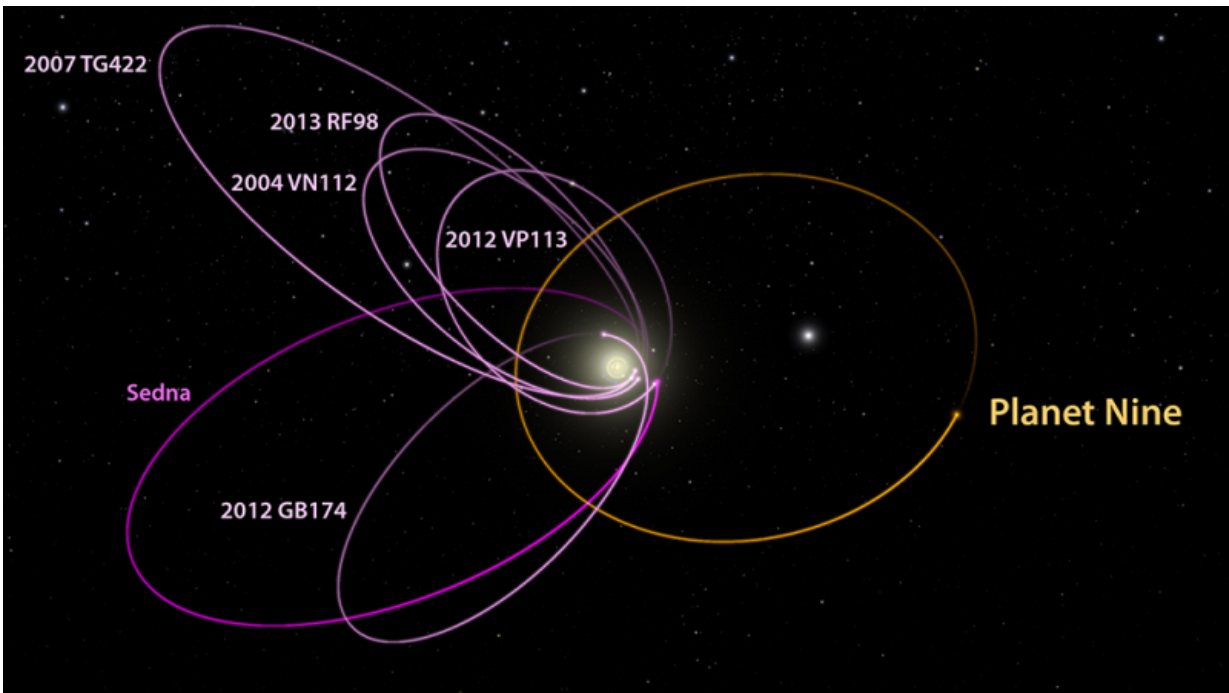


Predicting planets: The highs and lows

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The six most distant known objects in the solar system with orbits exclusively beyond Neptune (magenta) all mysteriously line up in a single direction. Also, when viewed in three dimensions, they all tilt nearly identically away from the plane of the solar system. Batygin and Brown show that a planet with 10 times the mass of the earth in a distant eccentric orbit anti-aligned with the other six objects (orange) is required to maintain this configuration. The diagram was created using WorldWide Telescope. Credit: Caltech/R. Hurt (IPAC)

In the mid-19th century, astronomers hypothesised an extra planet in our solar system, orbiting between the Sun and Mercury.

Without ever seeing it, they calculated its orbit and named it Vulcan—the only explanation, they thought, for small deviations in Mercury's own orbit.

But decades of searching yielded no proof, and finally in 1915, Albert Einstein's theory of relativity made sense of Mercury's strange behaviour in a way which obviated the need for Vulcan.

The search was abandoned.

Vulcan is only one of many [planets](#) wrongly predicted to exist in our solar system over the decades.

Nibiru, Tyche, and various versions of a "Planet X" beyond Neptune's orbit, excited the public imagination before fizzling out.

But in one very well-known case, mathematical modelling turned out to be right.

The existence of Neptune—the eighth and furthest known planet from the Sun—was deduced from a pull observed on the orbit of Uranus.

Scientists launched a telescope search, and the planet was detected within days.

On Wednesday, a duo of astronomers in the US [said they hope to have found a another planet](#) beyond Neptune's orbit—a giant with about ten times the mass of Earth.

Dubbed Planet Nine, it would perfectly explain the peculiar, clustered motion of a small group of comet-like bodies in the outer reaches of our solar system.

The idea of adding a planet to the solar system's arsenal caused great excitement, but experts cautioned on Thursday that the theory remains just that for now. And it may take years to prove.

"The work they've done is impressive. They've got a lot of information, they've been very careful. But really, this is just step number one," Edward Bloomer of the Royal Observatory Greenwich told AFP.

"Lots of other people around the world will be looking at this information... Even the team themselves will be re-running things, they'll be making little tweaks to see if this holds up."

Needle in a haystack

Astronomers use modelling all the time to predict the existence, nature, and behaviour of things they cannot actually see.

Black holes, for example, are "observed" purely from their influence on surrounding stars.

"Nothing based on modelling is ever certain," said Francois Forget of the LMD research institute in Paris. "It's the nature of science."

Take Pluto.

It was discovered in 1930, by accident, by astronomers looking for a ninth planet to explain orbital anomalies of Neptune and Uranus.

At first Pluto fit the model perfectly. But it later turned out to be much too small to be a real planet, and Pluto was reclassified a [dwarf planet](#) in 2006.

Evidence for the latest hypothesised planet, was "more convincing" than

some other recent proposals, said Morgan Hollis of the Royal Astronomical Society.

But then again, "this study is just showing that a planet is a possible solution... It could also be something else."

For Alessandro Morbidelli of the JL Lagrange planetary research institute Nice, southern France, it is now "open season" for planet hunters with telescopes.

But he warned it won't be easy. The planet, if it existed, was very, very far away, where little of the Sun's light could reach it.

"We have no idea where on its orbit the planet is," said Morbidelli. "It will be like finding a needle in a haystack."

While modelling remains an inexact science, Bloomer said "wild claims" of new planetary discoveries are dwindling as technology advances.

"The analysis becomes ever more sophisticated, and people are a lot more careful... Things are double-checked," said Bloomer.

For now, "I wouldn't put any money on it myself," he said of Planet Nine.

"Not because I think it's unlikely, but just because I know that at this stage, even though it's a very compelling idea and although they've done lots of good work, it's just step number one."

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