

Abstract Submitted  
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**CEvNS reactor neutrino detection using recoil damage tracks in crystals**<sup>1</sup> APURVA GOEL, University of Washington — Recently it has been proposed by Baum et al. (Phys. Lett. B 803 (2020) 135325) to look for Dark Matter by identifying the damage tracks in crystals caused by nuclear recoil resulting from Dark Matter scattering. Here, we explore the feasibility of using this concept for the detection of reactor neutrinos via the CEvNS reaction since CEvNS, like Dark Matter scattering, leads to nuclear recoils in the keV-range. The obvious advantage of looking for CEvNS from reactor neutrinos is that this a well-known Standard Model reaction and the neutrino flux from a reactor is very high. Moreover, tailor-made materials can be employed. Apart from applications to basic science passive crystal detectors could be attractive for nuclear non-proliferation safeguards acting very much like a smart tag and fitting overall well into accepted IAEA operating procedures. We present an estimation of the track length distribution from CEvNS and compare it to the one of the most pernicious background source, cosmic ray neutrons. We find that even without shielding the CEvNS track number can exceed the neutron background track number by a factor of few for suitably chosen materials and a detection with gram-scale crystals appears possible.

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