

Roles of Space Plasma Physics in the CAWSES Program

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The magnetosphere is a complex nonlinear dynamical system. We need to clarify the role of chaos, stochastic processes and self organized criticality in determining its behavior such as plasma sheet dynamics, substorm onset and the magnetosphere-ionosphere coupling via field-aligned currents. In correlation with such macroscopic disturbances of the magnetosphere, various kinds of microscopic processes take place producing localized electric field such as double layers and solitary waves observed in various regions of the magnetosphere. These microscopic nonlinear processes are the key to understanding of anomalous resistivities needed for reconnection, shocks and potential drops along the magnetic field lines. We will discuss on several important issues of basic plasma physics in space plasmas, that should be studied as a part of the CAWSES program.