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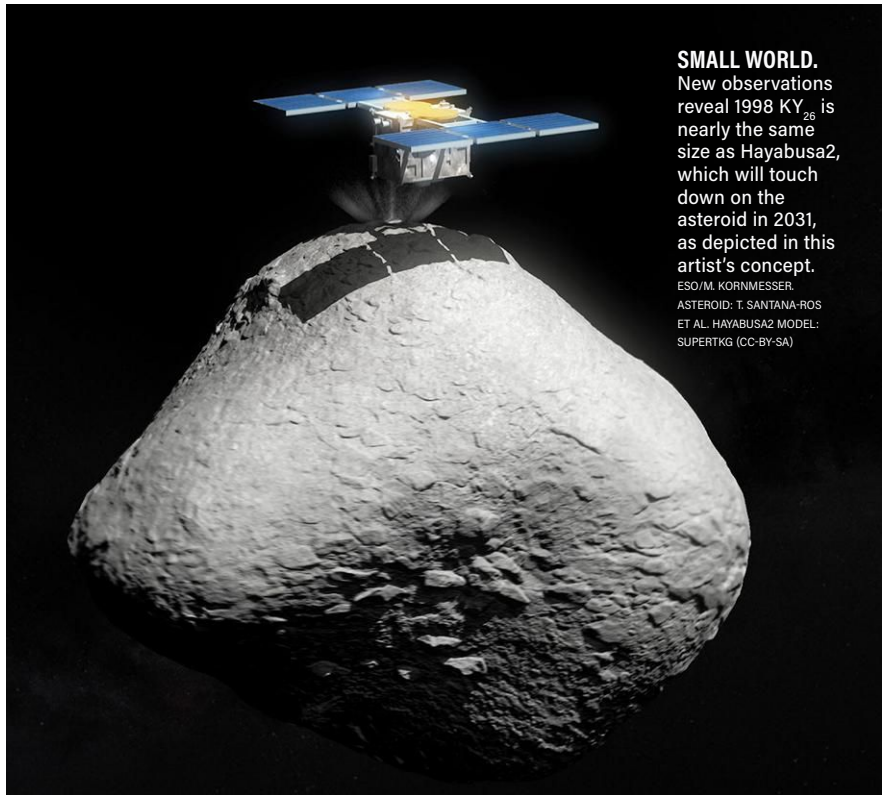
HAYABUSA2, TARGET ASTEROID ARE OF A SIZE

AFTER DROPPING OFF samples of asteroid 162173 Ryugu in December 2020, the Japan Aerospace Exploration Agency's (JAXA) Hayabusa2 is now on course to fly past asteroid 2001 CC₂₁ later this year before rendezvousing with 1998 KY₂₆ in 2031.

The latter encounter just got more interesting. A paper published Sept. 18 in *Nature Communications* revealed that 1998 KY₂₆ is smaller and rotating more quickly than initially thought. New data taken by ground-based telescopes during 1998 KY₂₆'s close approach to Earth in 2024 show it is just 36 feet (11 meters) across. That's one-third the size of previous estimates and on par with Hayabusa2 itself. While the spacecraft's body measures just 5.2 feet by 3.2 feet by 4.1 feet (1.6 m by 1 m by 1.25 m), with solar panels it is nearly 20 feet (6 m) across. Additionally, 1998 KY₂₆ is rotating every 5.4 minutes, twice as fast as the previously measured value.

Hayabusa2 is aiming to briefly touch down on 1998 KY₂₆ in a similar manner to its visit to Ryugu. But 2,960-foot (900 m) Ryugu spins once every 7.6 hours. On tiny, fast-spinning 1998 KY₂₆, the maneuver will be a totally different ballgame. "The smaller size and faster rotation now measured will make Hayabusa2's visit even more interesting, but also even more challenging," said European Southern Observatory astronomer and study co-author Olivier Hainaut in a press release.

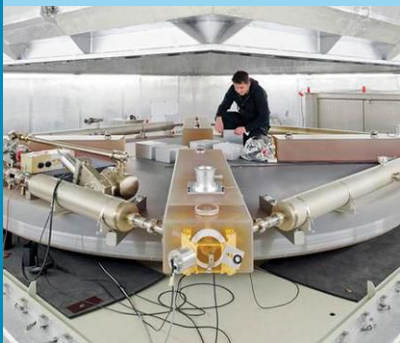
The asteroid's small size and fast spin also have implications for its structure.



SMALL WORLD. New observations reveal 1998 KY₂₆ is nearly the same size as Hayabusa2, which will touch down on the asteroid in 2031, as depicted in this artist's concept. ESO/M. KORNMESSENER. ASTEROID: T. SANTANA-ROS ET AL. HAYABUSA2 MODEL: SUPERTKG (CC-BY-SA)

Although it could be a so-called rubble-pile asteroid like Ryugu, made of accumulated smaller bits of debris, astronomers can't rule out the possibility that 1998 KY₂₆ is solid rock — a single piece of a larger body that was thrown out during a collision. "We have never seen a 10-meter-size asteroid in situ, so we don't really know what to expect and how it will look," said study first author Toni Santana-Ros of the University of Alicante, Spain.

While 1998 KY₂₆ is not considered a hazard, there are 2,508 currently known objects with orbits close enough to our planet to raise concerns. The new measurements demonstrate the ability of current technology to characterize small asteroids, bolstering future planetary defense efforts as we seek to understand the objects — particularly the small, stealthy ones — that populate our neighborhood. —A.K.



ASTRID ECKERT/TUM

RING LASER TRACKS EARTH'S WOBBLE

A 250-DAY experiment at the Technical University of Munich Institute of Engineering for Astronomical and Physical Geodesy in Germany has improved 100-fold our ability to measure changes in the wobble of Earth's axis as our planet spins. The team utilized a ring laser, which sends light along two different paths, bouncing each beam off a mirror so they come together at a single point to create a pattern of interference that changes depending on Earth's rotational speed. The result will allow scientists to model our planet's motion through space with unprecedented accuracy. —A.K.