HAO Colloquium Series
(Refreshments served)

Speaker: Steven R. Cranmer, Harvard-Smithsonian CfA
Time: 1:30–2:30 pm
Date: Wednesday, November 20, 2013
Location: CG1 – 1210 South Auditorium (also webcast at http://www.fin.ucar.edu/it/mms/cg-live.htm)

Title: Turbulent Origins of Solar and Stellar Winds

Abstract:
All stars are believed to possess expanding outer atmospheres known as stellar winds. The continual evaporation of gas from stars has a significant impact on stellar and planetary evolution, and also on the larger-scale evolution of gas and dust in galaxies. Despite more than a half-century of study, though, the basic mechanisms responsible for producing stellar winds are still largely unknown. Fortunately, there has been a great deal of recent progress toward identifying and characterizing the processes that produce our own Sun's mass outflow. Based on this progress, we have developed a new generation of physically motivated models of stellar wind acceleration for cool main-sequence stars and evolved giants. These models follow the production of magnetohydrodynamic turbulent motions from subsurface convection zones to their eventual dissipation and escape through the stellar wind. This talk will also summarize the results of time-dependent 3D reduced MHD simulations of turbulence in solar coronal loops and open field regions. These simulations largely validate the phenomenological turbulent heating rates used in larger-scale models.