Geophysical Research Abstracts
Vol. 16, EGU2014-11991, 2014
EGU General Assembly 2014


# Periodic motion of the magnetodisk as a cause of quasi-periodic variations in the Kronian magnetosphere

Zoltan Nemeth (1), Karoly Szego (1), Lajos Foldy (1), Margaret Kivelson (2,3), Xianzhe Jia (3), Stanley Cowley (4), Gabrielle Provan (4), and Michelle Thomsen (5)

(1) Institute for Particle and Nuclear Physics, MTA Wigner RCP, Budapest, Hungary (nemeth.zoltan@wigner.mta.hu), (2) Atmospheric, Oceanic, and Space Sciences, University of Michigan, Ann Arbor, MI, USA, (3) Earth and Space Sciences, University of California, Los Angeles, Los Angeles, CA, USA, (4) Department of Physics and Astronomy, University of Leicester, Leicester, UK, (5) Planetary Science Institute, Tucson, AZ, USA

Most of the parameters, which describe the magnetized plasma filling up the vast magnetosphere of Saturn exhibit periodic behavior. The fundamental period reflected in many magnetospheric phenomena is the rotational period of the planet, but the relationship is not at all trivial. In most cases decent periodic behavior can be found only for relatively short time intervals, and often even in these intervals abrupt phase-shifts occur and higher frequencies appear. Several sophisticated methods have been developed to filter out interfering fluctuations and find the basic periodicity and phase of the variations. Although these methods proved to be very useful, some information is inevitably lost in the process. This lost information can also be valuable; we found that from it one can (partially) reconstruct the spatial dependence of the plasma parameters. To recover this otherwise lost information we follow a different strategy to analyze the quasi-periodic variations of the plasma properties. We assume that the motion of the magnetodisk is periodic and that the observed quasi-periodic variations are due to the interplay of this periodic motion and the effects governing the spatial dependence of the plasma parameters (F), especially their dependence on the distance (d) from the central sheet of the magnetodisk. We found that relatively simple F(d) functions are able to reproduce the observed complex temporal dependence of the plasma properties.