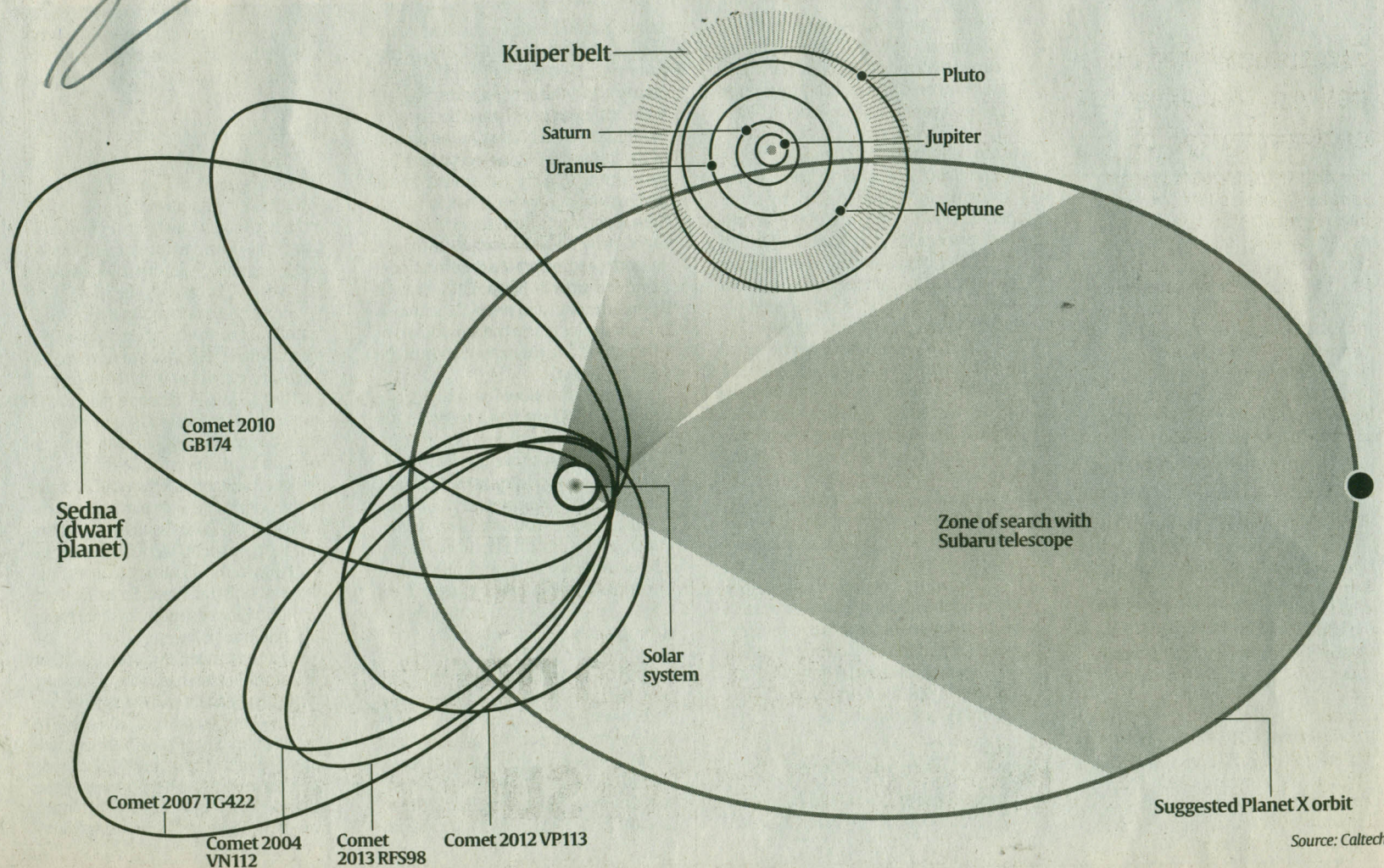


LEDGE



Source: Caltech

Have we finally found the 9th planet?

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A huge new celestial body is lurking at the edge of the solar system. Meet Planet X.

WHAT HAPPENED?

Two scientists at the California Institute of Technology (Caltech), the academic home of NASA's Jet Propulsion Laboratory, recently claimed they had found clear evidence of the existence of the ninth planet of the solar system. If true, the planet will fulfill the 19th century dream of discovering Planet X — a theoretical, enormous planet at the edge of our solar system. The planet, they claim, is roughly the size of Neptune and is yet to be spotted. However, other than their calculations, there is no direct evidence that the planet actually exists.

