Modeling low-energy (~10 MeV) inelastic neutrino-nucleus cross sections

- Targeting NF06 with relevance to TF11 and CompF02

- Complementary to LOIs on other neutrino cross section topics (CEvNS, SIS, Sam's LOI at this meeting)

- **Motivation**

  - Supernova ν, solar ν, & low-E BSM searches in DUNE, other experiments (HALO, future I-, Fe-, or Pb-based detectors)

  - Nucleosynthesis & supernova dynamics

  - gA quenching → applications to 0νββ

  - Substantial differences in theory treatment for ~10 MeV versus 100s MeV+ → unified picture?

- **Capabilities**

  - **Theory**: shell model, LDA, variants of RPA (QRPA, CRPA, etc.), hybrid approaches

    - All have strengths & weaknesses

    - Inclusive (i.e., outgoing lepton) predictions only

  - **Detectors & Facilities**: COHERENT "neutrino cubes", NaIvE, STS? @ ORNL, LArTPCs, etc.

  - **Generators**: MARLEY

    - First exclusive predictions for 40Ar

    - Better theory input & other targets under development

- **Plans**

  - Prospects for cross section measurements (very little data available, none for Ar)

  - MARLEY development: forbidden transitions, nuclear de-excitation improvements (e.g., ν-induced fission, pre-equilibrium)