



November 2023 Astronomy Report



- **Moon:**
 - Phases
 - “A chunk of the Moon”

- **Planets:**
 - Inner planets
 - Mercury reappears in the morning
 - Venus continues its brilliant predawn showing
 - Outer planets
 - Mars in solar conjunction, too close to Sun for observation
 - Jupiter & Uranus at opposition, best time of year to observe both
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- **Dark Sky Star Party:**
 - Location - BVS Observatory, November 11

- **Public Viewing:**
 - Cub Lake, November 18
 - Leonid meteor shower

Moon - Phases

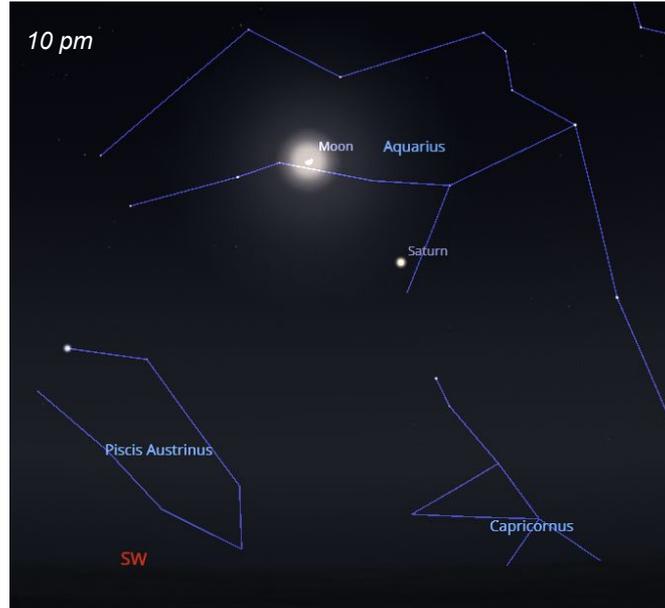
November 5 - Last Quarter (Cancer)



Apogee (251K miles) - 6th
Perigee (230K miles) - 21st

November 13 - New Moon

November 20 - First Quarter (Aquarius)



November 27 - Full Moon (Virgo)



Did you know? The Moon's most common element is oxygen, although always bound to another element.

A chunk of the Moon

A chunk of the moon appears to be orbiting near Earth, new study suggests

News By Ben Turner published 3 days ago

The asteroid Kamo'oalewa may have been ejected by a massive impact on Earth's moon, a new simulation has revealed.

[f](#) [t](#) [i](#) [p](#) [r](#) [m](#) [c](#) Comments (0)



Kamo'oalewa near the Earth-Moon system. (Image credit: Addy Graham/University of Arizona)

Astronomers have found more evidence that a near-Earth [asteroid](#) is an ejected chunk of the moon.

The asteroid Kamo'oalewa — a Hawaiian name that means "the oscillating fragment" — is a Ferris-wheel-size rock chunk that orbits within 9 million miles (14.4 million kilometers) of Earth every April.

Now, a new study, published Oct. 23 in the journal [Communications Earth & Environment](#), describes a feasible way that an ancient asteroid impact could have shunted the space rock onto its current trajectory and suggests there could be more moon chunks floating around the [solar system](#).

"We are now establishing that the moon is a more likely source of Kamo'oalewa," lead author [Renu Malhotra](#), a planetary scientist at the University of Arizona, [said in a statement](#).

Two unusual orbital properties drew astronomers to investigate Kamo'oalewa. First, as a "quasi-satellite" of Earth, it is so close to our planet that it appears to orbit it, even though its actual orbital partner is [the sun](#). Second, the asteroid is projected to stick closely by Earth's side for millions of years, whereas many near-Earth objects hang around for only decades.

These anomalies led the astronomers to conduct an analysis of the asteroid's spectra in 2021. They found that the light emitted and absorbed by Kamo'oalewa indicated that the asteroid was likely made of moon rock.

