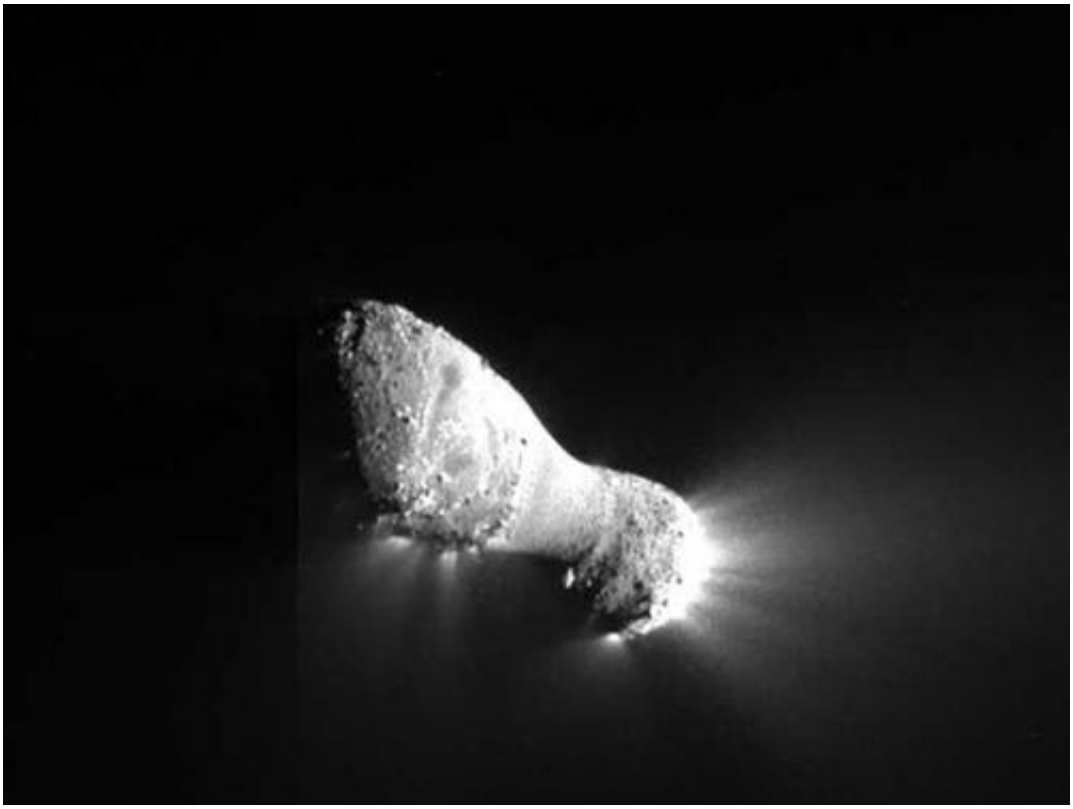
Comet Hartley 2

June 15 2011



An optical image of Comet Hartley 2, taken by the the NASA EPOXI (Deep Impact) mission between Nov. 3 and 4, 2010, during the spacecraft's flyby of comet Hartley 2. Credit: NASA/JPL-Caltech/UMd

(PhysOrg.com) -- The comet Hartley 2 is a relatively small and elongated comet - only about 0.6 x 0.4 kilometers in size. It orbits the sun every 6.46 years, getting as close to it as 1.05 astronomical units (the Earth is at a distance of 1 AU) and as far away as 5.88 AU; Hartley 2 was

discovered in 1986. In 2007, NASA decided to direct its Deep Impact satellite to visit Hartley 2, having completed its primary mission to study the comet Tempel 1. Hartley 2 was chosen because of its small size — about 100 times smaller in volume than Tempel 1 — and its odd propensity to shoot out relatively large amounts of gas and dust, a feature that makes it quite different from other known comets.

The mission reached Hartley 2 on November 4, 2010, and the results of its measurements, together with those from a multi-wavelength, multi-observatory campaign, appeared this month in the Astrophysical Journal Letters. CfA astronomer Scott Wolk was part of a large international team studying the comet during this period. He worked in particular with X-ray observations of Hartley 2 using the Chandra X-ray Observatory.

Hartley 2 had been flagged as a very active emitter of gas and material, but the astronomers found that most of this activity was actually coming from a large halo of fluffy, icy grains rather than from the nucleus of the comet itself, making the comet itself somewhat less strange.

Chandra detected X-ray emission due to the impact of atoms in the solar wind with molecular gas surrounding the comet. Models of the comet's overall behavior show that carbon dioxide gas evaporating from the comet is the dominant driver of its activity, at least once the comet gets near to its closest approach to the sun; this is the first time that carbon dioxide gas has been identified as being the dominant driving source of activity in a comet. The results shed new light on comets - the objects that are suspected of having brought water to the Earth in the early days of the solar system - and on the nature of the young solar system itself.

Provided by Harvard-Smithsonian Center for Astrophysics