

Astronomers discover new planet, larger and more distant than Pluto

Patrick Martin
2 August 2005

Three US astronomers announced July 29 that they had identified a new planet, significantly larger than Pluto, and orbiting the sun as far as 9 billion miles out, about three times the orbital radius of the ninth planet. The three scientists, Michael Brown of Caltech, David Rabinowitz of Yale and Chad Trujillo of the Gemini Observatory in Hawaii, used the 48-inch Palomar Observatory telescope in southern California.

The new planet was first catalogued in a photographic survey by the three astronomers in 2003, when it was given the temporary designation 2003 UB313. At the time, however, it had not yet been identified as a planet, but when the team located it a second time on January 8, 2005, they were able to determine that it was a distant object within the solar system, rather than a star.

The new planet, to be named Xena, has an estimated diameter of 1,700 miles, about 20 percent greater than Pluto. Like Pluto, it consists of rock and ice and is part of the Kuiper belt, an array of similar objects that forms the outer shell of the solar system. It takes about 560 Earth years to make one full revolution around the sun.

Solar system astronomers first identified the Kuiper belt in 1992. They now estimate that as many as 70,000 bodies comprised of rock and ice are circling the sun outside the orbit of Neptune. There is great interest in this region because it is believed to represent the remnants of the original material from which the solar system was consolidated, and its study should shed light on the process of formation of the major planets.

There was an initial flurry of media commentary about whether or not Xena could rightfully be considered the tenth planet, a distinction which is somewhat arbitrary. Thousands of asteroids circle the sun in the space between the orbits of Mars and Jupiter. These are not considered planets because of their size—they are all smaller than Mercury and Pluto, the

two smallest of the established nine planets. The moon and several of the satellites of Jupiter and Saturn are larger than Pluto or Xena, but they do not orbit the Sun independently and are therefore classified as moons rather than planets.

Whatever name is given to it, Xena will become an object of intense study by astronomers. Its surface temperature is only a few degrees above absolute zero, but it may well have an internal heat source to account for its brightness, as well as an atmosphere.

Six planets—Mercury, Venus, Earth, Mars, Jupiter and Saturn—have been known since the dawn of history. That number expanded by three over the course of a century and a half: Uranus, the seventh planet, was discovered by William Herschel in 1786; Neptune by Johan Galle in 1846; and Pluto by Clyde Tombaugh in 1930. Xena makes ten, and there may well be other objects as large or even larger in the Kuiper belt, so the official roster of the solar system could well expand.

Last year the same three astronomers discovered another Pluto-like object, which they named Sedna, in a very peculiar orbit some 10,500 years long, taking it as far as 84 billion miles from the Sun. (The nearest star to the Sun, Proxima Centauri, is about 25 trillion miles away, about 300 times as far as Sedna's furthest distance from the Sun). Sedna is slightly smaller than Pluto, with a diameter estimated at 1,250 miles. Its orbit is so eccentric, however, that the discoverers suggested it should be considered a wandering asteroid rather than a true planet.

Brown, Rabinowitz and Trujillo recently identified the second-brightest object in the Kuiper belt, but were holding the announcement until a scientific conference next month. A team of Spanish astronomers from the Institute of Astrophysics in Andalusia reported the same discovery on July 29, the day that Xena's

existence was announced.

Comets are thought to be Kuiper belt objects that have been displaced and fall toward the Sun in highly elliptical paths that cause them to cross the orbits of the inner planets, including Earth. Last month NASA conducted the first successful “exploration” of a comet, when its Deep Impact collider smashed into the comet Temple 1, producing a spectacular geyser of rock and ice that was studied at close range by the Deep Impact mother ship.

Xena’s orbit is highly eccentric, crossing the ecliptic, the plane in which the other nine planets orbit, at an angle of 45 degrees. Dr. Brown explained that this sharp angle explains why the planet, easily visible in a telescope, took so long to be discovered. No one had bothered to look for such an object so far out of ecliptic.

The planet’s orbit is also lopsided: currently at its furthest distance from the Sun (aphelion) at 9 billion miles, it will be as close as the orbit of Neptune, about 3.3 billion miles, at closest approach (perihelion). The last time Xena was that close to the Sun, however, in the 1720s, Neptune itself had not yet been discovered.

Neptune was the first to be detected as the result of an astronomical calculation rather than accidental observation. The physicists John Couch Adams and Urbain Jean Joseph Leverrier, British and French respectively, independently predicted the location of an eighth planet based on intricate mathematical calculations to explain slight variations in the orbit of Uranus, the seventh planet. Leverrier contacted Johan Galle, a German astronomer, and his colleague Heinrich Louis d’Arrest, and told them where to look. They discovered the planet on the night of September 23, 1846, within one degree of the predicted location.

Xena is the largest object in the solar system to be discovered since that day, nearly 159 years ago.



To contact the WSWs and the
Socialist Equality Party visit:

wsws.org/contact