

Cosmic Ray Muon Polarization to Facilitate Atmospheric Neutrino Physics

Atmospheric neutrinos (ATNs) offer a paradigm to understand neutrino properties while it is critical to quantify uncertainties in the flux modelings. Measurement of cosmic ray muons will contribute to the precision measurement of atmospheric neutrino oscillations due to the same parent particles. This letter suggests measuring the polarization of cosmic ray muons with an array strategy good for understanding low-energy cosmic ray muons and atmospheric neutrinos. Constraints on long-standing atmospheric neutrino flux uncertainties in the few-GeV range are achievable within one year using a $\mathcal{O}(10)\text{m}^2$ array of Cosmic-Ray muon Spin polarization detectors (CRmuSRs).

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