

Rare sky show: Two planets align with harvest moon

The nearly full moon will rise just above the bright planet Jupiter and a somewhat dimmer Uranus on Wednesday

By Geoff Gaherty



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Check out the eastern sky just after sunset tomorrow (Sept. 22), and you'll catch a skywatching treat. The nearly full moon will be rising just above the bright planet Jupiter and a somewhat dimmer Uranus.

You'll need binoculars if you hope to spot Uranus — it appears as a tiny bluish speck, too dim for the naked eye. So the coming celestial lineup is an excellent time to find that planet with binoculars or a small telescope, using Jupiter as a helpful guidepost.

This sky map shows where to spot the moon, Jupiter and Uranus this week.

Skywatching marathon

Several astronomical events happen in rapid succession this week, offering a celestial show for observers graced with clear skies. The times indicated here are for eastern North America and may vary a little if you're elsewhere in the world:

- Today (Sept. 21) at 8 p.m. EDT (1200 GMT), Jupiter is in opposition. This means that Jupiter will be exactly opposite the sun in Earth's sky. This also means that Jupiter will be visible the entire night. (Yesterday — Sept. 20 — Jupiter made its closest approach to Earth in nearly 50 years.)
- Five hours later, at 1 a.m. tomorrow (Sept. 22), Uranus will be in opposition, taking its turn opposite the sun in the sky.
- Later tomorrow at 3 p.m., Jupiter and Uranus will be in conjunction, less than 1 degree apart in the sky. They won't be visible right then in North America because they will be below the horizon, but they will still be close together when they rise just after sunset. You will be able to see both planets at the same time in the field of a small telescope at low magnification.
- The show continues tomorrow night at 11:09 p.m. EDT (0309 GMT Thursday, Sept. 23), when the sun crosses the celestial equator — a projection of Earth's equator on the sky — and enters the southern hemisphere. This is known as the equinox, meaning "equal nights." Daytime and nighttime are of equal length, about 12 hours, everywhere on Earth. (Of course, the sun won't be visible at this time in North America, being on the other side of the planet.)
- Finally, at 5:17 a.m. EDT (0917 GMT) Thursday, the full moon of September will occur, since the moon will be exactly opposite the sun in the sky. This is a special full moon: It is the full moon closest to the equinox, known as the harvest moon.

So we have two planets and the moon directly opposite the sun within a two-day period. This means that all three will be grouped closely together in the sky.

When to see them

The best night to observe the moon, Jupiter and Uranus will be tomorrow, weather permitting. The nearly full moon will rise around sunset, with Jupiter shining brightly beneath it. Uranus will be just slightly too faint to be seen with the naked eye, but will be easy to catch in binoculars or a small telescope.

This apparent close grouping of moon, Jupiter, and Uranus is actually a trick of perspective; the three objects aren't anywhere near each other.

The moon is very close to Earth, about 251,000 miles (404,000 km or 0.003 astronomical units) away. One astronomical unit, or AU, is the distance between the Earth and sun, about 93 million miles (150 million km).

Jupiter is nearly 1,500 times farther from Earth than the moon, placing it about 3.95 AU away. Uranus is nearly five times farther away than Jupiter, about 19.1 astronomical units from Earth. One way to visualize the relative distances is to imagine that the Earth is at one end of a 100-yard football field and Uranus is at the other end.

On this scale, Jupiter would be on the 20-yard line, and the moon would be about half an inch from the end zone. In the "overhead" view of the planetary alignment, the innermost circle is Earth's orbit; the moon's orbit is too small even to be visible.

This explains why our tiny moon appears so large in the sky while the giant planets Jupiter and Uranus are mere pinpricks of light. The moon is just tons closer. Pure and simple.