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TeV anisotropy

30 min. invited talk

TeV-PeV Cosmic Ray Anisotropies at Multiple Angular Scales: A Window on Local Magnetic Fields

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The TeV–PeV cosmic ray (CR) flux at Earth shows anisotropies at multiple angular scales. The diffusion approximation predicts a dipole anisotropy only. It fails at predicting the higher order multipoles, because it ensemble-averages over all possible realisations of the local magnetic field configuration. We show that the energy-dependent higher order multipoles are due to, and bear the imprints of, the local concrete realization of the magnetic fields within a CR mean free path from Earth. For the same reason, the dipole anisotropy actually points in the direction of the local interstellar magnetic field, and not towards the 'most recent' CR source contributing to the flux at Earth.

While heliospheric fields should be probed at \sim TeV energies, interstellar turbulent fields within ~ 10 pc from Earth will be probed by ~ 100 TeV – PeV CR anisotropies.

We discuss here how one can retrieve information on our local magnetic fields from the CR data.