"We looked at Kamo'oalewa's spectrum only because it was in an unusual orbit," Malhotra said. "If it had been a typical near-Earth asteroid, no one would have thought to find its spectrum and we wouldn't have known Kamo'oalewa could be a lunar fragment."



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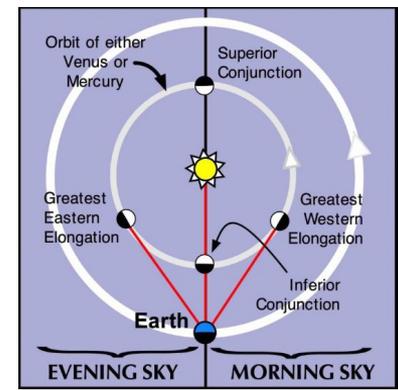
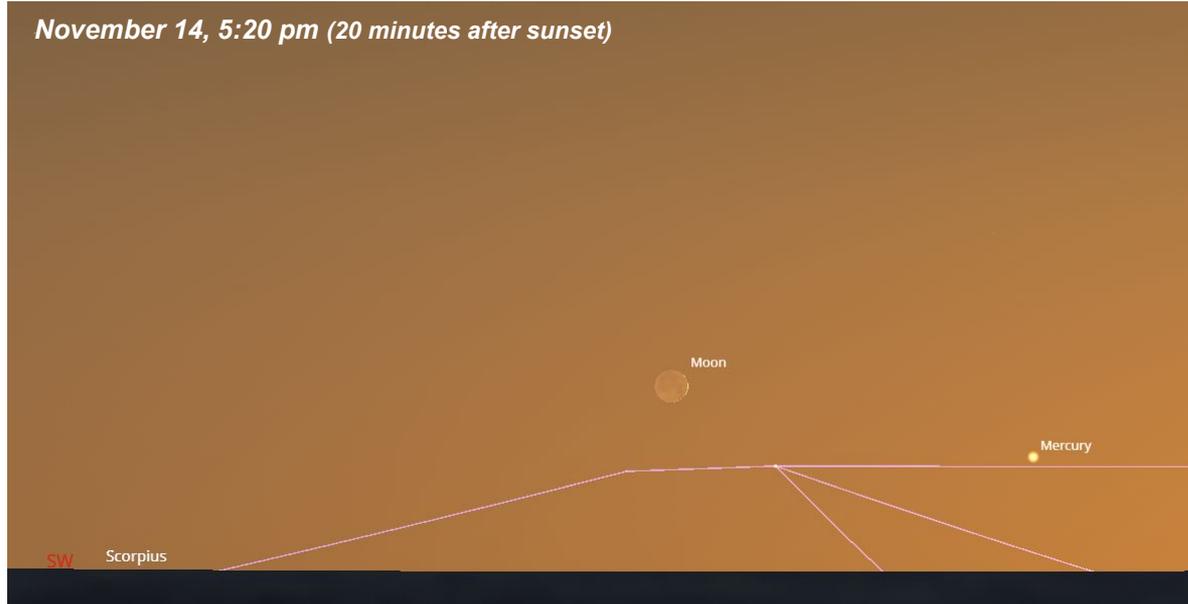
Evening: Mercury - (Virgo)

Reappearance in evening sky this month

Reaches 20 degree elongation from Sun on November 27

Month's end attains 5 degree altitude 30 minutes after sunset

November 14, 5:20 pm (20 minutes after sunset)

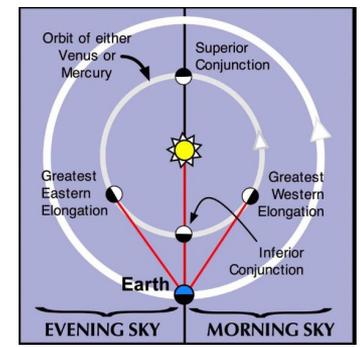


November 30, 5:45 pm
(~1 hour after sunset)



Morning: Venus - (Virgo)

