Geophysical Research Abstracts
Vol. 12, EGU2010-15480, 2010
EGU General Assembly 2010

Analysis of Suprathermal Events Observed by STEREO/PLASTIC with a Focus on Upstream/Magnetospheric Events

J.A. Barry (1), A.B. Galvin (1), M. Popecki (1), L. Ellis (1), B. Klecker (2), M.A. Lee (1), H. Kucharek (1), and the STEREO/PLASTIC Team

(1) EOS, University of New Hampshire, Durham, NH 03824, USA (jan43@unh.edu), (2) Max-Planck Institut für extraterrestrische Physik, Giessenbachstrasse, Garching, 85748, Germany, (3) Space Sciences Laboratory, University of California, Berkeley, CA 94720, USA, (4) Institute of Geophysics and Planetary Physics, University of California, Los Angeles, CA 90095, USA, (5) Physikalisches Institut, University of Bern, Bern, 3012, Switzerland, (6) NASA, Goddard Space Flight Center, Greenbelt, MD 20771, USA, (7) Institute for Experimental and Applied Physics, University of Kiel, Kiel, 24098, Germany

The topic of suprathermal and energetic ion events upstream of the Earth's bow shock has been a topic of investigation since the late 1960's. Over the past 50 years these events have been characterized as having energies ranging from just above the solar wind energies on up to 2MeV, time spans of minutes to hours, and particle distribution functions ranging from field aligned to isotropic. The possible sources of these ions include magnetospheric ions and solar wind ions accelerated between the Earth's bow shock and low-frequency large amplitude waves in the ion foreshock. Also, energetic ions from other heliospheric processes (such as Solar Energetic Particle (SEP) events or Corotating Interaction Regions (CIRs)) can be further accelerated at the Earth's bow shock. Utilizing the particularly quiet solar minimum and the unique orbit of STEREO-A (STA), drifting ahead of the Earth in its heliocentric orbit, we are able to examine field-aligned upstream/magnetospheric energetic ion events in the unexamined region far upstream of the Earth's ion foreshock. Using both the PLASTIC and IMPACT instruments on board STA we have examined protons throughout 2007 in the energy range of 4keV up to 80keV. We find that the occurrence of automatically defined suprathermal events falls off with increasing STA-Earth separation. More importantly, it is shown through a crude approximation of the magnetic field via the Parker spiral that after a STA-Earth separation of about 3000Re it is unlikely that the Earth and STA will be magnetically connected. This corresponds well with the observed cutoff of the occurrence of suprathermal events with field-aligned anisotropies. The detection of upstream/magnetospheric events at these large distances from the Earth's bow shock indicates that the ions propagate relatively scatter free beyond the ion foreshock.