



The gigantic comet bernardinelli-bernstein: a review

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Abstract

Huge comets are considered as serious threat to Earth. Bernardinelli-Bernstein (BB) comet is one of such huge comets. Based on the gathered data using space telescopes, scientists and astronomers have confirmed the fact that, the BB comet (C/2014 UN271) is the biggest comet ever seen. In this paper, we give a short review about the BB comet and we are trying to answer the question, does the comet BB pose a real threat to Earth?

Keywords: Comet Bernardinelli-Bernstein (BB); C/2014 UN271; Mega comets.

1. Introduction

The data collected by Hubble space telescope has confirmed that the enormous Bernardinelli-Bernstein comet is considered as the largest frozen comet nucleus ever spotted by astronomers (Bernardinelli et al., 2021). The official name of this comet is C/2014 UN271. Its diameter is about 129 km. The mass of the nucleus, which is estimated to be 500 Trillion Tons, is nearly 50 times greater than that of the majority of known comet nuclei. A wonderful opportunity to study a comet that is far from the Sun has been presented to us by the finding of the BB comet. At the Cerro Tololo Inter-American Observatory in Chile, astronomers Pedro Bernardinelli and Gary Bernstein found the BB comet in old Dark Energy Survey photographs. It was unintentionally detected in November 2010 when it was 3 billion miles from the Sun, about the distance to Neptune on average. Since then, it has been intensively investigated by both ground and space-based observatories.

2. Discovery and observation

According to Bernardinelli et al., comet BB was identified as part of a search for trans-Neptunian objects (TNOs) in the 80,000 exposures taken by the Dark Energy Survey (DES) between 2013 and 2019. (2021). This sequence illustrates how Comet BB's nucleus was separated from the huge shell of dust and gas that around the solid frozen nucleus (Farnham et al., 2021). A photograph of the comet captured by NASA Hubble's Wide Field Camera 3 on January 8, 2022, may be seen on the left. Fitting the surface brightness profile assembled from the observed image on the left resulted in a coma model (middle panel). This made it possible to lift the coma, exposing the nucleus' point-like light. Using information from radio telescopes, astronomers were able to precisely calculate the nucleus size. Nearly 2 billion miles away, that is no small accomplishment. While being 85 miles across, the nucleus is so far away that Hubble cannot discern it. Hubble's study of its reflectance yields its size. The nucleus is said to be as black as charcoal. Radio measurements are utilized to compute the nucleus area. Like other comets that approach the Sun, C/2014 UN271 is encircled by a coma, which is a sizable cloud of gas that is evaporating from the comet's surface. A portion of C/2014 UN271's coma, which is visible in the photos, is more than 150,000 miles long, according to Jewitt. Comets get their tails from this cloud, and they can have incredibly long tails. Because the comet is currently too far away and hence too cold for water to transform into a gas, the coma is most likely composed of chemicals that change into gases at much lower temperatures, such as carbon monoxide. According to Jewitt, the comet's body is losing more than 2,000 pounds of material every second as it transitions from a solid to a gas (Hui et al., 2022).

3. Some feature of the BB comet

Comet C/2014 UN271's coma, a huge cloud of gas around the object as it evaporates from its surface (Khalil et al., 2019; Khalil et al., 2020; Khalil et al., 2021). The cometary tails are composed of that cloud, which may be rather enormous; according to Jewitt, the portion of C/2014 UN271's coma visible in the images is more than 150,000 miles long. The coma is most likely made up of substances like carbon monoxide that can turn into gases at much lower temperatures because the comet is now too far away and too cold for water to become a gas. According to Jewitt, the comet's body loses more than 2,000 pounds of material per second as it transitions from a solid to a gas. The Oort Cloud, a vast region assumed to be outside the Solar System, is supposed to be where the comet's extraordinarily lengthy orbital period began. According to observations, the comet is travelling at a speed of 35,400 km/h and will be closest to the sun in 2031.



It will return to Earth in 4.5 million years. It is still around 1.6 billion kilometres from the sun at its closest point, which is in Saturn's orbit. With an estimated temperature of -348 degrees Fahrenheit and a 3-million-year elliptical orbit, the Bernardinelli-Bernstein comet is extremely cold. Warm enough for sublimation of surface carbon monoxide (CO), which causes a dusty coma. The comet is about a hundred miles long and a thousand times bigger than a typical comet. When the comet was originally discovered in June 2021, astronomers mistook it for a minor planet due to its enormous size. Nature, 2022; Lellouch et al., 2022)

4. Is the BB comet a potential hazard to Earth?

One of the biggest comets ever observed in our solar system is the gigantic comet BB. The Earth will perish if it collides with the planet. But there is no danger to Earth from the comet. It is most likely to travel between the orbits of Uranus and Saturn. So, there is no need to be concerned because this comet won't affect Earth. (NASA, 2022).

5. Conclusion

In this study, we present an overview of the comet BB to explain some of its important features and to confirm that it is not considered as potential threat to Earth. We motivate researchers to study the BB comet and any other similar comets that may come close to Earth in the future.

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