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Inelastic nuclear scattering of neutrinos and dark matter

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Pion decay-at-rest neutrino experiments could also be a copious source of dark sector particles. Experiments looking for the elastic scattering of neutrinos may also be sensitive to decay of nuclei excited by inelastic scattering of both neutrinos and dark matter. Using this channel, with an additional timing cut to reduce the neutrino background, we demonstrate an increased sensitivity to a dark photon portal DM model compared to the existing constraints. With ongoing experiments, world-leading constraints on this parameter space will be obtained.

Author: NEWSTEAD, Jayden (University of Melbourne)

Co-authors: Prof. DUTTA, Bhaskar (Texas A&M); Mr HUANG, Wei-Chih (Texas A&M)

Presenter: NEWSTEAD, Jayden (University of Melbourne)

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