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Searching for Dark Matter Using the NOvA Upward-going Muon Trigger (15' + 5')

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The NOvA collaboration has constructed a 14,000 ton, fine-grained, low-Z, total absorption tracking calorimeter at an off-axis angle to an upgraded NuMI neutrino beam. This detector, with its excellent granularity and energy resolution and relatively low-energy neutrino thresholds, was designed to observe electron neutrino appearance in a muon neutrino beam, but it also has unique capabilities suitable for more exotic efforts. In fact, if sufficient cosmic ray background rejection can be demonstrated, NOvA will be capable of a competitive indirect dark matter search for low-mass Weakly-Interacting Massive Particles (WIMPs). The cosmic ray muon rate at the NOvA far detector is approximately 100 kHz and provides the primary challenge for triggering and optimizing such a search analysis. We present the first dark matter search results using data collected with the upward-going muon trigger.

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