



An overview of the aims and plans of an ISSI Team “Investigating the Dynamics of Planetary Magnetotails”

Caitriona Jackman and the International Space Science Institute: "Investigating the Dynamics of Planetary Magnetotails" Team

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Spacecraft observations have established that all magnetised planets interact strongly with the solar wind and possess well-developed magnetic tails. We have recently set up an international team at the International Space Science Institute (ISSI) to study reconnection, convection, and charged particle acceleration in the magnetic tails of Mercury, Earth, Jupiter and Saturn. These fundamental physical processes are common to all these planetary environments and relate to a complex chain of events that ultimately release mass and energy in magnetised configurations. The great differences in solar wind conditions, planetary rotation rates, ionospheric conductivity, and physical dimensions from Mercury’s small magnetosphere to the giant magnetospheres of Jupiter and Saturn, provide an outstanding opportunity to extend our understanding of the influence of these factors on these basic processes. We have drawn together data analysis experts and global modellers to build up a full picture of small- and large-scale dynamics. We plan to make use of numerous data sets from MESSENGER, Geotail, Cluster, THEMIS, Galileo, New Horizons, Cassini, and the Hubble Space Telescope (HST) to name but a few, together with sophisticated simulation and modelling tools in order to probe in-situ and remotely the deep magnetotails of these planets.

We report the open questions discussed at our first team meeting and provide a brief overview of some new studies which we have begun.