RECENT OBSERVATIONS OF RELATIVISIC ELECTRON ENERGISATION IN THE EARTH'S MAGNETOSPHERE

S. G. Kanekal[1,2], D. N. Baker[1], J. B. Blake [3]
[1]LASP, University of Colorado, Bouldert, CO
[2]Catholic University of America, Washington DC
[3]Aerospace Corporation, El Segundo, CA

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Abstract: kanekal20002

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The energization to relativistic energies of electrons in the Earth's inner magnetosphere is still not fully understood. However, it has long been known that the basic interplanetary drivers are the solarwind and the southward component of the interplanetary magnetic field. Increased solar wind speeds together with the southward turning of the interplanetary field lead to enhanced levels of relativistic electron fluxes in the outer Van Allen radiation belts. Many physical models have been proposed to connect the basic interplanetary causes to the observed increase in the relativistic electron flux levels. Broadly the models rely on particle trnasport or in-situ acceleration of low energy electron populations. Physical models that have been proposed to explain electron energization invoke physical processes ranging from radial diffusion dominated particle transport to in-situ energization through wave-particle interactions. These models can be discriminated on the basis of pitch angle evolution, flux growth and decay rates.

Observations of the characteristics of electron energization can help identify the dominant physicalprocess(es) causing the energization. Important observational features include pitch angle distributions, electron flux growth and decay rates, spatial extent and electron spectra. Measurements Flux isotropization time-scale which provides information about the time evolution of pitch angle distributions are important in identfying the dominant mechanism.

This paper reviews the recent observations of relativistic electrons made by spacecraft such as SAMPEX, POLAR and GOES and LANL geosynchronous spacecraft. The paper will emphasize observational aspects such as global coherence and spectral characteristics of electron energization. Observations from SAMPEX comprise nearly a solar cycle and POLAR about a decade. Both provide full coverage of the outer zone over the energy range of interest from a few hundred keV to a few MeV.

1. (a)
   shrikanth kanekal
   NOAA/SEC
   325 Broadway
   Boulder, CO
   80305 USA
   shrikanth.kanekal@noaa.gov

   (b) 3034974604

   (c)

2. H - Waves in Plasma

3. (a) Radiation Belt

4. I - Invited Paper, Program chair: Greg Ginet Gurudas Ganguli

5. No special instructions