



The Source Population for Upstream Ion Events Near the Earth's Bow Shock

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Enhancements in the intensities of energetic ions above a few keV/nucleon have been routinely observed upstream of the Earth's bow shock since the 1960's. Such upstream events were typically attributed either to the leakage of ionospheric ions accelerated inside the Earth's magnetosphere into the upstream region or to the acceleration of solar wind ions via a first-order Fermi process occurring at the bow shock. Although these ion events have been studied extensively over the last few decades, their origin remains highly controversial primarily due to the lack of sophisticated composition measurements in the suprathermal energy range i.e., from the thermal solar wind energy through the tens of keV/nucleon. However, the launch of the Wind spacecraft in 1994 with mass spectrometers such as the SupraThermal through Energetic Particle (STEP) instrument has offered new opportunities to investigate the seed population of these upstream ions. In this talk, we will focus on measurements of the heavy ion composition and energy spectra above ~ 30 keV/nucleon obtained by the STEP instrument over the course of the 10-year duration of the Wind mission. We will compare our observations with predictions of various models and highlight the main challenges posed by these new results.