LIDINE 2017 Roundtable Summary

Large (Future) Detectors

Backgrounds (L. Grandi, R. Mannino)

- Rn removal is critical for operation of LXe low background experiments
  - Reduce Rn emanation in warm components (SS tubing, welds, cables,etc.).
  - Large detectors will have better surface/volume ratios so monolithic detectors should be preferred on modular ones.
- Double beta decay
  - Directionality in double beta decay can help discriminate background events.
  - Barium tagging of the barium daughter of $0\nu\beta\beta$ of ^{136}Xe could be a useful tool in $0\nu\beta\beta$ search.
- Neutrino background in LXe DM detectors
  - Is it really a measurable extra channel or, given the unknowns and the low rate is it more a BG?
  - Is annual modulation of dark matter useful to see neutrinos?

Complex event topology reconstruction (D. Whittington, A. Biekert)

- Main concern was (lack of) overlap in event topologies between neutrino and dark matter experiments.
  - Complicated events in dark matter experiments are multiple scattering vs. deep inelastic scattering, etc. in high energy neutrino experiments.
  - DM experiments would love to resolve ~10 nm nuclear recoils to go beyond seeing point interactions.
- Everybody will see supernova neutrinos!
  - There might be similarities in those signals.
- What happens to neutrons in big TPCs? Develop better understanding.
- “Xenon is magical”

Maximizing light collection (A. Szelc, R. Linehan)

1. Maximizing light collection plays an important role in future large liquid noble detectors by improving our ability to:
   a. Establish a trigger time (T0) for proton decay and supernova events
   b. Perform calorimetry
   c. Perform event position reconstruction
2. The influence of dissolved TPB on light propagation and collection needs to be better understood.
3. We need to have a clearer understanding of optical properties of detector media, like the Rayleigh scattering length and the absorption length.
4. The advantages of doping argon with other noble elements need to be fleshed out. It’s also important to understand how doping efforts scale to large-scale detectors.

Thank You!