

INTERSTELLAR OBJECTS

What's in a name?

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Credit: ESA/Hubble, NASA, ESO, M. Kornmesser

Is it an asteroid? Is it a comet? It seems the interstellar visitor 1I/2017 — better known as ‘Oumuamua — has properties of both. Its highly hyperbolic orbit and surface properties are comet-like, but the absence of any detectable gas or dust emission is asteroid-like. To add to the puzzle, ‘Oumuamua has an unusual shape (pictured) and is tumbling as it hurtles through space. Marco Micheli and co-workers analyse hundreds of positional measurements to map its trajectory, in the hope of pinpointing its origin.

Using all available astrometric data, from ground-based telescopes as well as the Hubble Space Telescope, the authors found that the recorded orbital arc does not fit a model if only gravitational acceleration (from the

Sun, planets and so forth) is present. Adding a radial acceleration term fits best, at 30σ significance. After considering eight sources of non-gravitational acceleration, such as outgassing, solar radiation pressure, friction, collisions and presence of (undetected) secondary body or fragment, to name but a few, Micheli et al. conclude that outgassing is the most plausible, though below our detection limit. They also point out that as ‘Oumuamua comes from a different star system, it shouldn't be surprising that it differs from Solar System objects.

May Chiao

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