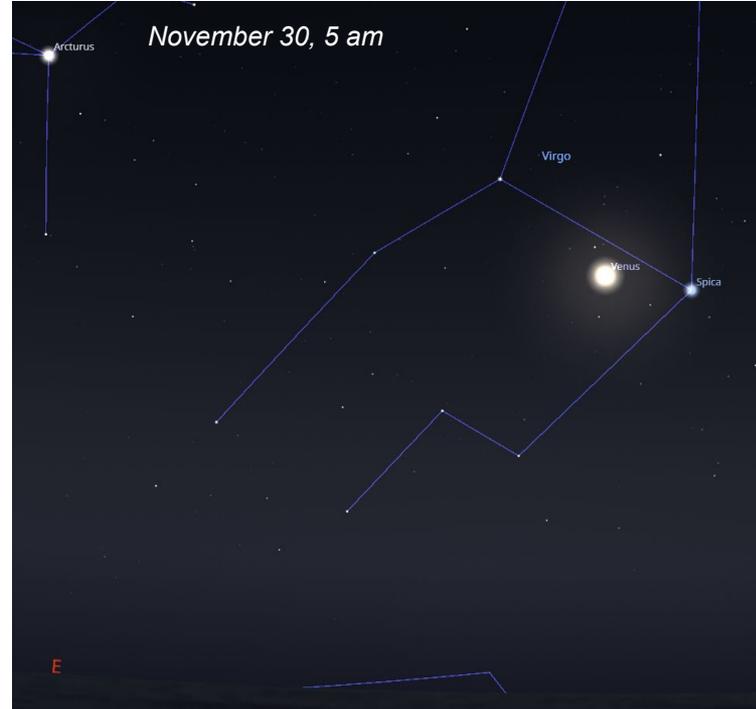
Venus dominates in early morning, rising 4 hours before the sun; receding from Earth through November



November 9, 5 am

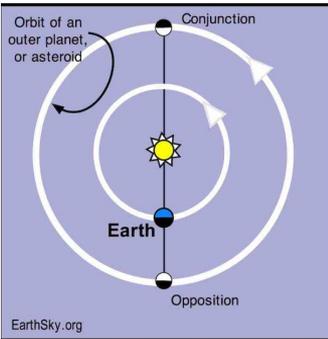


November 30, 5 am

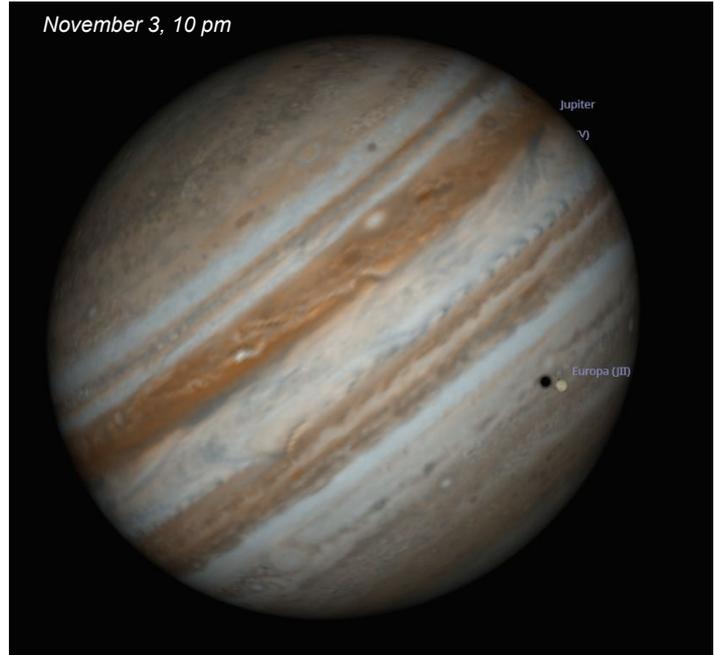


Evening / Morning: Jupiter - (Cetus)

Jupiter at opposition November 3rd (only 370 million miles from Earth)
Highest position in night sky since 2015 - less interference from our atmosphere
Long nights allow for an entire rotation of Jupiter to be viewed in <10 hours

