

Project Details

ROSES ID: NRA-03-OSS-01

Selection Year: 2004

Program Element: Independent Investigation: LWS

Project Title:

Characterizing the Solar Vector Magnetic Field with Application to Space Weather Forecasting

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Project Member(s):

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Summary:

We propose to acquire and use unique, new magnetic observations to characterize the physical properties and evolution of solar vector magnetic fields and to use this new understanding to help develop tools to forecast storms in the Sun-Earth system. A powerful new instrument called SOLIS provides the first regular, full-disk measurements of the solar vector magnetic field. It also measures the line-of-sight component of the photospheric and chromospheric magnetic fields with an unprecedented combination of sensitivity, freedom from instrumental polarization, high accuracy, and good temporal and spatial resolution. Although many aspects of the vector magnetic field will be examined, particular attention will be directed to spatial scales larger than a typical active region and to high latitude properties of the vector field. It is likely that these regions contain important information about the formation and evolution of open fields connected to the heliosphere and the magnetic structures that spawn coronal mass ejections. We will provide vector boundary conditions for models of the corona and heliosphere that have heretofore been forced to depend on only one component of the magnetic field. This will enable more accurate MHD coronal modeling. Vector observations of active regions will be used to calculate the fluxes of magnetic free energy and magnetic helicity. Variations of these fluxes will be evaluated as flare forecasting tools. We will study the structure and time variations of fields associated with filaments and large bipolar coronal streamers in order to test physical models of these phenomena and also to seek properties of use in building coronal mass ejection forecasting tools. We propose to operate SOLIS for daily periods up to two times longer than will otherwise be possible, to better support operating and forthcoming NASA missions such as SOHO, TRACE, RHESSI, STEREO, Solar-B and SDO.

Publication References:

Summary: "

Reference: John Harvey / National Solar Observatory- Characterizing the Solar Vector Magnetic Field with Application to Space Weather Forecasting

Summary: "

Reference: John Harvey / National Solar Observatory- Translation and Correction of NSO Kitt Peak Vacuum Telescope Solar Synoptic Data