meteor showers with records suggesting in 1799, 1833 and 1966, Earth witnessed a meteor storm with thousands of meteors per hour. Since then, the expected meteor shower has not reached that milestone, though amateurs still await Leonids putting up a mega show every year. It is always great to enjoy the spectacle of nature as it is a naked-eye event, which doesn't need any equipment for observation.



Photograph By Rudresh Naik

Many astronomical happenings were a mystery in the past, and the reason behind meteor showers was not understood much, although astronomers were making discoveries through their dedicated observation and mathematical calculations by keeping track of events that were happening around the year. They realised and found a link between comets and meteor showers. It was Italian astronomer Giovanni Schiaparelli who propounded the relation between comets and meteors. Comet Biela, a short-period comet, was visible at an interval of 6.6 years period till 1852, but it so happened that in subsequent periodicity when astronomers waited for the comet, it failed to appear, but they were shocked to observe the meteor shower during that time. That established the relationship between meteors and comets. Nowadays, space scientists keep track of meteor showers to protect satellites from possible damage from high-velocity particles from cometary debris.

Experiencing astronomical events is a determination of grit and perseverance to enjoy nature's beauty, and a night sky offers enough excitement. Although the amateurs delight in observing the night sky,



especially meteor showers, many time braving chilly weather conditions, it is simply a joy to lie down under starry sky and watch those brilliant colourful streaks of light that illuminate the night sky year after year.

With the meteor shower coinciding with the full moon this year, we will surely miss the spectacle unless a few fireballs outsmart the lunar brightness



and brighten the sky. Otherwise, we have to wait for another year, hoping for the best of sky in 2025. Still, taking a chance is always within our means!

By Govind Potekar