



HAO Colloquium Series

(Refreshments served)

Speaker: Brian Welsch, SSL/Berkeley

Time: 1:30–2:30 pm

Date: Wednesday, September 28, 2011

Location: CG1-South Auditorium

Title: More Than You Want to Know About Estimating
Photospheric Electric Fields

Abstract:

Observations of the evolving magnetic field at the photosphere can be used with Faraday's law to estimate the electric field there (or, combined with the ideal Ohm's law, to estimate the velocity field there), which can, in turn, be used to estimate the fluxes of magnetic energy and helicity into the corona. These fluxes probably play key roles in driving the corona to flare and to launch coronal mass ejections (CMEs), as well as in coronal heating. Vector magnetogram sequences (hitherto rare, but expected to be routine with the launch of HMI) contain more information about field evolution than sequences of line-of-sight (LOS) magnetic fields previously available. Recently, we have developed methods of estimating electric fields that incorporate information from evolution of the transverse magnetic field, as well as Doppler shifts along polarity inversion lines (PILs) of the LOS magnetic field. I will present our approach, describe special treatment of the Doppler data that is required to overcome biases in determination of line center introduced by convective blueshifts, outline additional observational constraints that can be imposed on our electric field estimates, and discuss challenges posed by noise in the observations. I will also describe how these techniques can address additional open questions regarding flux cancellation.