

Detection and Location of Icy Particles Surrounding 103P/Hartley 2

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Abstract

The Deep Impact Flyby Spacecraft encountered comet 103P/Hartley 2 on November 4th, 2010 at a minimum distance of 694 km [1]. Both the High Resolution (HRI) and Medium Resolution Instruments (MRI) captured images of a field of debris enveloping the comet. Fine grain dust and ice (primarily detected in the HRI) and hundreds of discrete larger particles are apparent during encounter. The larger golf ball to basketball-sized particles are detected primarily near the nucleus (Fig. 1). This swarming of individual grains in the near-nucleus environment of Hartley 2 has not been observed in any other comet to date.

The motion of the spacecraft instruments relative to the comet nucleus (including not only spacecraft velocity but pointing adjustments) provides sufficient parallax between successive images around closest approach to stereoscopically reconstruct the distance and displacement of these particles. In this study, we present an analysis of the identification, position, and motion of discrete ejected particles surrounding the comet.

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References

[1] A'Hearn, M. F., et al.: EPOXI at Comet Hartley 2, *Science*, in press, 2011.

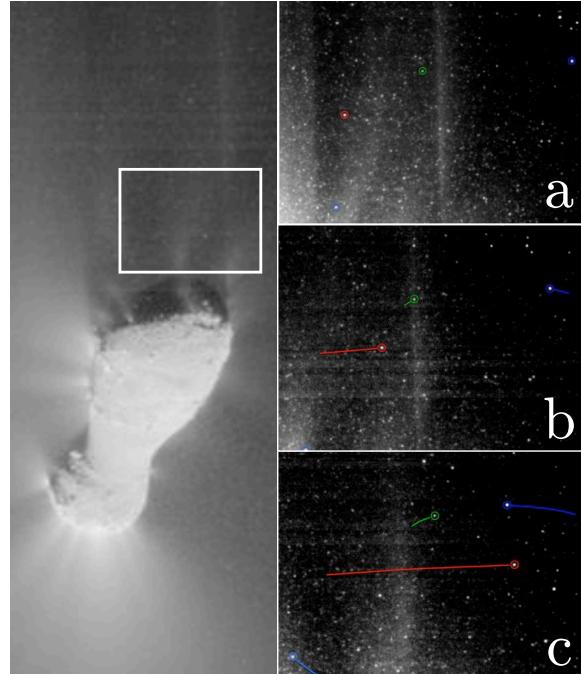


Figure 1: MRI clear filter encounter image near closest approach of Hartley 2 (left; approximately 800 km from nucleus). Image is stretched to illustrate jets and an icy particle cloud. White box corresponds to the approximate position of the sub-frames on the right (a,b,c), which identify and track four particles over three successive images. Solar direction is from the bottom.