

The Imprint of Large Scale Structure on the Ultra-High-Energy Cosmic Ray Sky

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We account for the magnitude, direction and energy dependence of the large-scale anisotropy of ultra-high-energy cosmic rays at energies above 8 EeV and possibly Auger hot spot with the ansatz that the source distribution follows the matter distribution of the Universe. We consider the impact of energy losses during propagation and the deflections by the Galactic magnetic field. We further constrain the cosmic ray composition and the properties of extragalactic and Galactic magnetic fields. We show that the observed dipole anisotropy is incompatible with a pure proton composition in this scenario. Our work sets the stage for searching for individual sources, by enabling the continuous background to be removed as the analysis is refined.

Keywords

Cosmic rays; Ultra-high-energy cosmic rays; Cosmic-ray anisotropy; Cosmic-ray composition; Auger hotspot; Galactic magnetic field; Extragalactic magnetic field

Collaboration

other Collaboration

Subcategory

Theoretical Results

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