

“A Charged Particle Moving in Non-uniform Magnetic Field and the Forbush Effect”

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The report discusses the dynamics of charged particle motion in a non-uniform magnetic field. Specifically, we examine the possible trajectories of cosmic rays in Earth's dipole magnetic field.

The study demonstrates the potential chaotic dynamics of cosmic rays using the Lyapunov exponent and Fourier spectrum. Additionally, it presents modeling of Van Allen belt formation and analyzes the influence of cosmic ray energy on the geometry of these belts.

Furthermore, an analysis was conducted on the impact of the May 10, 2024, magnetic storm on cosmic ray detection on Earth. As is known, during such storms, the Forbush effect is observed, which manifests as a decrease in the intensity of detected cosmic rays. Relevant laboratory records are provided, utilizing data from the Dusheti Geophysical Observatory and the Tbilisi Cosmic Ray Laboratory.

The study also investigates the dependence of the Forbush effect's depth on the magnitude of geomagnetic field disturbances.

References

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