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Understanding cosmic ray small-scale anisotropies

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The arrival directions of Galactic cosmic rays are highly isotropic. This is expected from the presence of turbulent magnetic fields in our Galactic environment that repeatedly scatter charged cosmic rays during propagation. However, various cosmic ray observatories have identified weak anisotropies of various angular sizes and with relative intensities of up to a level of 1 part in 1,000. Whereas large-scale anisotropies are generally predicted by standard diffusion models, the appearance of small-scale anisotropies down to an angular size of 10° is surprising. In this review, I summarise the current experimental situation and address some of the remaining questions in interpreting the observed large-scale anisotropies. I review some of the various suggestions for explaining the small-scale anisotropies, focussing on the promising idea that they are a direct reflection of the particular realisation of the turbulent magnetic field in our Galactic neighbourhood.

Experimental Collaboration

Primary author: MERTSCH, Philipp**Presenter:** MERTSCH, Philipp**Session Classification:** Astroparticle physics**Track Classification:** Astroparticle Physics