Geophysical Research Abstracts
Vol. 12, EGU2010-7613, 2010
EGU General Assembly 2010

Probing moon-plasma interactions with ion cyclotron waves: Cassini's lessons for EJSM

Jared Leisner (1), Christopher Russell (2), Xochitl Blanco-Cano (3), Michele Dougherty (4), and Robert Strangeway (2)

(1) Department of Physics and Astronomy, University of Iowa, Iowa City, United States (jared-leisner@uiowa.edu), (2) University of California, Los Angeles, Institute of Geophysics and Planetary Physics, Los Angeles, United States, (3) Instituto de Geofísica, UNAM, Coyoacán, Mexico, (4) Space and Atmospheric Physics Group, Imperial College London, London, United Kingdom.

Enceladus' plume ejects hundreds of kilograms of neutral water molecules into the saturnian system every second, creating Saturn's extended neutral cloud. One of the primary loss mechanisms for this material is charge exchange: a neutral molecule gives up an electron to a thermal ion (which then leaves the system as a fast neutral) and is picked up by the magnetospheric plasma. In this pick-up process, ion cyclotron waves are generated and are detected by the Cassini magnetometer. Similar to Enceladus, Jupiter's moons Europa and Io are sources of neutral particles. Ion cyclotron waves generated by the pick-up of neutral particles from these moons were detected during some of Galileo's close flybys. Looking forward to a return to the jovian system and to the Galilean satellites, we review how we use ion cyclotron waves at Saturn to study the ionization and construct density profiles of the neutral cloud. We then take these methods and the other lessons that we've learned at Saturn and discuss our expectations for the next mission at Jupiter, for what the magnetometer will observe, and for how those observations will contribute to the understanding of the jovian system.