

Workshop on Xenon Detector $0\nu\beta\beta$ Searches: Steps Towards the Kilotonne Scale

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TinyTPC - A test stand for photosensitive dopants

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LArTPCs highly doped with Xenon could be interesting platforms for probing MeV- and sub-MeV physics including neutrinoless-double beta decay. A main hurdle is the small fraction of scintillation photons that are collected, which significantly impacts LArTPCs' energy resolution. One solution is the use of photosensitive dopants, which convert light to charge. A team from Rutgers University and FNAL have built a test stand (TinyTPC) with a LArPix pixelated anode plane and an active mass of 2.1 kg to study these charge enhancements. Our plan is to measure the TinyTPC's energy resolution with and without dopants for radioactive gamma sources, which is crucial for accurate calorimetric energy reconstruction of low-energy physics signals. The doping agent that will be used is isobutylene and the radiation sources are Co-60, Y-88, and Th-228.

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