



Hybrid Code Simulation of the Interaction of Enceladus's Plume with Saturn's Magnetosphere

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In 2005 three close Cassini flybys of Enceladus enabled a direct in situ measurement of water escaping from the surface and its interaction with the ambient plasma environment. Cassini measurements show that Enceladus acts as an obstacle to the magnetized Saturnian plasma resulting in an effect of field line draping. Ionization of escaping water molecules and charge exchange between water and ions create fresh ions which are picked up by the Saturnian magnetosphere. The Saturnian co-rotating plasma flow thus slows down and the ambient magnetic field is affected. We study these local plasma interaction of Enceladus and its neutral water plume with the Saturnian magnetosphere by using a full 3D hybrid code simulation. The results of our model are then compared with magnetic field and plasma Cassini observations and already published estimates of the total mass-loading rate in the vicinity of Enceladus.