Geophysical Research Abstracts
Vol. 17, EGU2015-3712, 2015
EGU General Assembly 2015

Planetary turbulence: survey of Cassini data in the Saturn's magnetosheath

Lina Hadid (1), Fouad Sahraoui (1), Khurom Kiyani (5), Ronan Modolo (2), Alessandro Retino (1), Patrick Canu (1), Adam Masters (3), Michele K. Dougherty (3), and Donald A. Gurnett (4)

(1) Laboratoire de Physique des Plasmas CNRS-Ecole Polytechnique-UPMC-Université Paris Sud France (lina.hadid@lpp.polytechnique.fr), (2) LATMOS, CNRS-UVSQ-UPMCS, Guyancourt, France , , (3) Department of Physics, Imperial College, London, UK , (4) University of Iowa, Iowa City, USA, (5) Centre for Fusion, Space and Astrophysics, University of Warwick, Coventry CV4 7AL, UK

Turbulence is one of the most important yet not fully understood topics of modern physics. Understanding turbulence is collisionless plasmas, where kinetic effects mediate interactions between fields and charged particles play, is crucial to apprehend many dynamical processes such as particle heating and acceleration. Among others, one key open issue of plasma turbulence is how the energy associated to magnetic and electric fields is converted, and eventually dissipated, into kinetic and internal energy of the plasma.
The planets' magnetosheath present a high level of turbulence that involves both nonlinear stochastic processes and a rich variety of wave phenomena. In comparison with turbulence in the solar wind and in the terrestrial magnetosheath, turbulence around other planets is far less explored. Here, we expand our knowledge in plasma turbulence by exploring the properties of turbulence in the Kronian magnetosheath using the Cassini spacecraft data. These properties include the magnetic field energy spectra, the magnetic compressibility and intermittency at both MHD and kinetic scales. The analysis is based on in-situ data provided by the Fluxgate Magnetometer of the MAG instrument, which measures the magnetic field data with 32ms time resolution and the plasma data from the CAPS/IMS (Cassini Plasma Spectrometer) and the Electron Spectrometer (ELS), during 39 shock-crossings between 2004 and 2005. Similarities and differences with the solar wind were found, in particular about the nature of the turbulence and its scaling laws, as well as the dependence of those properties on the topology of the bow shock.