

New limits on muon-philic dark matter searches and other recent progresses from PKMu

The PKMu experiment uses a resistive plate chamber (RPC) muon tomography system to study cosmic-ray scattering as a probe of both secondary cosmic-ray composition and new physics. During a 63-day data-taking campaign, 1.18 million scattering events were recorded and analyzed. Template fits to the scattering-angle distribution enable precise measurements of secondary cosmic-ray components, including the electron fraction at approximately 2% precision. The same dataset is also used to search for elastic scattering between cosmic-ray muons and muon-philic dark matter. Assuming a slow dark matter component captured and thermalized within the Earth, PKMu sets a 95% confidence level upper limit of $1.61 \times 10^{-17} \text{ cm}^2$ on the muon-dark matter elastic scattering cross section for 1 GeV dark matter. This contribution presents these new dark matter constraints together with other recent experimental developments from PKMu.

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