ICRC2015

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

Contribution ID: **183** Type: **Oral contribution**

A study of Forbush Decreases with a 3-D cosmic ray modulation model

Monday, 3 August 2015 15:45 (15 minutes)

We have constructed a 3-D numerical model for studying Forbush Decreases (FDs) in the heliosphere. It incorporates 3-D propagation barriers, with enhanced cooling inside, into a time-dependent Parker type modulation model using a Stochastic Differential Equation (SDE) approach. This numerical model simultaneously takes into account the effect of solar wind convection, regular drift plus current sheet drift, parallel and perpendicular diffusion and adiabatic energy changes. This state-of-art numerical model enables us to find and study some new 3-D features for FD type events: 1. The cosmic ray intensity at Earth varies depending on the relative location of the Earth to the current sheet, and is reflected also in the amplitude of the FDs. The local modulation conditions, at a given observational point, determine the total amplitude. 2. The radial, latitudinal and longitudinal extent of a diffusion barrier significantly affects the amplitude of a FD. 3. The recovery time of a FD, at a given observational location, is determined by the modulation conditions which the corresponding propagation barrier encounters as it moves outwards in the heliosphere.

Collaboration

– not specified –

Registration number following ”ICRC2015-I/”

196

Primary author: Dr LUO, Xi (North-West University, Potchefstroom, South Africa)

Co-authors: POTGIETER, Marthinus (North-West Uiversity); Prof. ZHANG, Ming (Florida Institute of Technology)

Presenter: Dr LUO, Xi (North-West University, Potchefstroom, South Africa)

Session Classification: Parallel SH05 GLEs & FDs

Track Classification: SH-TH