



HAO Colloquium Series

(Refreshments served)

Speaker: **Bruce Lites, HAO/NCAR**

Time: **10:30–11:30 am**

Date: **Wednesday, August 3, 2011**

Location: **CG1, Room 3131**

Title: **Hinode Observations Suggesting the Presence of a Local Small-Scale Turbulent Dynamo**

Abstract:

Analysis of observations from the Hinode/SOT spectro-polarimeter yield results that are consistent with the operation of a small-scale turbulent dynamo in the upper solar convection zone.

Examination of 45 \textit{Hinode} data sets obtained in 2007 reveal only a very small correlation of the net polarity imbalance of the regions of the quiet Sun having very weak flux, relative to the polarity imbalance averaged over each data set. Further, there is no correlation of the average net unsigned flux of those regions of weakest flux with the average unsigned flux of each region studied. Positive correlations, especially of the net unsigned flux, should exist if the internetwork fields were to arise from dispersal of flux from active regions, so the absence of significant correlations supports the small-scale dynamo scenario. Considering only regions of weakest flux, the net longitudinal flux increases slightly toward the limb, probably as the result of the dominance of horizontal fields higher in the photosphere.

Inferred distributions of magnetic field strength as derived from inversions of Stokes profiles indicates that the magnetic energy of the quiet Sun observed at the resolution of the Hinode Spectro-Polarimeter is dominated by the small fraction of field elements having kiloGauss strengths. Because these strong-field elements carry most of the imbalance of magnetic flux measured in each region, they likely arise primarily from dispersal of flux from active regions, rather than from a small-scale dynamo.

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