ICRC2015

ICRC
The Astroparticle Physics Conference
34th International Cosmic Ray Conference
July 30 - August 6, 2015
The Hague, The Netherlands

Contribution ID: **1080** Type: **Oral contribution**

Simulation of energetic particle interaction with shock waves in a focused transport model

Wednesday 5 August 2015 11:30 (15 minutes)

We use numerical solutions of the focused transport equation to study the evolution of the pitch-angle dependent distribution function of protons in the vicinity of parallel and oblique shock waves and compare the results with predictions of diffusive shock acceleration theory. We then consider the case that a seed population of protons is injected close to the Sun simultaneously with a travelling interplanetary shock, and investigate the effects of pitch-angle dependent spatial diffusion, first-order Fermi acceleration at the shock and adiabatic energy losses in the expanding solar wind behind the shock. We analyze the resulting energy spectra, angular distributions and intensity-time profiles at various distances from the Sun and discuss the question whether the typically observed spectra can be explained from acceleration out of a thermal seed population, or whether a hard injection spectrum would be necessary. Finally, we apply our simulations to model a number of interplanetary particle events involving shock waves which were observed on the Helios, ACE and Wind spacecraft.

Collaboration

– not specified –

Registration number following "ICRC2015-I/"

0897

Primary author: Dr KARTAVYKH, Yulia (Julius-Maximilians Universität Würzburg, Würzburg, Germany)

Co-authors: Prof. GEDALIN, Michael (Department of Physics, Ben-Gurion University of the Negev, Beer-Sheva, Israel); Prof. DRÖGE, Wolfgang (Julius-Maximilians Universität Würzburg, Würzburg, Germany)

Presenter: Dr KARTAVYKH, Yulia (Julius-Maximilians Universität Würzburg, Würzburg, Germany)

Session Classification: Parallel SH 08 Theory

Track Classification: SH-TH