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## Insights Into Particle Transport Obtained from Solar Energetic Particle Anisotropies

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Solar energetic particle (SEP) pitch angle distributions are shaped by the competing effects of magnetic focusing and scattering as the particles travel through interplanetary space. Therefore, measurements of SEP anisotropies provide insight into particle transport and can probe interplanetary conditions at remote locations from the observer. The Low Energy Telescopes (LETs) onboard the twin STEREO spacecraft measure pitch angle distributions for protons and heavier ions at energies of about 2-12 MeV/nucleon. Using these instruments, we have observed a wide variety of SEP anisotropies, such as bidirectional flows within interplanetary coronal mass ejections, sunward-flowing particles when the spacecraft was magnetically connected to the back side of a distant shock, and loss cone distributions in which particles with large pitch angles magnetically mirror at an interplanetary field enhancement that is too weak to reflect particles with the smallest pitch angles. One of the more puzzling observations is unusual oscillations on a timescale of several minutes in the width of a beamed distribution at the onset of the very large 23 July 2012 SEP event. We present STEREO/LET anisotropy observations and discuss their implications for SEP transport. In particular, we note that the shapes of the pitch angle distributions often depend on energy and particle species, which may allow an empirical determination of the rigidity dependence of the pitch angle diffusion coefficient.

### Collaboration

– not specified –

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