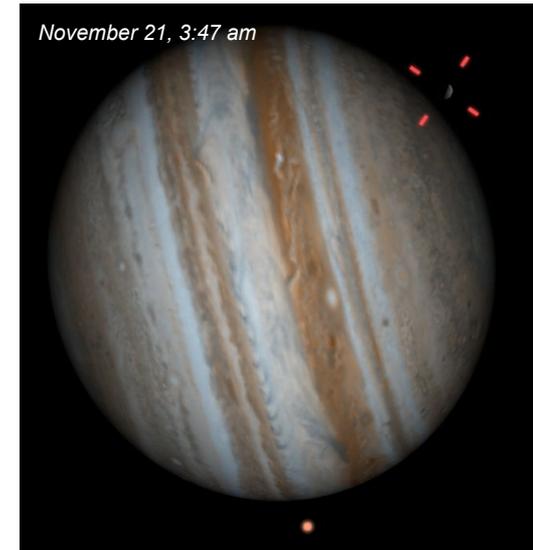
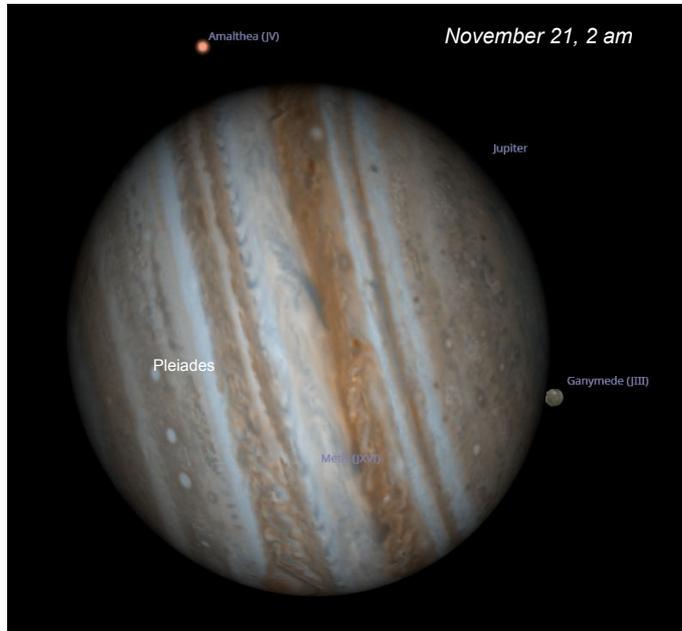


At opposition Jupiter's moons and their shadows cross Jupiter at nearly the same time



Jupiter & Ganymede play hide & seek - November 21

Ganymede disappears behind Jupiter, reappears later on other side, then is eclipsed by Jupiter's shadow ~20 minutes later



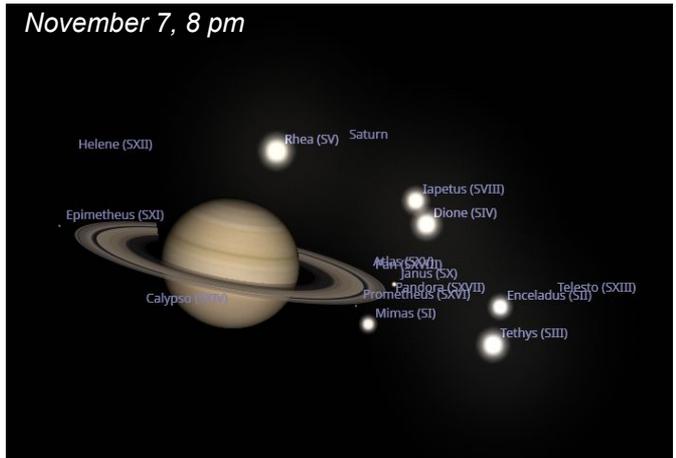
*This eclipse lasts nearly two hours -
Jupiter has set by this time*

