Project Details

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Program Element: Focused Science Topic

Topic: Plasma Neutral Gas Coupling

Project Title:
Thermal and magnetic models for ion-neutral chromospheric studies based upon Hinode, TRACE, SDO and ground-based data

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Summary:
We propose a three-pronged attack on the solar chromosphere to begin meaningful quantitative studies of the macroscopic and microscopic effects of ion-neutral collisions. First, we will reduce existing spectropolarimetric data of magnetic features on the Sun carefully acquired by us using Hinode, TRACE, augmented with the IBIS ground-based instrument. Second, we will acquire new data augmented with SDO and the new FIRS instrument through new campaigns to take advantage of the rise of the next solar cycle and new instrumental capabilities. Third, we will build single fluid MHD models based upon the data using established inversion methods constrained with MHD models, within which parameters relevant to ion neutral dynamics can be accurately defined. We hope to work with other groups in the plasma-neutral FST team to study multi-fluid MHD models of several types of magnetic structure through the solar chromosphere.

Our proposed effort is central to a meaningful assessment of ion-neutral effects in the solar chromosphere. The datasets acquired and models developed will also help set a meaningful force-free boundary condition for the overlying corona. Both of these issues are critical to the LWS TR&T program.

Publication References:

no references