

The longitudinal extent of 3He rich SEP events: A comparison of simulation results and multi-spacecraft observations

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Abstract: Impulsive 3He rich Solar Energetic Particle (SEP) events are usually produced by solar flares. Early observational results showed that the longitudinal extent for impulsive events is usually near 40 degrees. New observations from STEREO show that some impulsive 3He rich events can cover a much wider longitudinal extent than 40 degrees. It seems that SEPs can still be observed on field lines far away from those directly connected to the source. As a result, the spread in longitude of SEP events is much larger than the width of sources. One possible explanation of such a wide extent is cross-field transport. We use a Fokker-Planck focused transport equation to calculate the transport of SEPs in the three-dimensional Parker interplanetary magnetic field. We compare the numerical simulation results with the simultaneous spacecraft observations of STEREO A, B, and ACE. In this way, we can investigate how SEPs propagate in the heliospheric magnetic fields.

Keywords: Solar energetic particle, diffusion.