

"Long before it's in the papers"



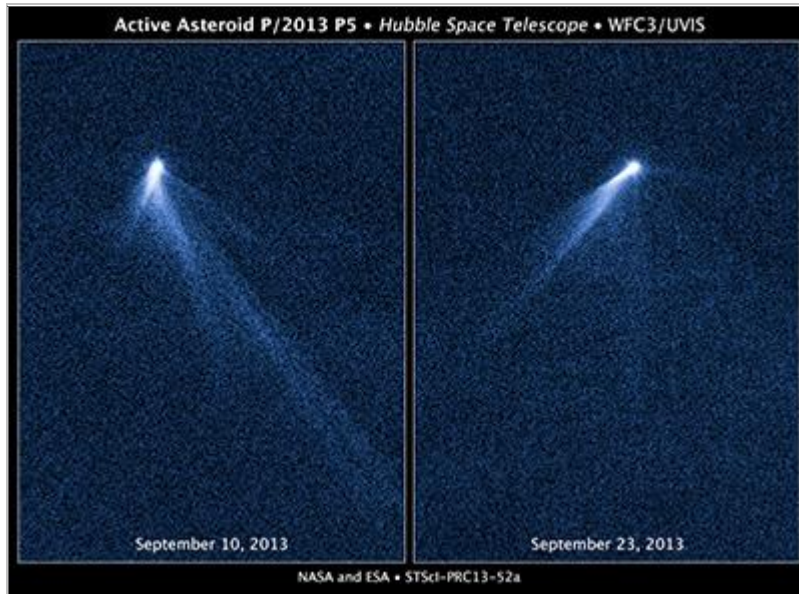
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“Freakish” asteroid resembles spinning sprinkler

Nov. 8, 2013
Courtesy of the University of California-Los Angeles
and World Science staff

Astronomers have found a “weird and freakish object” resembling a spinning lawn sprinkler in the asteroid belt between Mars and Jupiter.

The find, reported online in the Nov. 7 issue of the journal *Astrophysical Journal Letters*, has left them scratching their heads for an explanation. Normal asteroids appear simply as tiny points of light. This bizarre one has six comet-like tails of dust radiating from it like spokes on a wheel.



Credit: NASA, ESA, and D. Jewitt (UCLA)

“It’s hard to believe we’re looking at an asteroid,” said lead investigator David Jewitt, of the University of California-Los Angeles. “We were dumbfounded when we saw it. Amazingly, its tail structures change dramatically in just 13 days as it belches out dust.”

One possibility is that thanks to increasingly fast spin, the asteroid’s surface started flying apart, spitting out dust in bursts starting last spring, the researchers added.

It was first seen as an unusually fuzzy object with the Pan-STARRS survey telescope in Hawaii. Its

multiple tails were discovered in images taken by NASA's Hubble Space Telescope on Sept. 10. When Hubble returned to the asteroid on Sept. 23, it looked as if the whole structure had swung around.

"We were completely knocked out," said Jewitt.

The tails could have arisen from a series of "impulsive dust-ejection events," modeling by team member Jessica Agarwal indicated. Agarwal, of the Max Planck Institute for Solar System Research in Lindau, Germany, calculated that the first ejection occurred on April 15 and the last on Sept. 4. The ones in between were on July 18, July 24, Aug. 8 and Aug. 26.

Pressure from the sun's radiation smears the dust into streamers. The asteroid may have been "spun up" if that pressure exerted a torque, or twisting force, Jewitt said. If the spin got fast enough, he added, the object's weak gravity would no longer be able to hold it together. Dust might avalanche toward its equator and eventually drift into space to make a tail. So far, less than a thousandth of the asteroid's content has been lost—perhaps 100 to 1,000 tons of dust, Jewitt said.

Follow-up observations may show whether the dust leaves the asteroid in the equatorial plane; that would indicate a "rotational breakup," Jewitt said. This must be a common phenomenon in the asteroid belt, Jewitt said, and may even be the main way that small asteroids die. "In astronomy, where you find one, you eventually find a whole bunch more," he said.

The object may be a piece from an asteroid collision around 200 million years ago, Jewitt added. The resulting fragments, known as the Flora asteroid family, are still following similar orbits around the sun. Meteorites from these bodies show evidence of having been heated to as much as 1,500 degrees Fahrenheit (800 Celsius).