



## Seasonal variation of upstream energetic electrons as observed by COSTEP/SOHO

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We have analyzed 219 electron bursts at energies above 0.25 MeV observed with the EPHIN/COSTEP instrument onboard the SOHO spacecraft far upstream of the Earth's bow-shock at the libration point L1 from 1996 through 2008. Most of the bursts were observed during low solar activity (in 1996–1997 and in 2005–2008) and all 219 bursts were not associated with solar particle events. It is shown that some upstream events are detected at energies above 0.7 MeV.

We find that the event occurrence number shows a distinct seasonal variation with maxima around equinoxes and minima near solstices. This together with a close correspondence between the event occurrence number with maxima in solar wind speed ( $V_{sw}$ ), geomagnetic activity index ( $A_p$ ) and in the southward interplanetary magnetic field (IMF) component ( $B_z$ ) indicates that the observed events can be explained in terms of leakage of magnetospheric particles during enhanced geoactivity rather than by acceleration at the Earth's bow-shock.