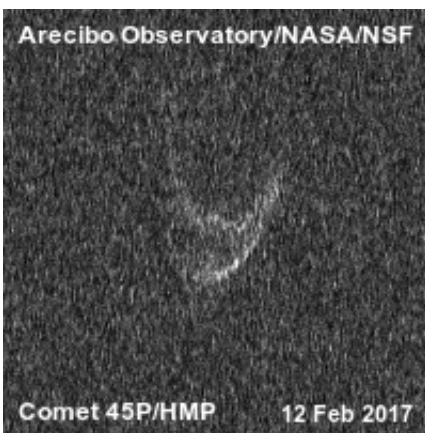


Arecibo Observatory captures revealing images of Comet 45P/Honda-Mrkos-Pajdusakova

February 16 2017, by Suraiya Farukhi



Gif composed of thirteen delay-Doppler images of Comet 45P/HMP after 2 hours of observation. Credit: Universities Space Research Association

Though not visible to the naked eye or even with binoculars, the green-tailed Comet 45P/Honda-Mrkos-Pajdusakova (HMP) did not escape the gaze of the world-renowned Arecibo Observatory. Scientists from the University of Arizona's Lunar and Planetary Laboratory (LPL) and the Universities Space Research Association (USRA) at Arecibo Observatory have been studying the comet with radar to better understand its solid nucleus and the dusty coma that surrounds it.

"Comets are remnants of the planet forming process and are part of a

group of objects made of water ice and rocky material that formed beyond Neptune," noted Dr. Ellen Howell, Scientist at LPL and the leader of the observing campaign at Arecibo. "Studying these objects gives us an idea of how the outer reaches of our Solar System formed and evolved over time."

Studying the comet with radar not only very precisely determines its orbit, allowing scientists to better predict its location in the future, but also gives a glimpse of the typically unseen part, the comet's nucleus, which is usually hidden behind the cloud of gas and dust that makes up the its coma and tail.

"The Arecibo Observatory planetary radar system can pierce through the comet's coma and allows us to study the surface properties, size, shape, rotation, and geology of the [comet nucleus](#)," said Dr. Patrick Taylor, USRA Scientist and Group Lead for Planetary Radar at Arecibo. "We gain roughly the same amount of knowledge from a radar observation as a spacecraft flyby of the same object, but at considerably less cost."

In fact, the new radar observations have revealed Comet 45P/HMP to be somewhat larger than previously estimated. The [radar images](#) suggest a size of about 1.3 km (0.8 mi) and that it rotates about once every 7.6 hours. "We see complex structures and bright regions on the comet and have been able to investigate the coma with radar," indicated Cassandra Lejoly, graduate student at the University of Arizona.

This [comet](#) is only the seventh imaged using radar because comets rarely come close enough to the Earth to get such detailed [radar](#) images. In fact, though 45P/HMP has an orbital period of about 5.3 years, it rarely passes close to Earth, as it is doing now. Comet 45P is one of a group of comets called Jupiter family comets (JFCs), whose orbits are controlled by Jupiter's gravity and typically orbit the sun about every 6 years.

Comet 45P/HMP, which is passing by Earth at a speed of about 23 km/s (relative to Earth) and a close approach of about 32 Earth-Moon distances, will be observed widely at different wavelengths to characterize the gas and dust emanating from the nucleus that forms the coma. As comets orbit the sun, the ices sublime from solids to gases and escape the nucleus. The nucleus gradually shrinks and will disappear completely within in less than a million years.

Radar observations at Arecibo of Comet 45P/HMP began on February 9, 2017 and will continue through February 17, 2017.

Provided by Universities Space Research Association

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