



Planets in Space (Julius Bartels Medal Lecture)

Karl-Heinz Glassmeier

Institute of Geophysics and extraterrestrial Physics, Technische Universität Braunschweig and Max-Planck-Institute for Solar System Research, Katlenburg-Lindau, Germany

Interplanetary space is not void, but filled with photons and energetic particle of solar origin as well as the fast stream solar wind plasma. Planets and other planetary bodies such as comets and asteroids need to interact with this interplanetary medium. Different types of interaction are known, dependent on the properties of the planetary body. The parameter space in which the interaction is described is mainly spanned by the magnetic field of the body, the density of its atmosphere, and the solar wind dynamic pressure. Using the concept of ternary triangles, different possible interaction scenarios will be described. As no active planetary scale experiments are possible only a few points in the interaction space can be visited right now. The discovery of exo-planets will allow exploring the parameter space further. Also, temporal changes of the terrestrial magnetic field strength and the resulting paleo-interaction situations will be discussed as they represent additional points in parameter space. Furthermore, the interaction between a planetary body and the interplanetary medium will not only modify the solar wind streaming past, but the body itself experiences changes. Planetary bodies are thus treated as embedded systems. As an example the impact of an external magnetic field on planetary dynamo action is discussed. Possible connections with the small observed magnetic field of Mercury are mentioned.