



Galactic cosmic ray electrons; A tool to predict the radiation environment at solar minimum every 22 years

Bernd Heber and Jan Gieseler

Christian-Albrechts-Universität Kiel, Institut für Experimentelle und Angewandte Physik, Kiel, Germany
(heber@physik.uni-kiel.de)

In contrast to humans on Earth astronauts on an interplanetary journey are only protected against galactic cosmic rays up to a few tens of GeV by heliospheric modulation. The reduction depends on the solar activity and can vary by a few ten percent at 5 GeV to several orders of magnitude at a few tenth of MeV. This modulation in the heliosphere as a function of position, energy and time is a complex combination of different physical mechanism as described in Parker's transport equation. The current solar minimum is the lowest observed since the space area. In contrast to the protons the intensity of GCR electrons measured by the Kiel Electron Telescope aboard Ulysses in 2008/2009 exceed the intensity of protons by more than 30%. Since electrons and protons at the rigidity of interest have the same modulation amplitude, the intensity of particles with energies >100 MeV will increase by more than 15% when approaching real solar minimum conditions. Such an increase has been recently observed by EPHIN aboard SOHO. Therefore these kind of measurements are useful for predicting interplanetary radiation dose.