

Abstract Submitted
for the NEF09 Meeting of
The American Physical Society

Solar Energetic Particle Events with High Iron Charge State at Low SEP Energies ZHANGBO GUO, EBERHARD MOEBIUS, MARK POPECKI, University of New Hampshire, BERNDT KLECKER, Max-Planck-Institut fuer extraterrestrische Physik, GLEN MASON, Applied Physics Laboratory, Johns Hopkins University — The ionic charge states of Solar Energetic Particle (SEP) events provide direct information about the environment of the source plasma. Gradual events show consistent Q_{Fe} of ~ 10 reflecting typical corona temperature, while impulsive events show a sharp increase of Q_{Fe} with energy, indicating energy dependent stripping. Both types of events have similar Q_{Fe} at $E < 0.1$ MeV/nuc, indicating a similar source temperature of 1-3 MK. However, $Q_{Fe} > 16$ is frequently found in the solar wind, particularly coming from active regions, suggesting high Q in source populations, while so far only low Q_{Fe} was observed at low SEP energies. Therefore, we performed a survey of iron charge states of all SEP events observed with ACE SEPICA during 1998 – 2000, complemented by ACE SWICS and SOHO STOF. We found a set of 6 events with $Q_{Fe} > 14$ over the entire SEPICA energy range. The observation of high iron charge states at low SEP energies points to a source temperature of 2-6 MK. However, these events are rather rare, indicating that additional conditions must be met to accelerate high Q source populations.

Zhangbo Guo
University of New Hampshire

Date submitted: 01 Oct 2009

Electronic form version 1.4