

Flux predictions in the transition region incorporating the effects from propagation of cosmic rays in the Galactic magnetic field

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Galactic cosmic rays (GCRs) and (anisotropically injected) extragalactic cosmic rays (EGCRs) are both affected by the Galactic magnetic field (GMF) on their voyage to Earth at energies pertaining to the transition from GCRs to EGCRs, such that their flux, composition and arrival directions are modified. GCRs increasingly leak from the Galaxy with rising energy, leading to a flux suppression. The flux modification imposed on EGCRs is more complex, but may exhibit (subtle) spectral breaks depending on the direction and nature of the injected anisotropy.

Using a full Monte Carlo approach with CRPropa and making realistic and minimal assumptions about the injected GCR and EGCR fluxes, we make predictions of the total all-particle flux in the transition region. We find that it cannot account for the flux measured by various cosmic ray experiments in this energy range. This calls for the need of an additional component to the flux in the transition region.

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