The Physics of Planetary Magnetospheres

Spacecraft exploration of the solar system has introduced us to multiple planetary magnetospheres whose properties differ in interesting ways. This talk will describe some of the key properties of magnetospheres and discuss some of the different features that have been observed. Mach numbers, ratios of thermal to magnetic pressure, and other dimensionless parameters formed from ratios of properties of the central body (radius, spin period, surface magnetic field) and properties of the flowing plasma within which they are embedded (magnetic, thermal, and flow energy density) control scale, form, and dynamics. The relative importance of internal plasma sources (moons, the ionosphere) and external sources (the solar wind or a rotating magnetospheric plasma) is also significant. Comparison of planetary magnetospheres with Earth's highlights the effects of unusual plasma sources and exotic energy supply mechanisms, and dramatizes the role of the confining plasma.

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Thursday, February 20 @ 3:30 PM
Knudsen Hall Room 1200
Refreshments in 2-222 following lecture