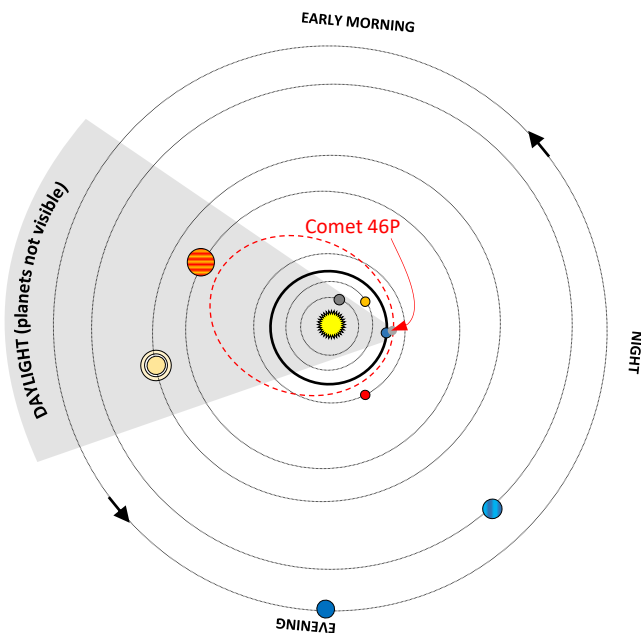


There is much for amateur astronomers to celebrate this month! Whether you celebrate Hanukkah (Dec 2-10), the Winter Solstice (December 21), Christmas (Dec 25), Kwanza (Dec 26-Jan 1), or other traditions; the night-sky this December offers many gifts: The sky will be clear and dark in early December, highlighting the beautiful deep-sky objects of the season. The jewel of the solar system Venus shines brightly at dawn. And **Comet 46P** will be easily visible all month long as it makes a close fly-by of the Earth! Join me as we hitch a ride on a comet to experience the wonders of the December skies!

Solar System: Deep-sky viewing will be at its best during the first 2 weeks of December, with a **NEW MOON** on Dec 8. The moon will again be **FULL** on Dec 23, shining brightly from the Winter Solstice through the New Year.

Venus is visible at sunrise. And although Mercury, Jupiter, and Saturn are not visible this month, our closest companion planet **Mars** continues to shine in the southwest as it passes through constellation **Aquarius**. Mars and Neptune will be in close conjunction on Dec 7. Planet **Uranus** appears as a hazy pale-blue “star” in Pisces.

The Solar System on December 15, 2018 (not to scale)



Deep-Sky: This month, we visit some of the stars and objects that comet 46P passes during its fly-by.

Comet 46P/Wirtanin is a small but “hyperactive” short-period comet which orbits the sun every 5.4 years. It was the **46th** confirmed “**P**eriodic” comet and was discovered in 1948 by US Astronomer Karl Wirtanin. *46P’s orbit is shown as the dashed ellipse on the solar system map.*

Comets are fragments of rock and ice, left over from the formation of the solar system 4.6 billion years ago. Periodic comets (designated “P”) orbit the sun in short elliptical orbits and return “periodically” to the inner solar system. Other comets (designated “C”) have long elliptical or hyperbolic orbits and return rarely, if ever.

As they approach the sun, comets heat up and release gas and debris to form huge glowing comas and tails. Even small comets like 46P can become visible for millions of miles. The debris left in their wake produces meteor showers on the Earth as the earth passes through it. (Since 46P does not cross the orbit of earth, it doesn’t produce a meteor shower.)

Comet 46P is expected to be bright enough to be easily visible in binoculars, telescopes, and possibly unaided eyes all month long. However, comets are notoriously unpredictable; so its position and brightness may vary: “Comets are like cats: they have tails and do what they want!”

Follow along with the star-map on the next page as we track comet 46P on its expected path:

- Dec 1: 46P begins the month in constellation *Cetus*, two degrees northwest of 4th-magnitude star **Tau-1-Eridani**. It follows “the river” *Eridanus* during the first week of December.
- Dec 4: 46P enters *Eridanus* near 4th-magnitude star **Pi-Ceti**.
- Dec 6: 46P passes within ½ degree of 3rd-magnitude star **Azha** (Eta-Eridani).

Dec 9: 46P passes near the tail of *Cetus*, just south of the 2.5 magnitude star **Menkar (Alpha-Ceti)** and the barred-spiral galaxy M77 (NGC 1068).

Dec 11: 46P enters *Taurus*.

Dec 12: 46P is two degrees from the 3rd-magnitude visual pair of stars **Xi-** and **Omicron-Tauri**.

Dec 13: 46P reaches perihelion (closest to the sun) at a distance of 1.048 Astronomical Units from the sun.

Dec 16: 46P is at its brightest as it makes its closest approach to earth: a safe 7.16 million miles away. It is passing between two well-known open star-clusters: **The Pleiades (M45)** and **The Hyades (C41)**.

Dec 18: 46P enters *Perseus*, just south of a dim planetary nebula, **NGC 1514**, and an equally faint emission nebula, **NGC 1499 (The California Nebula)**.

Dec 21: 46P enters constellation *Auriga* where it will spend Christmas.

Dec 23: 46P passes less than 1 degree from the bright 1st-magnitude star **Capella (Alpha-Aurigae)**.

Dec 28: 46P enters *Lynx*.

Dec 31: 46P passes 1 degree from 4th-magnitude star **15-Lyncis**.

46P will spend the first few days of 2019 in Lynx before passing on into Ursa Major. From here it will quickly dim as it returns to Jupiter on its 5.4 year orbit.

