

The dust environment surrounding the E-ring moons Dione, Helene and Polydeuce

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Abstract

Compared to the dust clouds around three of the Galilean satellites of Jupiter, no clear Saturnian pendants have been found yet by the CDA detector aboard the Cassini spacecraft. However, three dust tori and arcs have been detected along the orbits of Pallene, Methone and Anthe in ISS images [1] and the Pallene dust torus was confirmed by in situ CDA measurements [4]. These observations have sparked interest whether the small co-orbital companions to E-ring moons like Dione or Thetys are efficient dust sources.

We simulate the motion of dust particles, which originate from hypervelocity impacts of micro-meteoroids onto Dione, Helene and Polydeuce [2]. Gravity, Lorentz force, solar radiation pressure and plasma drag are considered for the dynamic evolution of small dust particles. Assuming a steady state distribution, we scale the phase space data with dust production rates based on recent IDP measurements at Saturn [3]. We will present dust particle number densities along the orbits of Dione, Helene and Polydeuce and we will make predictions for the Cassini flybys of Helene and Polydeuce, which take place in the summer and fall this year.

Acknowledgements

This work was supported by Deutsche Forschungsgemeinschaft (Sp 384/24-2) and by Deutsches Zentrum für Luft- und Raumfahrt (OH 1401).

References

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