Evolution of electron spectra and flux isotropization during electron energization in the inner magnetosphere

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Current models of electron energization in the Earth's magnetosphere may be broadly classified into two types. One class of models emphasize in-situ processes such as resonant or stochastic wave particle interactions and the second class invokes particle transport process such as enhanced radial diffusion as the domninant mechansim. Electron energization in actuality may be due to both the classes of processes with one or other being dominant. Observationally the characteristic features of energization events, such as evolution of electron spectra and flux isotropization time scales may provide important clues in discriminating which processes may dominate in any given event.

We report here on measurements of electron spectra and flux isotropization time scales during electron energization events. We will measure spectra and flux isotrpization during events driven by high speed solar wind streams and Coronal mass ejections. We will separately examine electrons that are stably trapped as well as those in the drift loss cone which being freshly injected provide information regarding on drift period time scales.

We will use data collected by detectors onboard SAMPEX in low earth orbit and Polar which measures electron fluxes at a much higher altitude to measure spectra and flux isotropization. Pulse height analyzed data from the PET detector onboard SAMPEX are used to measure electron spectra. Flux isotropization is measured by comparing SAMPEX and Polar fluxes. We will use global field models such as the Tsyaganenko-96 model, to calculate the L parameter during geomagnetically disturbed times. SAMPEX measurements cover the entire outer zone for more than a decade from mid 1992 to mid 2004 and Polar covers the time period from mid 1996 to the present.