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New Limits on Neutrino-Nucleus Elastic Scattering at Kuo- Sheng Nuclear Reactor

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Nuclear reactors are source of intense low energy neutrinos providing a great tool to look for neutrino-nucleus elastic scattering in the fully coherent regime. Taiwan EXperiment On NeutrinO (TEXONO) is few decades old research program [1] at Kuo-Sheng nuclear power plant working with state-of-art high purity point-contact Germanium detectors with O(100 eV) threshold [2]. In this work we will present our latest findings exploiting the Reactor ON(OFF) data with exposure of 242(357) kg.days. For this data set 4.7 times excess over the SM predicted cross section is excluded at 90% C.L. considering the standard Linhard parameterization k = 0.162 [3] with achieved 200 eV ionization threshold. Further, the updated analysis with additional 250(440) kg.days exposure, and future goals will also be presented.

Reference:
1. H. T. Wong et al. (TEXONO Collaboration), Research program towards observation of neutrino-nucleus coherent scattering, J. Phys. Conf. Ser. 39, 266 (2006).
2. A. Soma et al. (TEXONO Collaboration), Characterization and performance of germanium detectors with sub-keV sensitivities for neutrino and dark matter experiments, Nucl. Instrum. Methods Phys.Res., Sect. A 836, 67 (2016).
3. S. Karmakar et al. (TEXONO Collaboration), New Limits on the Coherent Neutrino-Nucleus Elastic Scattering Cross Section at the Kuo-Sheng Reactor-Neutrino Laboratory, Phys. Rev. Lett. 134, 121802 (2025).

Collaboration you are representing

TEXONO

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