[초SE-01] HIGH-ENERGY SOLAR PARTICLE EVENTS IN THREE DIMENSIONS

Leon Kocharov
University of Turku, Finland

Using SOHO particle and EUV detection and radio spectrograms from both ground-based and spaceborne instruments, we have studied the first phase of major solar energetic particle (SEP) events associated with wide and fast coronal mass ejections (CMEs) centered at different solar longitudes. Observations support the idea that acceleration of SEPs starts in the helium-rich plasma of the eruption's core well behind the CME leading edge, in association with coronal shocks and magnetic reconnection caused by the CME liftoff; and those "coronal" components dominate during the first ~1.5 hour of the SEP event, not yet being hidden by the CME-bow shock in solar wind. At magnetic connection to the eruption's periphery, onset of SEP emission is delayed for a time of the lateral expansion that is visualized by global coronal (EIT) wave. The first, "coronal" phase of SEP acceleration is followed by a second phase associated with CME-driven shock wave in solar wind, which accelerates high-energy ions from a helium-poor particle population until the interplanetary shock slows down to below 1000 km/s. Based on these and other SOHO observations, we discuss what findings can be expected from STEREO in the SOHO era perspective.

[구SE-02] Onset time analysis of solar proton events

Junga Hwang[1], Kyung-Suk Cho[1] ,Jae jin Lee[1], Leon Kocharov[2], Sam Krucker[3], Yeon-HanKim[1] and Young-Deuk Park[1]

[1]*Solar and Space Weather Research Group, Korea Astronomy and Space Science Institute*
[2]*Space Research Lab, Department of Physics and Astronomy, University of Turku, Finland*
[3]*Space Sciences Lab, U.C. Berkeley*

We analyzed onset times of the largest six solar proton events during 1997-2006 of solar cycle 23, as observed at 1AU by two satellites of GOES/SEM (Geostationary Operational Environmental Satellites/the Space Environment Monitor) and SOHO/ERNE (Solar and Heliospheric Observatory/the Energetic and Relativistic Nuclei and Electron). We adopted the time shifted method suggested by Leon Kocharov and determined the path length by Sam Krucker's fitting method. We found some problems of those methods and tried to improve those.

In this presentation, we will give details of the energy spectra of the 6 SPE events from the ERNE/HED, and onset time comparison among the SPE, flare, type II burst, and CME.