HAO Colloquium Series

(Refreshments served)

Speaker: **Joe Huba, NRL**

Time: **1:30–2:30 pm**

Date: **Wednesday, September 11, 2013**

Location: **CG1 – South Auditorium (also webcast at http://www.fin.ucar.edu/it/mms/cg-live.htm)**

Title: **Modeling the Plasmasphere with SAMI3**

Abstract:

The study of the plasmasphere is extremely important to understanding space weather phenomena; for example, it plays a critical role in the regulation of radiation belt dynamics. We present the first 3D simulation of the plasmasphere based on a first-principles physics model (SAMI3). We include the corotation potential, the neutral wind dynamo potential, and a time-dependent Volland-Stern-Maynard-Chen potential to model the response of the convection potential to an idealized magnetic storm. We find that prior to the storm the plasmasphere is largely toroidal and symmetric in magnetic local time with He+/H+ = 5% - 10%. After the storm, the plasmasphere substantially contracts because plasma is convected away from the outer plasmasphere by the enhanced convection velocity. Moreover, a plume-like structure forms in the mid-afternoon sector because of the modified convection pattern associated with the storm. Additionally good agreement is found between the simulation results and data for the L shell dependence of the equatorial electron density as well as the electron density along the field line at a given L shell under quiet geomagnetic conditions, as well as plasma refilling rates.