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Studies of Quantum Mechanical Coherency Effects in Neutrino-Nucleus Elastic Scattering

Neutrino-nucleus elastic scattering provides a unique laboratory to study the quantum mechanical coherency effects in electroweak interactions. We present an analytical formulation [1] to quantify the coherency effects, relate this to nuclear form factors and experimental cross-section ratios, and characterize how its energy dependence leads to complementarity among measurements at various neutrino sources with different targets. The latest results and prospects of observing this process at the Kuo-Sheng Reactor Neutrino Laboratory with germanium detectors with O(100 eV) threshold [2] will also be presented.

- [1]. "Coherency in neutrino-nucleus elastic scattering", S. Kerman et al., TEXONO Collaboration, Phys. Rev. D, 2017.
[2]. "Characterization and performance of germanium detectors with sub-keV sensitivities for neutrino and antineutrino detection", S. Kerman et al., Phys. Rev. D, 2018.

Mini-abstract

Study of coherence effects in electroweak interactions with neutrino-nucleus elastic scattering.

Experiment/Collaboration

Taiwan Experiment on Neutrino (TEXONO)

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