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Isotopically enriched detectors as a tool for low-threshold CEvNS detection

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In this work we present a study of Coherent Elastic Neutrino-Nucleus Scattering (CEvNS) with a proposed array of isotopic enriched detectors. These detectors could improve the precision of CEvNS measurements, allowing to test predictions of the Standard Model, nuclear physics and new physics scenarios, due to the correlation of the systematic uncertainties. Based on these results, we explore how such detectors would behave if the nuclear recoil energy is transferred to lattices excitations, in particular phonons. We will review the dark matter-phonon effective field theory aiming to model the phonon response of isotopically enriched materials to CEvNS- induced recoil in order to evaluate the potential for single- and multi-phonon excitations in different isotopic configurations. Lower threshold detectors have been proposed for CEvNS studies using a variety of technologies, many of which may have additional isotopic effects that need to be studied carefully.

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