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Determination of the convection electric field in the kronian magnetosphere during an Enceladus encounter by the Cassini spacecraft.

Sandrine Grimald, Iannis Dandouras, and Alban Rochel
(grimald@cesr.fr)

The dynamics of the terrestrial magnetosphere is dominated by the convection induced by the interaction with the solar wind. The dynamics of the Jovian magnetosphere, in contrast is dominated by the corotation of the magnetised plasma. In the case of Saturn, the effect of a strong corotation is observed, but there is also evidence of an interaction between the solar wind and the magnetosphere. The convection electric field coming from this interaction influences the movement of the particles inside the magnetosphere and need to be determined.
In the inner magnetosphere, the magnetic field influences the movement of the particles. Gradient of magnetic field and curvature of magnetic field lines are responsible for the existence of magnetic drift velocities with a magnitude dependent on the energy of the particle. In the kronian magnetosphere, the drift velocity of the electrons is in the opposite direction of the corotation velocity direction. In consequence, the high energy electrons and the low energy electrons rotate around the planet in opposite directions. This phenomenon and the interactions between Enceladus and the kronian magnetospheric plasma are responsible for the appearencen of gaps in the electron spectrograms. The energy boundary limits of the gap depend on the drift velocities (drift due to magnetic, gravitational and centrifugal forces), and on the corotation and convection velocities. Using an Enceladus orbit crossing by the Cassini spacecraft, we will study the energy boundary limit of the gap in the electrons spectrograms. The calculation of the different components of the total velocity of the electrons will allow us to determine the convection electric field for this event.