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ARIADNE – A Liquid Argon Time Projection Chamber (LArTPC) featuring an ultra-fast optical readout

ARIADNE, a state-of-the-art 1-ton dual-phase LArTPC, featuring game-changing photographic readout, utilising ultra-fast photon sensitive TPX3 cameras, to image the secondary scintillation light produced in THGEM holes. ARIADNE underwent testing at the CERN T9 beamline, becoming the first dual-phase LArTPC with photographic capabilities to be positioned at a charged particle beamline, successfully imaging beautiful LAr interactions with 1 mm track resolution at momenta between 0.5-8GeV. With this technology a dream TPC has been created, allowing for 'videos' of particle interactions, with ns time resolution and mm spatial resolution, based solely on light. The system is ideal for colossal dual-phase LAr neutrino detectors reducing readout cost, and as such, is now considered as an option for the fourth module of DUNE. Results using the upgraded system at Liverpool will be presented detailing the many benefits and capabilities of this technology.

Mini-abstract

ARIADNE LArTPC detector summary, including detail and benefits of the optical readout technology.

Experiment/Collaboration

ARIADNE

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