



Dynamics of Enceladus' Plume Particles and the Compositional Profile of the Plume

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Abstract

The Cosmic Dust Analyzer (CDA) onboard the CASSINI spacecraft obtained in-situ compositional measurements of freshly ejected particles in the Enceladus plume. A main result is that the proportion of salt rich particles is significantly enhanced in the plume, relative to the abundance inferred previously in the E ring[1]. We show how this compositional profile in the plume, as well as the relative depletion in the E ring, arises as a consequence of a size-dependent dynamical filtering of particles. The generally larger size of salt rich grains (as compared to salt poor particles) leads to their enhanced concentration in the lower parts of the plume. From our model we infer the proportion of salt rich grains in the total flux of dust produced at Enceladus. We find that the dominant part of the dust mass is salt rich.

References

[1] Postberg *et al.*, *Nature* **459**, 1098 (2009).