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Recent Results on Cosmic Ray Spectrum and Anisotropy from the GRAPES-3 Experiment (remote)

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The GRAPES-3 experiment, situated in Ooty, India, uses a dense array of plastic scintillator detectors and a large-area tracking muon detector to measure all charged particles and the muonic components of cosmic ray showers, respectively. The experiment has measured the cosmic ray proton spectrum in the energy range of 50 TeV to 1.3 PeV, and the relative proton composition was determined using muon multiplicity distributions. A spectral hardening was observed beyond 166 TeV, challenging the simple power-law description extending to the knee energy. Furthermore, two significant small-scale anisotropic structures in the cosmic ray arrival distribution were detected at a median energy of 16 TeV, consistent with results from the HAWC and ARGO-YBJ experiments. This presentation will highlight these findings, along with updates on the status of the detector upgrades and future plans.

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