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Small-scale anisotropies of cosmic rays from relative diffusion

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The arrival directions of multi-TeV cosmic rays show significant anisotropies at small angular scales. It has been argued that this small scale structure is the reflection of the local, turbulent magnetic field in the presence of a global dipole anisotropy in cosmic rays as determined by diffusion. This effect is analogous to weak gravitational lensing of temperature fluctuations of the cosmic microwave background. We show that the non-trivial power spectrum in this setup can be related to the properties of relative diffusion. A rigorous mathematical treatment of the generation of small scale anisotropies will help in unraveling the structure of the local magnetic field through cosmic ray anisotropies.

Collaboration

– not specified –

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