Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09842, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09842
EGU General Assembly 2008


# Analysis of Intercalibrated Plasma Observations in Saturn's Magnetosphere

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The magnetosphere of Saturn, a very complex environment host of various plasma sources, has been systematically investigated by the Cassini spacecraft since 2004. The aim of the present study is to produce an overview of the plasma dynamics inferred from all particle observations and to establish a three dimensional map of the kronian plasma distribution. We study the properties of the plasma energy spectra in the different regions crossed by Cassini and determine the relevant fluid parameters (temperature, density, pressure, spectral index) using a forward modeling method. For this purpose, we use data from the two plasma instruments onboard the Cassini spacecraft: the CAPS electron and ion spectrometer (ELS \& IMS) measuring the low energy plasma (eV to keV) and the Low Energy Magnetospheric Measurement System (LEMMS) of the MIMI instrument measuring the energetic plasma (keV to MeV).The calculated radial, latitudinal, and local time profiles enable us to detail the plasma configuration and dynamics and add constraints on the various transport mechanisms operating in the magnetosphere. These observations are further complemented by observations of electron pitch-angles and low-frequency radio emissions. All to-

gether, these observations enable us to identify a well-defined plasma boundary at around 9 Rs, that we tentatively relate to the boundary of Saturn's inner neutral cloud.