Evening: Saturn - (Aquarius)

Saturn already visible after sunset, sets by 11pm by end of month
 Stops moving retrograde on the 4th and resumes an easterly trek across southern Aquarius

Five moons curve around western end of the rings

November 7, 8 pm



In one hour their relative motions upset the smooth arc

November 7, 9 pm

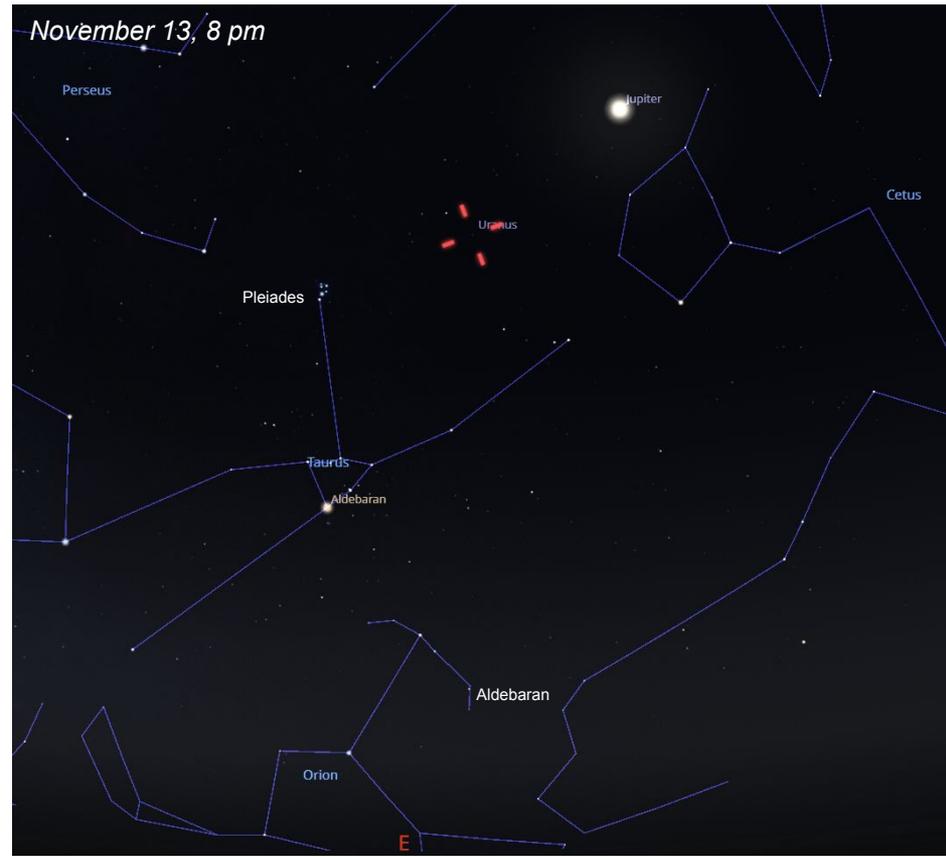
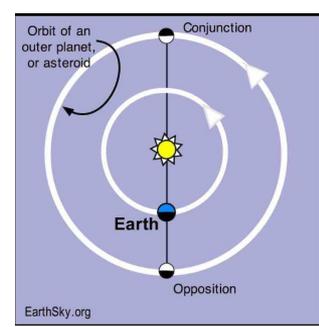


