

First results from the ARTIE experiment

Tuesday 7 September 2021 16:00 (20 minutes)

A measurement of the transmission coefficient for neutrons through a thick (~ 3 atoms/b) liquid natural argon target in the energy range 30-70 keV was performed by the Argon Resonance Transmission Interaction Experiment (ARTIE) using a time of flight neutron beam at Los Alamos National Laboratory. In this energy range theory predicts an anti-resonance in the ^{40}Ar cross section near 57 keV, but the existing data, coming from an experiment performed in the 90s (Winters. et al.), does not support this. This discrepancy gives rise to significant uncertainty in the penetration depth of neutrons through liquid argon, an important parameter for next generation neutrino and dark matter experiments. In this talk, the first results from the ARTIE experiment will be presented. The ARTIE measurement of the total cross section as a function of energy confirms the existence of the anti-resonance near 57 keV, but not as deep as the theory prediction. This measurement is important for the Deep Underground Neutrino Experiment since it could allow a viable means of calibration and a deeper understanding of signals and backgrounds for the neutrino science program.

Working group

WG2

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