
Galactic cosmic ray decreases associated to non-interacting magnetic clouds during the 23rd solar cycle

Jimmy Masías-Meza^{*†1} and Sergio Dasso^{‡1,2}

¹Departamento de Física de la Facultad de Ciencias Exactas y Naturales Universidad de Buenos Aires
(Depto. Física FCEyN UBA) – Departamento de Física Facultad de Ciencias Exactas y Naturales
Pabellón I Ciudad Universitaria 1428 Buenos Aires, Argentina

²Instituto de Astronomía y Física del Espacio (IAFE (UBA-CONICET)) – Casilla de Correo 67 - Suc.
28 (C1428ZAA) Ciudad Autónoma de Buenos Aires, Argentina

Abstract

It is known that the presence of magnetic clouds (MCs) in the vicinity of Earth causes the deepest decreases in galactic cosmic ray (GCRs) flux at ground level (i.e., Forbush decreases). We present here a selection of Forbush decreases, which are associated to non-interacting MCs, and perform a statistical study on the shock/ejecta components for a subset of this events. By looking for correlation between the most relevant parameters of MCs and GCRs, we propose causality mechanisms to explain the observed correlations. In particular, we determine the relevance of each of the physical processes involved in the GCRs modulation, such as: diffusion, magnetic cloud expansion and trapping times of confinement.

Keywords: magnetic clouds, galactic cosmic rays, forbush decreases, diffusion

^{*}Speaker

[†]Corresponding author: jimmy.ilws@gmail.com

[‡]Corresponding author: sdasso@iafe.uba.ar