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P4.030 An accelerator-produced, sub-GeV dark matter search with the MiniBooNE neutrino detector

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There is overwhelming astrophysical and cosmological evidence for the existence of dark matter. For more than two decades, significant experimental work has been done to search for non-gravitational interactions of dark matter in deep underground detectors. The signal for these searches is low-energy nuclear recoils, but these searches lose sensitivity if the WIMP mass is below 1 GeV. There are ample theoretical motivations to search for dark matter masses below 1 GeV though. One model proposes that low-mass dark matter is part of a dark sector that couples to the Standard Model via a sub-GeV vector portal particle. The MiniBooNE dark matter experiment is searching for accelerator-produced, low-mass dark matter at the Fermilab Booster Neutrino Beamline with the MiniBooNE neutrino detector. To enhance possible low-mass dark matter production and to suppress neutrino backgrounds, a 8.9 GeV proton beam is diverted off target to hit a steel beamstop at the end of the pion decay drift region. The accelerator-produced dark matter are boosted to higher energies and elastically scatter on the mineral oil target (CH^2) in the MiniBooNE detector. The boosted dark matter will deposit up to a few-hundred MeV of energy on the target nucleons or electrons and will be reconstructed with high efficiency in the 800-ton target volume. MiniBooNE has completed its experimental run with 1.86×10^{20} protons- on-target and analysis is underway. In this poster, I will discuss low-mass, vector-mediated WIMP dark matter models, describe the MiniBooNE detector and the beam-off-target experiment, and summarize the expected sensitivity from the final analysis.