

International Workshop on Next generation Nucleon Decay and Neutrino Detectors (NNN19)



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LiquidO: a Novel Neutrino Detection Concept

Liquid Scintillator (LS) detectors have been a workhorse for low energy neutrino physics ever since the discovery of these elusive particles in the late fifties. In the traditional implementation of these detectors, the light produced by particle interactions propagates across transparent scintillator volumes to surrounding photosensors. This talk introduces a new concept for LS detection called LiquidO that departs from the conventional transparency-based approach in at least two significant ways: the use of an opaque liquid scintillator that confines light near its creation point, and the collection of light from within the LS volume through a dense fiber array. The result is a detector that has a high affinity for loading and that, by preserving the precious topological information of particle interactions lost in conventional LS detectors, has unprecedented capabilities for event identification and background rejection. A small prototype called micro-LiquidO was recently built and tested with a 1 MeV monochromatic electron beam, validating the basic principles behind the new paradigm. A proto-collaboration is coming together to develop and exploit this promising new technology whose main features, R&D status and possible applications will be discussed in this talk.

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