Geophysical Research Abstracts, Vol. 7, 09391, 2005
SRef-ID: 1607-7962/gra/EGU05-A-09391
© European Geosciences Union 2005

Particle acceleration in stressed coronal magnetic fields

R. Turkmani (1), L. Vlahos (2), K. Galsgaard (3), P. J. Cargill (1), and H. Isliker (2)

1. Space and Atmospheric Physics group, Imperial College, London, UK
2. Department of Physics, University of Thessaloniki, Thessaloniki, Greece
3. Niels Bohr Institute for Astronomy, Physics and Geophysics, Copenhagen, Denemark

An analysis of particle acceleration in a model of the complex magnetic field environment in the flaring solar corona is presented. A slender flux tube, initially in hydrodynamic equilibrium, is stressed by random photospheric motions. A three-dimensional MHD code is used to follow the stochastic development of transient current sheets. These processes generate a highly fragmented electric field, through which particles are tracked using a relativistic test particle code. It is shown that both ions and electrons are accelerated readily to relativistic energies in times of order 10^{-2}s for electrons and 10^{-1} s for protons forming power-law distributions in energy.

The behaviour of individual particles and their interaction with the background magnetic structure is studied in addition to the behaviour of an ensemble of large number of particles. The time-evolution of the distribution function if followed and the corresponding HXR spectrum is calculated.