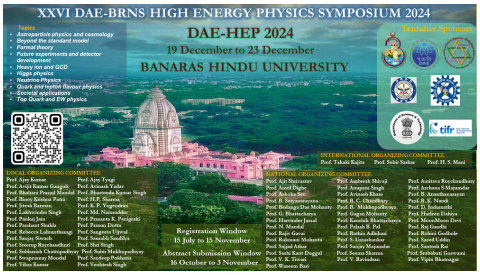

Contribution ID: **202** Type: **Oral**

Investigation of Electromagnetic Properties of Neutrinos with sub-keV Sensitive Germanium Detectors in the TEXONO Experiment

The discovery of non-zero neutrino masses has triggered intensive studies on nontrivial electromagnetic properties of neutrinos, which emerge from electroweak radiative corrections. Despite numerous experimental efforts to detect neutrino electromagnetic interactions, no conclusive evidence has yet been observed. These interactions are characterized by different energy dependencies: the interaction rates for neutrino magnetic moment interactions are inversely proportional to recoil energy, whereas those for millicharge interactions decrease with the square of the recoil energy. As a result, experiments with ultra-low-energy thresholds, especially in the sub-keV range, are particularly well-suited to exploring these elusive properties. The current data from ultra-low-energy thresholds aligns with the atomic scale of the target. In order to account the atomic responses in the analysis, we employ the ab-initio multiconfiguration relativistic random-phase approximation (MCRRPA) to calculate differential cross-sections, which accurately account for the many-body effects in atomic germanium. This approach significantly reduces the uncertainties associated with atomic effects, making our results more robust. This work presents new preliminary constraints on the millicharge and magnetic moment of reactor antineutrinos using 200eV threshold data from the TEXONO experiment at the Kuo-Sheng Neutrino Laboratory, Taiwan.

Field of contribution

Experiment

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Track Classification: Beyond the standard model