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

VIVEK SHARMA, HENRY WONG, Institute of Physics, Academia Sinica, TEXONO COLLABORATION — Neutrino-Nucleus Elastic Scattering ($\nu A_{el}$) is a well-defined process in the Standard Model of particle physics. It 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 ($\alpha$), relate this to nuclear form factors and experimental cross-section ratios, and characterize how its energy dependence leads to complementary among measurements at various neutrino sources with different targets. The latest results and prospects of observing $\nu A_{el}$ at the Kuo-Sheng Reactor Neutrino Laboratory with germanium detectors with $\mathcal{O}(100 \text{ eV})$ threshold \(^2\) will also be presented.

\(^1\) S. Kerman et al., *Phy. Rev. D* 93, 113006 (2016)