

Formation of a Forbush decrease in a magnetic cloud by the electromagnetic mechanism

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We calculate cosmic ray intensity and anisotropy using the model of the Forbush decrease formation in a magnetic cloud by the electromagnetic mechanism for three events. The properties of the Forbush decrease are determined by solving the Boltzmann kinetic equation without particle scattering. Geometrical parameters of the magnetic cloud, such as velocity, velocity gradient, cross-section area, and angular sizes, are based on the kinematic model. The magnetic field properties and the type of helical structure near the Sun are based on the Miller and Turner toroidal model. In interplanetary space, magnetic field components are determined by the frozen-in condition. The model properties of the velocity, velocity gradient, magnetic field components, and characteristics of the Forbush decrease roughly agree with measurements in three events. There are no free parameters in the Forbush decrease formation model.

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