Project Details

ROSES ID: NRA-01-OSS-01
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Project Title:
Solar energetic electrons as predictors of geo-effective CME-driven shocks and solar energetic particle events

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Summary:
We propose that near-relativistic (40-300 keV) solar electrons may be useful predictors of prompt solar energetic particle (SEP) events, as well as subsequent energetic storm particle (ESP) events accompanying interplanetary shocks associated with geo-effective interplanetary coronal mass ejections (ICMEs). The basis for this claim is our recent finding that (i) impulsive beam-like electron events are injected into the solar wind some 10 minutes after the associated solar electromagnetic (EM) emission centered on W70, because (ii) they are probably accelerated by CME-driven coronal shocks. We will exploit this close link between near-relativistic electrons and coronal shocks by: (1) analyzing their relation to prompt SEP ion events; (2) establishing the differences between impulsive near-relativistic solar electron events from the western hemisphere and those from near central meridian; (3) examining whether the central meridian electron events are good predictors of halo CMEs and Earth-directed ICMEs with their associated interplanetary shocks and ESP events; and (4) identifying any solar-cycle dependence in relations (1), (2), and (3). Finally, (5) we will investigate the impact that these results may have on the planning for payloads and orbits of future Living with a Star missions.

Publication References:

Summary: ''

Reference: Solar energetic electrons as predictors of geo-effective CME-driven shocks and solar energetic particle events - Haggerty, Dennis APL

Summary: no summary

Reference:
Mewaldt, R. A.; Cohen, C. M. S.; Mason, G. M.; Labrador, A. W.; Looper, M. L.; Haggerty, D. E.; Maclennan, C. G.; Cummings, A. C.; Desai, M. I.; Leske, R. A.; Li, G.; Mazur, J. E.; Stone, E. C.; Wiedenbeck, M. E.; (2005), Solar Energetic Particle Spectral Breaks, THE PHYSICS OF COLLISIONLESS SHOCKS: 4th Annual IGPP International Astrophysics Conference. AIP Conference Proceedings, Volume 781, pp. 227-232 (2005). (AIPC Homepage), doi: 10.1063/1.2032701