

SoLAr: a novel approach to multipurpose LArTPCs for neutrino physics

Tuesday, May 14, 2024 4:40 PM (20 minutes)

Liquid Argon Time Projection Chambers (LArTPCs) are set to be one of the main detector technologies for the next generation of neutrino experiments. While LArTPCs have already been proven to be exceptional detectors for GeV-scale physics, their sensitivity to the MeV scale is still limited by backgrounds and non-optimal energy resolution.

SoLAr is a R&D project aiming to boost the performance of LArTPCs at the energy scale of low-energy astrophysical neutrinos (>5 MeV) such as Supernova neutrinos and solar neutrinos produced by the ${}^8\text{B}$ and the still unobserved hep reaction. SoLAr's innovative approach combines the light and charge readout of LArTPCs onto a combined dual readout anode plane, allowing for better positional resolution in light detection and combined light and charge calorimetry. Two small-scale prototype detectors were built and operated at the University of Bern in 2022 and 2023. Furthermore, simulations studies are underway to design an effective shielding against radiological background and to establish the experiment sensitivity under different assumptions on the detector design. This contribution will cover the SoLAr detector concept, preliminary results from the two prototype detectors, and some initial considerations on the expected experiment performance.

Primary author: GUFFANTI, Daniele (University & INFN Milano-Bicocca)

Presenter: GUFFANTI, Daniele (University & INFN Milano-Bicocca)

Session Classification: DUNE Phase 2 - Parallel

Track Classification: DUNE Phase II