



Anisotropies of wide-spread solar energetic electron events observed with STEREO and ACE

Nina Dresing (1), Raúl Gómez-Herrero (2), Andreas Klassen (1), Bernd Heber (1), Olga Malandraki (3), Wolfgang Dröge (4), Yulia Kartavykh (4,5)

(1) IEAP, University of Kiel, Kiel, Germany, (2) Space Research Group, University of Alcalá, Alcalá, Spain, (3) IAASARS, National Observatory of Athens, Athens, Greece, (4) Ioffe Physical-Technical Institute, St. Petersburg, Russian Federation, (5) Institut für Theoretische Physik und Astrophysik, University of Würzburg, Würzburg, Germany

The two STEREO spacecraft, in combination with near-Earth observatories as ACE or Wind provide three well separated viewpoints, which are perfectly suited to investigate SEP events and their longitudinal dependences. We collected a list of 21 near-relativistic wide-spread electron events in the period from 2009 to mid 2013. To be counted as a wide-spread event, we request a minimum longitudinal separation angle of 80 degrees between the source active region at the Sun and the magnetic footpoint of one spacecraft observing the event.

Energetic electron anisotropies are investigated to disentangle source and transport mechanisms leading to the observed wide particle spreads. One favorable mechanism is efficient perpendicular transport in the interplanetary medium leading to vanishing anisotropies for larger separation angles. Another scenario is a large particle spread which is performed close to the Sun either due to a coronal shock or due to coronal transport. In this case, the observations at 1 AU during the early phase of the events are expected to show significant anisotropies due to the wide injection range at the Sun and particle focusing during the outwards propagation. For both of the above scenarios we find events in our sample, which suit the expected observations and even further events, which do not agree with these.