November 19, 8 pm

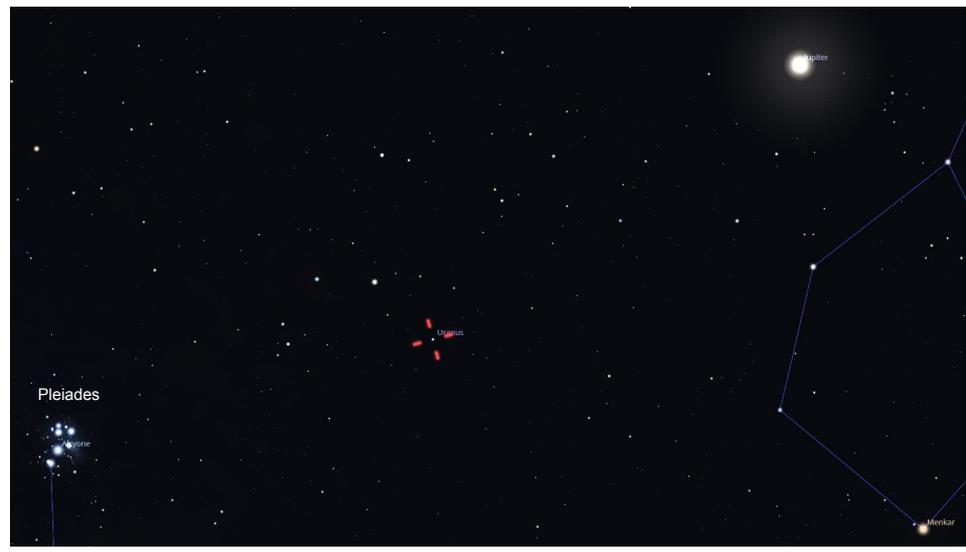


Evening / Morning: Uranus - (Cetus, Taurus)

Uranus viewed between the Pleiades and Jupiter; reaches opposition on November 13 (good viewing opportunity during New Moon)



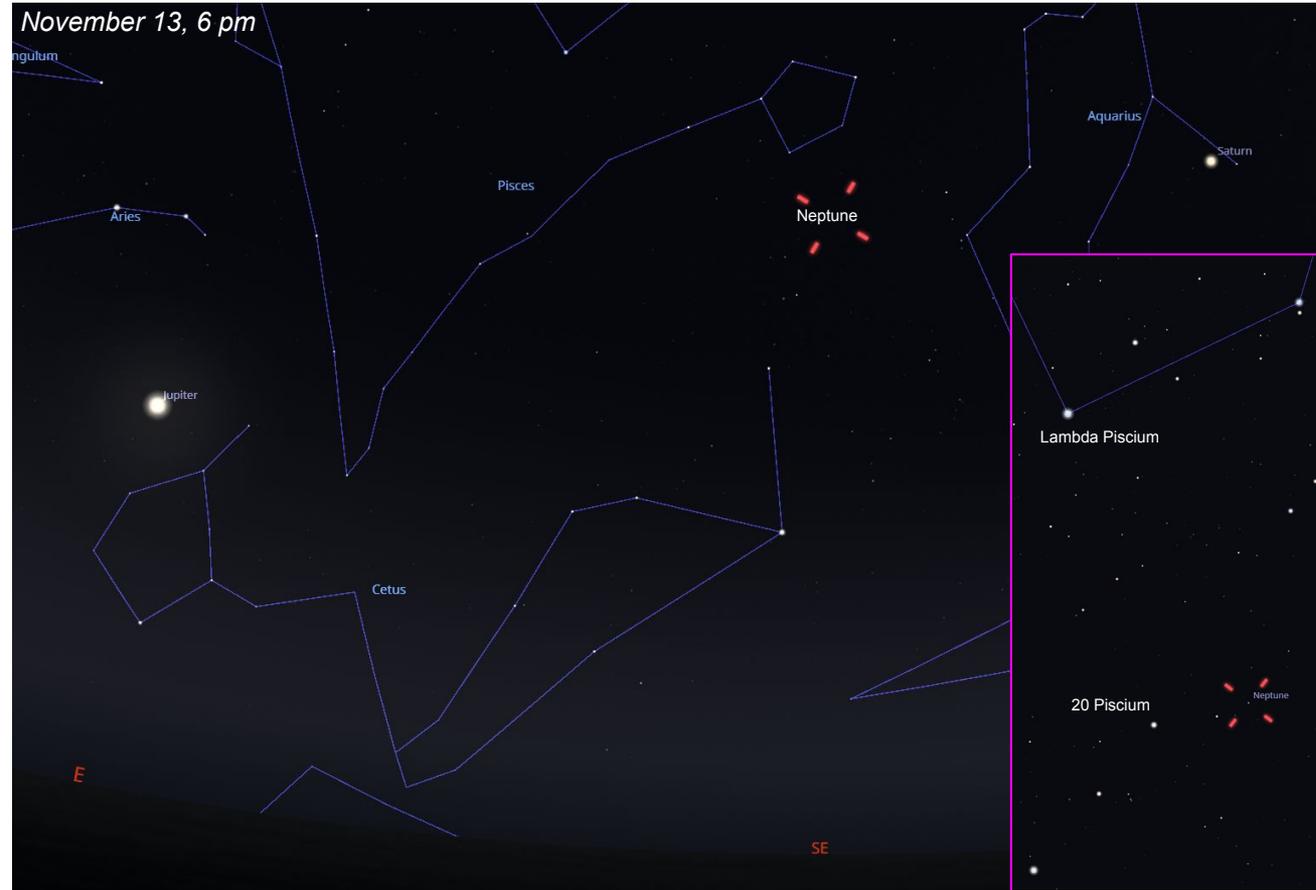
This month "an easy binocular object". An interesting test of sky conditions is to see whether one can spot Uranus with unaided eye - requires very dark skies away from light pollution.



