

SPACE PHYSICS SEMINAR

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"The Magnetosphere as a System"

Thursday, November 15, 2012 Refreshments at 3:30pm in CAS 500 Talk begins at 4:00pm in CAS 502

Abstract:

What is a system? A group of elements interacting with each other so as to create feedback loops. A system gets complex as the number of feedback loops increases and as the feedback loops exhibit time delays. Positive and negative feedback loops with time delays can give a system intrinsic time dependence and emergent properties. A system generally has input and output flows of something (matter, energy, money), which, if time variable, add an extrinsic component to its behavior. The magnetosphere is a group of elements interacting through feedback loops, some with time delays, driven by energy and mass inflow from a variable solar wind and outflow into the atmosphere and solar wind. The magnetosphere is a complex system. With no solar wind, there is no behavior. With solar wind, there is behavior from intrinsic and extrinsic causes. As a contribution to taking a macroscopic view of magnetospheric dynamics, to treating the magnetosphere as a globally integrated, complex entity, I will discuss the magnetosphere as a system, its feedback loops, time delays, emergent behavior, and intrinsic and extrinsic behavior modes.