

Astronomers confirm size of largest comet ever discovered, bigger than Rhode Island

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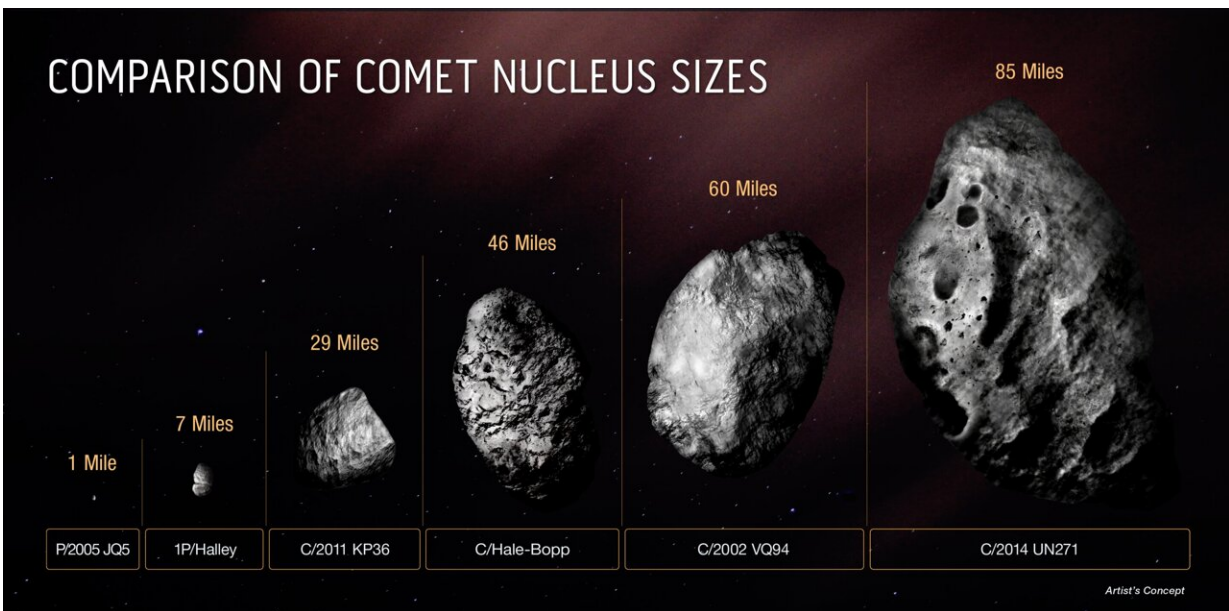


Diagram comparing the size of the icy, solid nucleus of comet C/2014 UN271 (Bernardinelli-Bernstein) to several other comets. Credit: NASA, ESA, Zena Levy (STScI)

Astronomers using NASA's Hubble Telescope have confirmed the existence the largest comet ever discovered, and it will pass by our sun in the next decade.

Comets are different from asteroids in that asteroids are rocky objects,

while as a [comet](#) is a ball of ice and dust. Comets are also known for the "tail" they leave behind and the glowing head, or [nucleus](#), that appears as it approaches the sun.

Now astronomers have determined the size of "the largest icy comet nucleus ever seen." Comet C/2014 UN271, also known as Comet Bernardinelli-Bernstein, is about 80 miles wide, larger than Rhode Island. Its nucleus is estimated to weigh 500 trillion tons, about 100,000 times greater than most comets.

Also, the comet is traveling at 22,000 mph and headed closer to Earth. It won't be of any concern when it makes its [closest approach](#) in 2031, because it will be around 1 billion miles away from the sun, slightly farther than the distance between Earth and Saturn. The findings on the comet were published Tuesday in the journal *The Astrophysical Journal Letters*.

"This comet is literally the tip of the iceberg for many thousands of comets that are too faint to see in the more distant parts of the solar system," David Jewitt, [planetary science](#) and astronomy professor at UCLA and co-author of the study, said in a statement. "We've always suspected this comet had to be big because it is so bright at such a large distance. Now we confirm it is."

First discovered by astronomers Pedro Bernardinelli and Gary Bernstein in archival images in 2014, the comet was spotted when it was more than 3 billion miles from the sun, an indicator of its size.

"We guessed the comet might be pretty big, but we needed the best data to confirm this," said Man-To Hui of the Macau University of Science and Technology in Taipa, Macau, and lead author of the study.

To confirm the comet's size, astronomers took images of it using the

Hubble telescope on Jan. 8. But the challenge of deciphering the images was distinguishing the comet's nucleus from the cloud and tail, or coma, surrounding it. As a comet gets closer to the sun, it heats up, and the coma expands.

The comet is around 2 billion miles away from the sun, where temperatures are an estimated minus 348 degrees Fahrenheit, but enough for the [carbon monoxide](#) to sublime off the comet's surface to form the coma.

Hui and colleagues then made a computer model of the comet and adjusted it to the telescope images. They then were able to take out the coma to leave just the nucleus.

Hui and his colleagues next made a computer model of the surrounding coma and adjusted it to fit the Hubble images. Then they subtracted the glow of the [coma](#).

The team then took the nucleus photos and compared its brightness to radio observations from the Atacama Large Millimeter/submillimeter Array (ALMA) in Chile. The combined data allowed [astronomers](#) to determine its diameter, as well as what the nucleus actually looks like.

"It's big, and it's blacker than coal," Jewitt said.

The comet takes 3 million years to orbit the solar system, and it reaches as far as half a light-year from the sun.

Astronomers hope the comet will provide answers on what comets from the Oort Cloud are like. The Oort Cloud is believed to be a massive nesting ground for trillions of comets; it has yet to be observed directly.

More information: Man-To Hui et al, Hubble Space Telescope

Detection of the Nucleus of Comet C/2014 UN271
(Bernardinelli–Bernstein), *The Astrophysical Journal Letters* (2022).
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