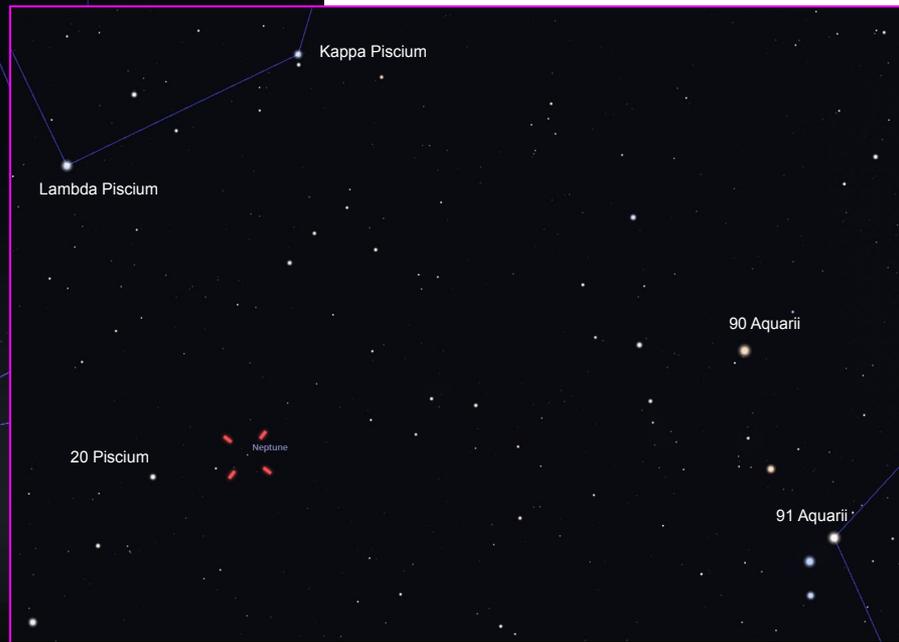
Evening / Morning: Neptune - (*Pisces*)

Neptune visible much of the night in Pisces, sets by 1am by end of November

November 13, 6 pm



Visible with binoculars





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November Dark Sky Party BVS Observatory, November 11

Ps 19:2

1 - M31 (Andromeda Galaxy)



2.5 million light years from Earth
best observed Oct-Dec, (naked eye, binoculars)
on collision course with Milky Way

2 - Sculptor Galaxy



11.6 million light years from Earth
visible with binoculars
considered one of the most easily viewed galaxies after Andromeda

