

Long-Term Fluences of Energetic Particles in the Heliosphere

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We use data from the SWICS, ULEIS, SIS, and CRIS instruments on ACE to measure the integrated energy spectra of He, O, and Fe nuclei observed at 1 AU over the period from 10/1997 to 6/2000. These measurements extend from ~0.4 keV/nucleon to ~400 MeV/nucleon, and include contributions from fast and slow solar wind, coronal mass ejections, pickup ions, impulsive and gradual solar energetic particle events, acceleration in corotating interaction regions and other interplanetary shocks, and anomalous and galactic cosmic rays. Measured fluences are presented as a function of energy and time for several key species ranging up to Fe. We discuss the relative contributions of the various particle components, and comment on the shape and time dependence of the measured energy spectra. By combining these measurements with spectra measured at higher energies, it is possible to construct an all-particle spectrum of energetic particles that extends from ~300 eV to $>10^{20}$ eV. We comment on the shape and similarities of the heliospheric and galactic contributions to this spectrum.