

## Video: Enjoying the Geminids from above and below

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On the night of December 13, into the morning of December 14, 2018, tune into the night sky for a dazzling display of fireballs. Thanks to the International Space Station, this sky show – the Geminids meteor shower—will be viewed from both above and below.

Sky watchers on the Earth will be sprawled flat on their backs, scanning the skies for fleeting streaks of light or "meteors" from small particles or "meteoroids" burning up as they plunge into the atmosphere. While most of those viewers won't be pondering what the shooting stars are made of, astronomers and planetary scientists will be. The Meteor camera on the space station will provide clues.

Meteor records HD video from inside the Window Observational Research Facility (WORF) – looking through the highest optical-quality window ever installed on a human space vehicle.

This camera helps scientists identify and monitor the activity of meteors, from bolides, extremely bright meteors that typically explode in the atmosphere, to much fainter ones not visible to the naked eye. The camera is equipped with a diffraction grating, an optical component that allows incoming light to be split into selected visible wavelengths of light that are signatures of various elements (Iron, Sodium, Calcium, and Magnesium). By measuring a spectrum or "chemical fingerprint" from the meteor, the presence of these elements is revealed.

Meteor Science Principal Investigator Tomoko Arai of the Chiba Institute of Technology in Japan says, "Our observations focus on annual meteor showers, such as Geminids and Perseids, because their meteoroids originated from known comets or asteroids, so-called meteor showers' parent bodies. The spectral information will tell us the chemical makeup of meteoroids and of their parent bodies. This can help us understand their origin and evolution."

The instrument also helps improve estimates of how much material actually enters Earth's atmosphere. Findings could help mission planners protect spacecraft and Earth from potential collisions with meteoroids.

So what parent body spawns the debris that results in the dazzling

## Geminids?

Many researchers hypothesize that they are related to a rocky asteroid known as 3200 Phaethon, which passes closer to the sun than any other named asteroid. Phaethon may be a "rock-comet"—a dormant comet that has accumulated a thick mantle of interplanetary dust grains that can slough off as the comet nears the sun. Phaethon may be an asteroid that was once rich in ice and organics like comets, originally located in the [main asteroid belt](#), which has become active as its orbit has evolved closer to the Sun.

Bill Cooke of NASA's Meteoroid Environment Office offers another possible explanation for the Geminids source.

"There is another object – Apollo asteroid 2005 UD – that seems to be dynamically related to Phaethon and has physical similarities. Some researchers believe that 2005 UD, 3200 Phaethon, and the massive amounts of debris that cause the Geminids are all products of a larger object that has broken apart."

Researchers continue to debate the cosmic drama underlying the Geminids. Meanwhile, Cooke gives this advice:

"Best viewing is Friday morning around 2 AM your local time, after moonset. In the suburbs you could see around 40-50 meteors per hour. Under ideal conditions you could see about 100 [meteors](#) per hour! Darker is always better when viewing meteor showers."

Provided by NASA

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