PLANET X

Based on their calculations, the scientists say the gaseous planet is around 10 times the mass of Earth. It is estimated to be anywhere between 200 and 1,200 times the distance from the Sun to Earth (1 Astronomical Unit or AU), as it has an extremely elliptical orbit. The researchers claim that the planet orbits the sun every 15,000 Earth years or so. During the solar system's infancy, 4.5 billion years ago, they say, the planet was knocked out to the extreme outer edges of the solar system where it settled into a distant elliptical orbit, and where it could be found today.

WHAT MAKES A PLANET?

The International Astronomical Union lists three criteria for being described as a full-size planet:

- It is in orbit around the Sun.
- It has sufficient mass to assume hydrostatic equilibrium, that means it must be large enough to have become round due to

AN ELUSIVE PLANET, A LONG-HELD DREAM

1846: Neptune is discovered after French mathematician Urbain Le Verrier finds discrepancies in Uranus's orbit.

1906: An observatory is founded in Flagstaff, Arizona, by Percival Lowell to search for a missing 10th planet in the Solar System, dubbed as Planet X

1930: Pluto is found by Clyde Tombaugh at the Lowell Observatory. However, it is too small to affect the orbit of Uranus

1992: A fresh set of calculations show that there is no discrepancies in the orbit of Uranus and Neptune, ruling out the need for Planet X

1999: Astronomers say that the orbits of a group of 5 comets could

mean there is a large planet lurking somewhere in the outer edges of the solar system

2003: A dwarf planet called Sedna is discovered which is at a distance of about 86 astronomical units from the Sun, about three times as far as Neptune. Its strange 12,000-year orbit needs an outside nudge, say scientists

2016: Based on the "bent" elliptical orbits of Sedna's and that of the 5 previous comets, Mike Brown and Konstantin Batygin say there is indirect evidence for a Neptune-sized planet with an orbit of around 15,000 years

the force of its own gravity.

■ It has "cleared the neighbourhood" around its orbit — it should have become gravitationally dominant, and there are no other bodies of comparable size other than its own satellites under its gravitational influence. Pluto was downgraded to the status of a dwarf planet because it did not meet this criteria.

'PLUTO-KILLER' DOES IT AGAIN

■ Konstantin Batygin and Mike Brown are two of the most well-known names in planetary science. Brown carries the distinction of being the 'Pluto-killer' — he is the man

who got Pluto demoted from its position as a planet. Brown's discovery of Eris in 2005 — which was as big as Pluto, orbited the sun at a distance nearly three times greater and was one of many such objects in the Kuiper Belt — led to the International Astronomical Union classifying both Eris and Pluto as dwarf planets.

■ In their results published in *The Astronomical Journal*, they are inferring the existence of Planet X from its ghostly gravitational effects on six objects beyond Neptune. This technique was used in 1846 by French mathematician Urbain Le Verrier to predict the existence of a giant planet from irregularities in the orbit of Uranus.

And thus, Neptune was found.

■ Researchers have deduced Planet X's presence from the peculiar clustering and the orbit paths of six previously known objects in the Kuiper Belt. They say that the gravitational pull from a planet with the mass of 10 Earths is the only explanation for their strange elliptical orbits, tilted out of the plane of the solar system. Essentially, all the objects have orbits that take them within the same area near the Sun, as if they've been pushed by something bigger. ■ They say there's only a 0.007 per cent chance, or about one in 15,000, that the clustering could be a coincidence. "I would love to find it," Brown told *Science* magazine. "But I'd also be perfectly happy if someone else found it. We hope that other people are going to get inspired and start searching."

A LONG AND DIFFICULT SEARCH

This is perhaps the most important hurdle in its discovery. At a distance of 1200 AU, the planet would receive so little light from the Sun, that it would hardly be reflecting any back. And the same goes for trying to discover it through its radiation signature, as it would hardly receive any heat from the Sun. Telescopes with capabilities of seeing extremely dim objects like the Hubble Space Telescope have an extremely narrow field of sight. This would make the process of searching for Planet X like looking for a needle in a haystack by seeing through a drinking straw. However, the Subaru telescope in Hawaii may provide some hope as it has dim light capabilities with a very wide field of vision.

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