

LEPLAr Day 2: Questions for cross-section modeling panelists

1. What should the process be for improving experimentalists' tools for low-energy (0-75 MeV) interaction simulations? Can we expand existing LArSoft-friendly generators, like MARLEY? If so, how does this work? If not, why not?
 1. Theorists need to think about and calculate more exclusive final states and less inclusive response functions. It may be more important to be correct (agree with experiment for a certain state) than to be consistent.
 2. 0-75 MeV involves different energy sub-domains where the importance of describing every single state is different. Does MARLEY get uglier as you go up in energy?
2. What existing datasets from existing experiments should be analyzed/produced to provide improved inputs for low-energy (0-75 MeV) generators? Are these inputs sufficient, or are additional datasets (i.e. new experiments) necessary?

Energy resolution is very important for SN!

- If ν oscillations or BSM physics introduces a “sharp” energy feature in the SN ν_e spectrum, how large and how sharp must this feature be for DUNE to see it?
- How well can we determine the small difference between the ν_e and anti- ν_e mean energies? This is important for oscillations and for nucleosynthesis.
- Neutrino driven wind in a SN is an important nucleosynthesis site. Composition of wind (neutron rich vs proton rich) depends sensitively on mean ν_e vs anti- ν_e energies.
- Extracted mean ν_e energy may have large systematic errors from cross section uncertainties.
- Important to measure CC Ar cross section with pion decay at rest ν s (probably at SNS).