

Searching for Coherent Elastic Neutrino-Nucleus Scattering (CEvNS) with the NUCLEUS detectors

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My Ph.D. research focuses on the NUCLEUS experiment, which aims to precisely measure coherent elastic neutrino-nucleus scattering (CEvNS) using reactor neutrinos at the Chooz power plant in France. This experiment employs transition-edge sensors (TESs) to detect the energy deposited by neutrinos into CaWO₄ and Al₂O₃ substrates. Operated at 10mK within a dry dilution cryostat, our cryogenic setup allows for an ultra-low noise environment in order to detect energies up to O(1keV). A central challenge of the NUCLEUS experiment is achieving a background level of 100 dnu at surface level. This goal is pursued through a combination of passive and active veto systems installed at both ambient and cryogenic temperatures. Currently undergoing commissioning at the Technical University of Munich (TUM) in Germany, NUCLEUS is scheduled to be deployed at Chooz in 2025.

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