

Nonlinear Structures in Saturn's Magnetosphere

Dharitree Dutta¹

¹Anandaram Dhekial Phookan College, Nagaon, India

Saturn is surrounded by a giant magnetic bubble - the magnetosphere, generated because of the interaction of the Planet's internal magnetic field with solar wind. Discovered by Pioneer 11 in 1979, the Saturn magnetosphere is filled with plasma, and thus is a hub of different nonlinear phenomena. Later, Cassini studied this magnetosphere and provided powerful insights about the planet's atmosphere and space around it. Schipper et al. analyzed data from the instruments onboard Cassini and reported the presence of two components of suprathermal electrons with two distinct temperatures. The Cassini mission also reported the observation of electrostatic solitary waves in Saturn's magnetosphere. Therefore, different nonlinear structures, viz. Solitons, Double Layers (DLs), and shocks generated in this magnetosphere are discussed in this work. The effect of different plasma parameters (density, temperature, viscosity, etc.) is discussed here. Moreover, the effect of two suprathermal components of electrons on the nature of the nonlinear structures is also discussed.