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In-house development and fabrication of proportional counters for a large area muon telescope at the GRAPES-3 experiment

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The GRAPES-3 experiment is home to the world's largest muon telescope containing nearly 4000 proportional counters of each dimension 6m x 6 m x 0.1m. Construction of another large muon telescope is currently under progress which is expected to enrich the physics potentials of GRAPES-3 in addressing the origin of Galactic cosmic rays, through accurate measurements of cosmic ray composition as well as enable the identification of PeV gamma ray sources. Nearly 4000 proportional counters were required for the new muon telescope. Various fabrication and indigenous test facilities were created at the GRAPES-3 laboratory along with skill development to perform precision tasks. The challenge to fabricate such a large number of detectors using old mild steel tubes was accomplished by members of the GRAPES-3. We will present the challenges faced, optimizations, and innovations during the process of fabrication, performance validation, and the successful installation of the proportional counters in the muon telescope.

Session

Future Experiments and Detector Development

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