HAO Colloquium Series

(Refreshments served)

Speaker: **Kathy Reeves, Harvard-Smithsonian CfA**

Time: **1:30 pm**

Date: **Wednesday, May 25, 2011**

Location: **CG-1, 2nd Floor, Room 2126**

Title: **Current sheet energetics, flare emissions, and energy partition in a simulated solar eruption**

Abstract: We investigate coronal energy flow during a simulated coronal mass ejection (CME). We model the CME in the context of the global corona using a 2.5D numerical MHD code in spherical coordinates that includes coronal heating, thermal conduction and radiative cooling in the energy equation. The simulation domain extends from 1 to 20 R_s. We find that the energy conservation properties of the code are quite good, conserving energy to within 4\% for the entire simulation. We examine the energy release in the current sheet as the eruption takes place, and find, as expected, that the Poynting flux is the dominant carrier of energy into the current sheet. However, there is a significant flow of energy out of the sides of the current sheet into the upstream region due to thermal conduction along field lines and viscous drag. This energy outflow is spatially partitioned into three separate components, namely the energy flux flowing out the sides of the current sheet, the energy flowing out the lower tip of the current sheet, and the energy flowing out the upper tip of the current sheet. The energy flow through the lower tip of the current sheet is the energy available for heating of the flare loops. We examine the simulated flare emissions and energetics due to the modeled CME and find reasonable agreement with flare loop morphologies and energy partitioning in observed solar eruptions. The simulation also provides an explanation for coronal dimming during eruptions, and predicts that the structures surrounding the current sheet can been seen in XRT and AIA observations.