

Project Details

ROSES ID: NRA-NNH04ZSS001N

Selection Year: 2005

Program Element: Focused Science Topic

Topic: To determine the topology and evolution of the open magnetic field of the Sun connecting the photosphere through the corona to the heliosphere.

Project Title:

Probing Solar Open Magnetic Fields With Near-Relativistic Electron Beams In The Heliosphere

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Project Member(s):

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Summary:

This proposed investigation utilizes a combination of heliospheric and solar data to identify a set of open solar magnetic fields for which both the solar and heliospheric locations are uniquely known. We will use solar imaging data to determine the origins of the beams of near-relativistic electrons recorded by the EPAM instrument aboard the ACE spacecraft. The beams come directly from the sun and act as probes of the solar and heliospheric magnetic fields. Detailed study of the solar regions at the inner terminus of the connecting magnetic fields will help resolve the presently incomplete understanding of the origins of energetic electrons in solar energetic particle (SEP) events. Delineation of the electron transport processes is one of the best ways to understand proton transport, which is of great interest to NASA because SEP protons can damage space systems, and in the worst of cases, they can sicken or kill astronauts working in space. We will use the electron and solar data to test existing models of magnetic field topology and to identify useful modifications of them. The primary goal of the investigation is to improve the quantitative agreement of magnetic models with the real heliosphere. A secondary goal is to prepare for the more rigorous tests of field connectivity that will be possible when the Solar Terrestrial Relations Observatory (STEREO) mission is operating.

Publication References:

no references