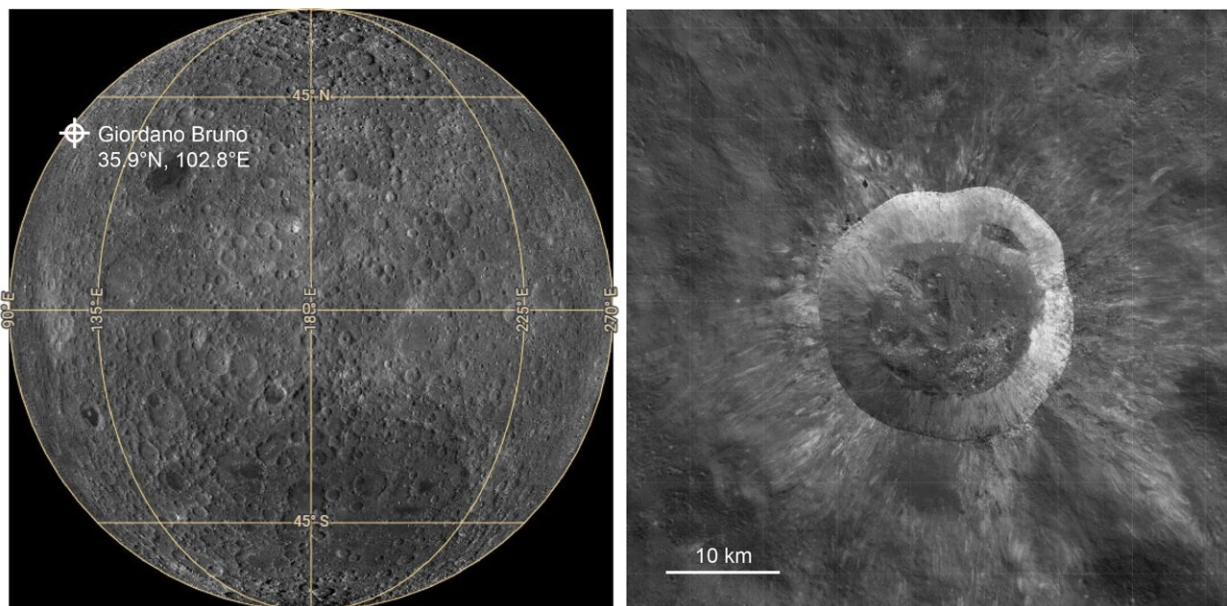


Computer model helps support theory of asteroid Kamo'oalewa as ejecta from the moon

April 22 2024, by Bob Yirka



The location and topography of lunar crater Giordano Bruno. Left is a map of the lunar farside using the Lunar QuickMap. Right is the topographic map of GB crater from the Lunar Reconnaissance Orbiter Camera (LROC) data. Credit: *Nature Astronomy* (2024). DOI: 10.1038/s41550-024-02258-z

A small international team of planetary scientists has found evidence supporting the theory that the near-Earth asteroid Kamo'oalewa is ejecta from the moon. In their paper [published](#) in the journal *Nature Astronomy*, the group describes their data-driven models and what they revealed.

The asteroid Kamo'oalewa was discovered in 2016 as part of an international effort to find asteroids that could potentially impact the Earth. It was determined that the asteroid circles the sun in an orbit that is synchronized with the Earth, making it appear as if it circles the planet. It was also estimated to be 40 to 100 meters across and it spins very fast for an asteroid.

Then, in 2021, another team found evidence suggesting that the makeup of Kamo'oalewa was similar to that of rocks that have been found on the moon, suggesting it may have a lunar origin. To investigate, the researchers launched a wide-ranging study of the asteroid and the possible places on the moon it might have come from.

The team began by creating a computer model to mimic the type of collision that could have resulted in a piece of the moon's surface the size of Kamo'oalewa being flung into space. In so doing they were able to estimate the likely size of the asteroid that would have struck the moon, and from that, the size of the [crater](#) it would have left behind.

The researchers also noted that such a strike would have had to have been fairly recent, which narrowed down the crater possibilities. They then compared samples of moon material brought back to Earth that had been found near one prime possibility—the Giordano Bruno crater. They found spectral similarities between the samples and the asteroid Kamo'oalewa—they also found both had bits of the mineral pyroxene in

them as well.

The team then made some estimations using their data and found that an asteroid colliding with the moon at the current site of the Giordano Bruno crater could have thrown off debris that made its way into space—with one chunk the size of Kamo'oalewa. They suggest further missions to study the moon could provide more information, possibly further cementing the idea of the Kamo'oalewa asteroid as a piece of the [moon](#).

More information: Yifei Jiao et al, Asteroid Kamo'oalewa's journey from the lunar Giordano Bruno crater to Earth 1:1 resonance, *Nature Astronomy* (2024). [DOI: 10.1038/s41550-024-02258-z](https://doi.org/10.1038/s41550-024-02258-z)

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