

Project Details

ROSES ID: NNH09ZDA001N

Selection Year: 2010

Program Element: Focused Science Topic

Topic: Origin and Nature of the Slow Solar Wind, Associated Interplanetary Structures, and SEP Transport

Project Title:

Multispacecraft Studies of the Origin and Evolution of the Slow Solar Wind with Predictions for Inner Heliosphere Probes

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Summary:

We propose to substantially extend previous studies of the slow solar wind and its comparison with the fast wind by performing multispacecraft and high-resolution studies of in situ measurements that allow for the clearer separation of spatial and temporal effects. This will greatly increase our ability to say what slow wind properties are due to initial conditions at or near the Sun as opposed to evolving with the wind, and to understand the detailed structure of often complex regions. The use of spacecraft at different solar distances, along with solar observations and (CCMC) models, examined in a variety of conditions, will lead to a greatly improved ability to predict the evolution of the solar wind properties. A representative observation as one starting point will be that slow solar wind has been measured to, at times, have temperature, fluctuation, composition, and other properties very like those in fast wind except for the speed. We will search for a comprehensive set of types of slow wind intervals and use the whole fleet of heliospheric spacecraft to determine, to the extent possible, the evolution of entropy, Alfven wave flux and spectra, pitch angle distributions, composition, and energetic particle populations, and use these to determine the types and unique properties of slow wind and to constrain the evolution of the wind. The roles of discontinuities, omnipresent but in varied ways, in the wind evolution will be elucidated. The investigation will involve many aspects that will have utility for the LWS Focus Group on the slow solar wind, including novel visualization and data mining methods, and the preparation of integrated datasets.

Publication References:

no references