Project Details

ROSES ID: NNH07ZDA001N
Selection Year: 2008
Program Element: Data, Tools, & Methods

Topic: Focused science topic for Strategic Goal 1 (Solar storms): Exploring the magnetic connection between the photosphere and low corona

Project Title:
Remote Sensing of CMEs and Flare Electrons Using Multi-Spacecraft Observations and the Effects of of Refraction and Scattering

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Summary:
The goal of this proposal is (1) to investigate the effects of refraction and scattering on the radio emissions in the inner heliosphere, (2) to provide a method to incorporate these propagation related effects in the algorithms used to track the CMEs and electron beams by the STEREO, Ulysses and Wind spacecraft, and (3) to track some of the major type II and type III events. For example, a key goal of the STEREO mission is to remotely track the CME-driven shocks and flare accelerated electrons from their genesis in the low corona to their interaction with the terrestrial magnetosphere using the radio measurements. This scientific goal is based on two ideal expectations: (1) the 2 rays from the 2 spacecraft to the source intersect, which is necessary for successful triangulation, and (2) there is no anomalous delay in the burst arrival times at the two spacecraft. However, many studies have shown that due to refraction and scattering, the intersection of the rays from the 2 spacecraft to the source sometimes does not occur, and when it does occur, may be misleading. Furthermore, when the bursts are detected at the two spacecraft, the time delays may be abnormally large. The proposed study can provide the needed remedy to overcome these difficulties and make this science objective of the STEREO mission successful. This study will also provide constraints on the emission mechanisms, as well as on electron density models. This study fits into NASA Solar and Heliospheric Physics program elements "Theory and Modeling," as well as "Data Analysis."

Publication References:

no references