Scientists find quasi-moon orbiting the Earth for the last 60 years—and it's not the first one

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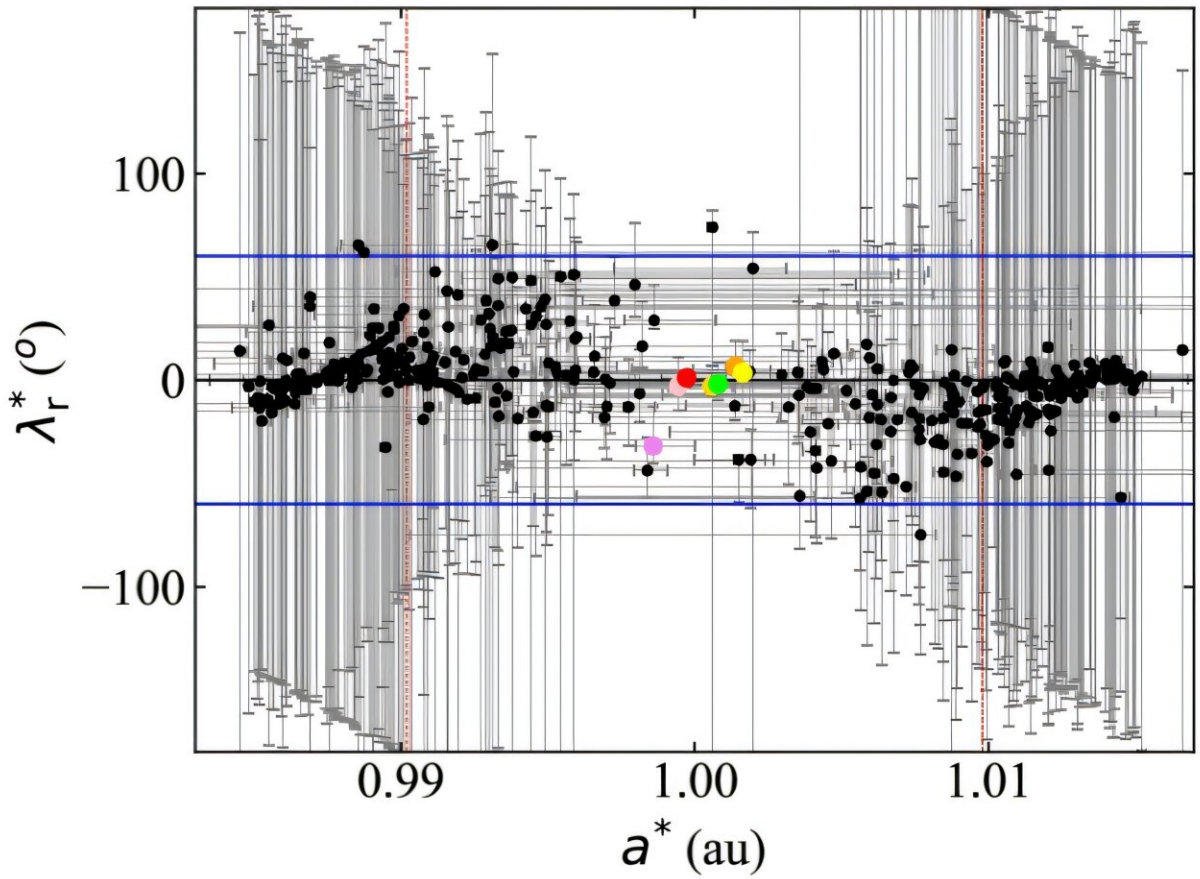

The panel maps the known quasi-satellites within the dynamic context of the Arjuna asteroid belt: Cardea (gold point), Kamo'oalewa (red), 277810 (orange), 2013 LX_{28} (yellow), 2014 OL_{339} (violet), 2023 FW_{13} (pink), and 2025 PN_7 (lime). The median value of λ_r in the year interval (2000, 2050) is displayed as $\lambda r*$, the equivalent value for the semimajor axis is a^*. Credit: *Research Notes of*

the AAS (2025). DOI: 10.3847/2515-5172/ae028f

Everyone who has ever lived on Earth has been well-aware of the moon, but it turns out Earth also has some frequent temporary companions. These "quasi-moons" are small asteroids that enter into a kind of resonance with Earth's orbit, although they aren't technically orbiting Earth. In August, this small group of asteroids, called Arjunas, offered another companion to add to the list.

Astronomers at the Pan-STARRS observatory in Hawaii discovered the new quasi-moon, referred to as "2025 PN7," on August 2, 2025. Their research was recently published in *Research Notes of the AAS*. Using JPL's Horizons system and Python tools, they analyzed the orbital data and compared it to other Arjunas and quasi-satellites.

The team found that 2025 PN7 had been in a quasi-orbit for about 60 years already and would likely be nearby for another 60 or so years before departing. Compared to other quasi-moons, this period is relatively short. The quasi-moon Kamo'oalewa has an expected near-Earth orbit of around 381 years, while the total time for 2025 PN7 is 128 years.

Scientists have been aware of these quasi-satellites since 1991, when they first discovered 1991 VG—which some believed was an interstellar probe at the time.

The study authors explain, "Over three decades later, it is now widely accepted that such objects are natural and constitute a secondary asteroid belt that occupies the region in which the Earth–moon system orbits around the sun, defining the Arjuna dynamical class. The Arjunas with the most Earth-like orbits can experience temporary captures as mini-

moons of our planet."

However, mini-moons are distinct from quasi-moons, like 2025 PN7, as mini-moons do temporarily orbit Earth and quasi-moons only appear to do so. Currently, there are six other known quasi-moons: 164207 Cardea (2004 GU9), 469219 Kamo'oalewa (2016 HO3), 277810 (2006 FV35), 2013 LX28, 2014 OL339 and 2023 FW13.

Future research might reveal more quasi-satellites or mini-moons. Keeping track of these near-Earth objects may be important for planetary defense and future space missions—possibly even for asteroid mining in the more distant future.

More information: Carlos de la Fuente Marcos et al, Meet Arjuna 2025 PN7, the Newest Quasi-satellite of Earth, *Research Notes of the AAS* (2025). DOI: 10.3847/2515-5172/ae028f