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Traversal of dust from the irregular Saturnian satellites through the inner Saturnian system

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Abstract

The dynamics of dust particles ejected from the outer, irregular satellites of the Saturn system has been studied in context of the Phoebe ring [1,2] and the color dichotomy of Iapetus [3]. The long-term dynamics of larger grains (>5µm) is dominated by Pointing-Robertson drag, which reduces their semi-major axis and most of these grains impact Iapetus or Titan [3].

In this work we study the fraction of those grains emitted from the irregulars that, in course of their orbital evolution, reach the inner Saturnian system. Some of these grains may have been detected directly by the Cassini Cosmic Dust Analyzer (CDA). In particular, we explore the hypothesis if collisions of particles from the irregular satellites with E-ring grains can explain the detection of non-icy grains of mineral composition by CDA inside the E ring.

References

[1] Verbiscer et al., 2009

[2] Hamilton et al., 2015

[3] Tamayo et al., 2011