3 - Pacman Nebula

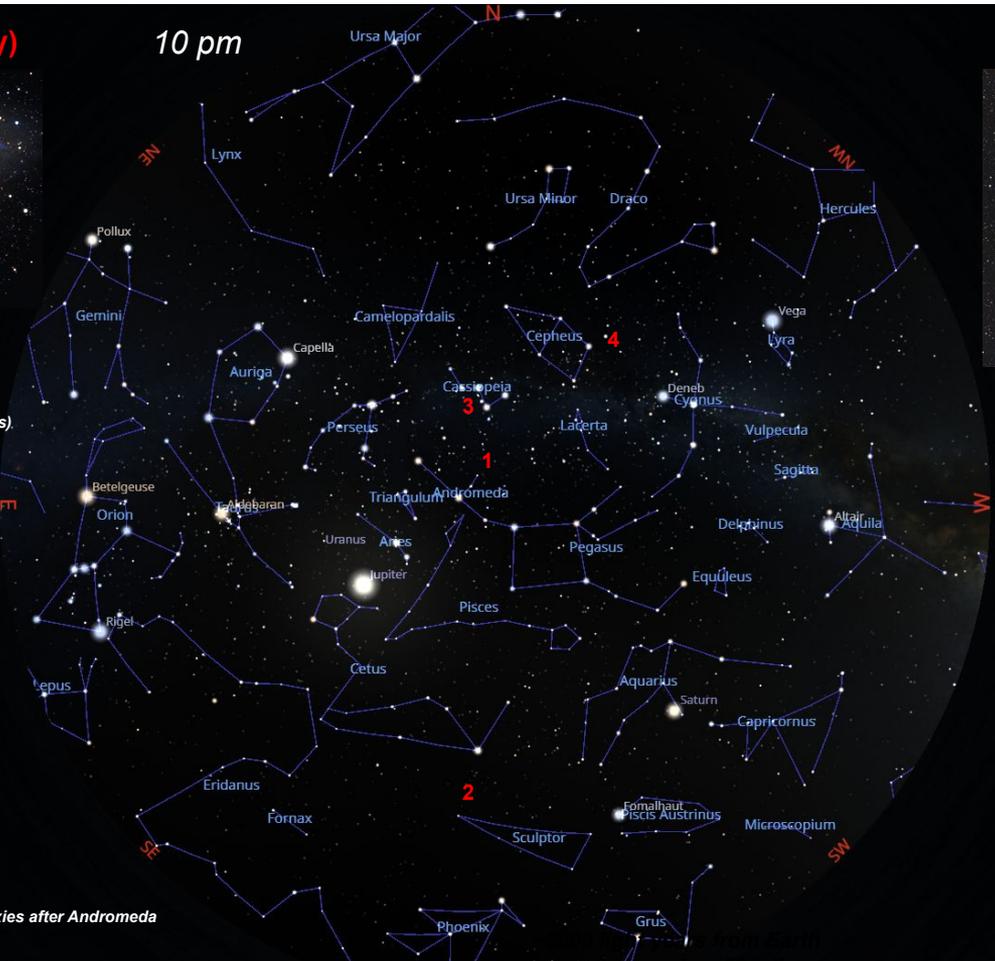


large emission nebula, 48 light years across
9200 light years from Earth
easily visible in small telescopes

4 - Fireworks Galaxy



25 million light years from Earth
hosted 10 supernovae in last century
Bright target for small/medium telescopes





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November Public Viewing

Cub Lake, November 18

Sun sets 4:40 pm

7 pm



First Quarter Moon



November Public Viewing

Leonid Meteor Shower

Leonids rise November 18 ~11:15 pm; moon sets at 11 pm



- Active November 6 - 30; peak November 17/18
- Derived from Comet 55P/Temple-Tuttle which last reached perihelion in 1998
- Maximum rate 10 meteors/hour
- In recent years, hourly rates have diminished and are not expected to improve for a few years
- Best time to observe is the hour before twilight as leading hemisphere of Earth directed into meteor debris path
- Leonids known to be very swift, leaving glowing, persistent trails
 - Look 40 - 60 degrees away from Leo to spot longest trails