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Strong New Limits on Light Dark Matter from Neutrino Experiments

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The non-detection of GeV-scale WIMPs has led to increased interest in more general candidates, including sub-GeV dark matter. Direct detection experiments, despite their high sensitivity to WIMPs, are nominally blind to dark matter much lighter than ~ 1 GeV. Recent work has shown that cosmic rays scattering with sub-GeV dark matter would both alter the observed cosmic ray spectra and produce a flux of relativistic dark matter, which would be detectable with both traditional dark matter experiments and neutrino detectors. Using data, detectors, and analysis techniques not previously considered, we substantially increase the regions of parameter space excluded by neutrino experiments for both dark matter-nucleon and dark matter-electron scattering.

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