

Abstract

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On structural properties of Comet 67/P dust particles collected in situ by ROSETTA/COSIMA from observations of electrical fragmentation

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During ESA's Rosetta science mission, the COSIMA instrument collected dust particles in the coma of Comet 67P/Churyumov-Gerasimenko during two years near the comet's nucleus. The largest particles are about 1 mm in size.

The collection process involved a low velocity impact on porous gold-black surfaces, often resulting in breakup, from which information on structural properties has previously been derived (Langevin et al., 2016). However, some of the particles were collected with little damage, but fragmented due to charging during subsequent secondary ion mass spectrometry.

This report shows that the details of this electrical fragmentation support the concept of the existence of stable units with sizes of tens of μm within the incoming cometary dust particles prior to collection, possibly representing remnants of the early accretion processes.