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Investigation of the galactic magnetic field with ultra-high energy cosmic rays

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We propose to perform an independent test of recent galactic magnetic field parameterizations, and to obtain information on the origin of cosmic rays. Based on 3D simulations of cosmic nuclei from their sources to observation, we determine the average expected arrival direction for protons. As energy decreases, the average direction is expected to move away from the source line of sight to several 10th of degrees. When comparing the angular distance between these expected average arrival directions and simulated protons we find angular distances at the level of a few degrees only. The analysis includes typical energy and angular resolutions of modern observatories, and their ability to separate protons from nuclei through shower shape measurements. We quantify the expected sensitivity for evaluating galactic and extragalactic magnetic fields, and for discovering point sources of cosmic rays.

Collaboration

– not specified –

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