



RSPP seminars

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“Tracking the evolution of rotating plasma features in Saturn’s magnetosphere”

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“A major driver of plasma circulation within Saturn’s magnetosphere is hot plasma injection following magnetic reconnection events in the tail. The point at which this injected plasma meets Saturn’s inner cold plasma torus is the subject of current research. The triggering of instabilities and resulting interchange processes that occur here are thought to dominate radial plasma transport, although these are not fully understood. It is difficult with in-situ measurements to pin down the timescale and spatial regions over which these processes operate. Global observations are required to capture the large radial distances traversed by hot plasma packets during injection events, and the observations must also span several planetary rotation periods. This seminar presents imagery from two instruments onboard the Cassini satellite that provide a picture of global magnetospheric dynamics. Firstly, the Cassini Ultraviolet Imaging Spectrograph (UVIS) captures Saturn’s most intense UV auroral emissions, which are the optical, ionospheric fingerprint of hot plasma in the magnetosphere. Secondly, a picture of the magnetosphere’s hot plasma population is possible through imaging of Energetic Neutral Atoms (ENAs) using the Cassini Ion-Neutral Camera (INCA).

The ultimate fate of the injected hot plasma is currently unknown, and the sustained presence of rotating ENA flux regions once they reach the inner magnetosphere remains puzzling. By tracking the auroral features and hot plasma in the magnetosphere together following injection events, we profile the magnetospheric dynamics from ‘source to sink’ during opportune periods of dual-observation, and try to answer some of these open questions. Early results indicate that it may be possible to locate Saturn’s ‘plasmopause’ by tracking transient auroral features via magnetospheric mapping”.



Wednesday, January 17th at 2 pm in Physics LTA