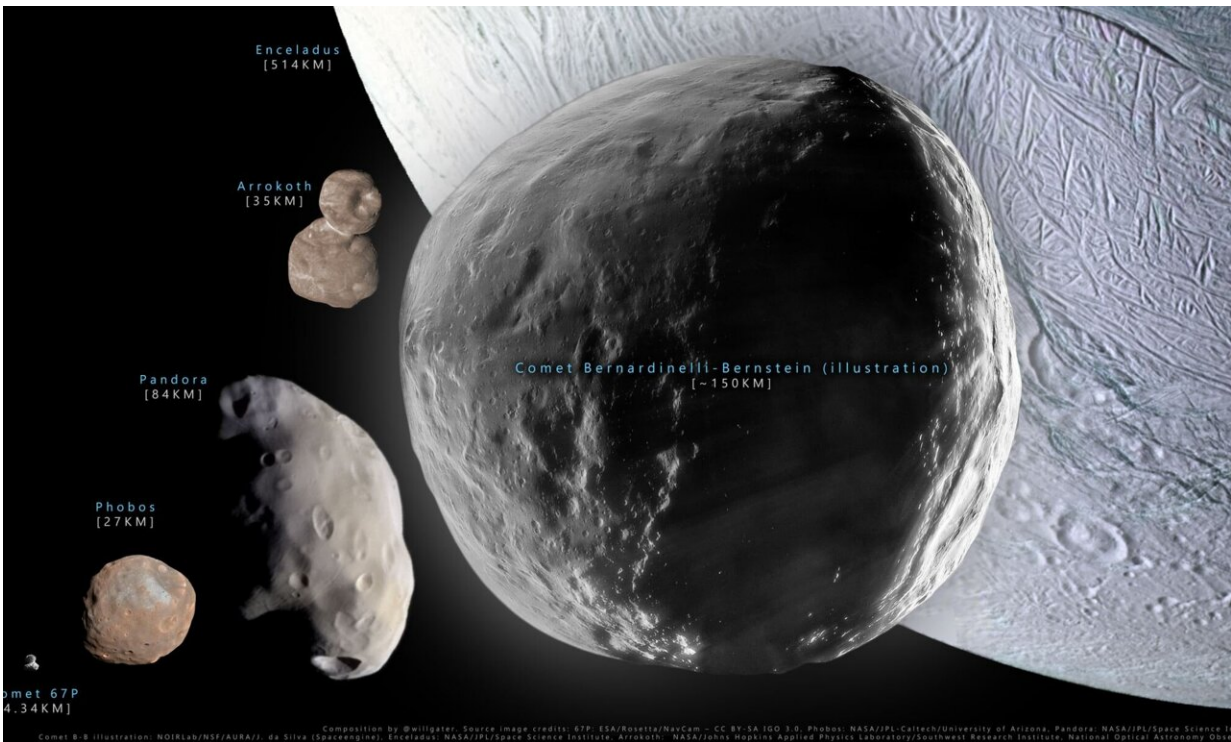


The biggest comet ever seen will get as close as Saturn in 2031

October 15 2021, by Nancy Atkinson



A graphic comparing the size of Comet 2014 UN271 (Bernardinelli-Bernstein) to other solar system objects. Credit: Will Gater

A mega-comet—potentially the largest ever discovered—is heading from the Oort Cloud towards our direction. Estimated to be 100–200 kilometers across, the unusual celestial wanderer will make its closest approach to the Sun in 2031. However, the closest it will come to Earth

is to the orbit of Saturn.

Astronomers say Comet Bernardinelli-Bernstein (C/2014 UN271) could be the largest member of the Oort Cloud ever detected, and it is the first comet on an incoming path to be detected so far away.

The graphic above, by astronomer Will Gater compares the size of the comet to other Solar System objects.

The comet was discovered Pedro Bernardinelli and Gary Bernstein, from the University of Pennsylvania earlier this year. They were scouring through data from the 570-megapixel Dark Energy Camera (DECAM) on the Víctor M. Blanco 4-meter Telescope in Chile. They found data of this object that was originally collected from 2014–2018, which did not show a typical comet tail, and the object was therefore thought to be a dwarf planet.

But within a day of the announcement of its discovery via the Minor Planet Center, [astronomers](#) using the Las Cumbres Observatory network took new images which revealed that it has grown a coma in the past 3 years, and that it was moving rapidly through the Oort Cloud. The object was then officially classified as a comet.

Bernardinelli and Bernstein (along with a crew of other astronomers) then began studying this comet in earnest, taking data from all sorts of previous and recent observational sources. They have now posted a paper on Arxiv, with the unusual title of "C/2014 UN271 (Bernardinelli-Bernstein): the nearly spherical cow of comets."

They said studying the comet's orbit using astrometry and "backwards integration" suggests this is a pristine new comet, and its previous [closest approach](#) to the Sun would have about 3.5 million years ago, only reaching about 18 au (astronomical units = distance of Earth from the

Sun) away.

They also said the coma appears to be displaying normal "simple" sublimation thermodynamics of most comets (hence the spherical cow title for the paper), but they can't predict how much brighter or more active the comet might get as it gets closer to the Sun. However, a recent *Astronomer's Telegram* said that the object had brightened with an "outburst" on September 14, from magnitude 20 to 18.9.

On Twitter, Bernardelli said "We were able to determine that this is probably consistent with CO₂ or NH₃ sublimation, but couldn't do much more than that."

The coma is consistent with a stationary model, and it follows simple sublimation thermodynamics (hence the spherical cow title for the paper!). We were able to determine that this is probably consistent with CO₂ or NH₃ sublimation, but couldn't do much more than that

(8/n) pic.twitter.com/0k8Lc4UuTG

— Dr. Pedro Bernardinelli (@phberardinelli) [September 22, 2021](#)

The astronomers deduced that the current inward journey of the comet began at a distance of over 40,000 astronomical units (au) from the Sun—in other words 40,000 times farther from the Sun than Earth is, or 6 trillion kilometers away (3.7 trillion miles or 0.6 light-years—1/7 of the distance to the nearest star). For comparison, Pluto is 39 au from the Sun, on average.

Currently, the comet is about as far away as Uranus (about 3 billion kilometers or 1.8 billion miles away) and has a magnitude of just under

20. Despite the [comet](#)'s size, even at its closest approach 10 years from now, it is currently predicted that it won't be visible to the naked eye, and only the largest amateur telescopes will be able to see it.

More information: Pedro H. Bernardinelli et al, C/2014 UN₂₇₁ (Bernardinelli-Bernstein): the nearly spherical cow of comets. arXiv:2109.09852v2 [astro-ph.EP], arxiv.org/abs/2109.09852

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