



## **HAO Colloquium Series**

(Refreshments served)

***Speaker:*** Bill Lotko, HAO Affiliate Scientist, Dartmouth College

***Time:*** 3:00–4:00 pm

***Date:*** Wednesday, July 11, 2012

***Location:*** CG1-1210 South Auditorium

***Title:*** Magnetic Reconnection and Convection in Geospace How the Ionosphere Controls Their Distributions

### ***Abstract:***

Observations reveal that for southward interplanetary magnetic field conditions the two-cell convection pattern in Earth's ionosphere rotates clockwise relative to the sun-earth line (when viewed from above the pole) with more magnetic flux circulating in the dusk convection cell than in the dawn cell. For the same interplanetary conditions the nightside magnetosphere exhibits enhanced magnetic reconnection along the premidnight x-line with fast exhaust flows developing in channels in the premidnight plasmasheet. These asymmetries have been investigated extensively in isolation and essentially as independent phenomena. It is shown here for the first time that they are actually different manifestations of the same coupled process. Global simulations of the magnetosphere-ionosphere interaction reveal that the observed asymmetries are a consequence of meridional gradients in the ionospheric Hall conductance. Causal relationships are demonstrated through a series of controlled numerical experiments that would be practically impossible to tease-out observationally.