

ARIADNE+: Large Scale Demonstration of Fast Optical Readout for Dual Phase LArTPCs at the CERN Neutrino Platform

Thursday, 4 August 2022 17:10 (20 minutes)

Optical readout of large scale dual-phase liquid Argon TPCs is an attractive and cost effective alternative to charge readout. Following the successful demonstration of 3D optical readout with the ARIADNE 1-ton detector, the ARIADNE+ experiment was recently deployed using the protoDUNE “cold box” at the CERN neutrino platform imaging a much larger active region of 2m x 2m. ARIADNE+ uses 4 Timepix3 cameras imaging the S2 light produced by 16 novel, patent pending, glass THGEMs. ARIADNE+ takes advantage of the raw Timepix3 data coming natively 3D and zero suppressed with a 1.6 ns timing resolution. Three of the four THGEM quadrants were visible readout with the fourth featuring a VUV light image intensifier, thus removing the need for wavelength shifting altogether. Cosmic muon events were recorded successfully at stable conditions providing the first demonstration for its use in kton scale experiments such as DUNE.

In my talk I will be discussing in detail the innovative ideas that make ARIADNE+ unique and the benefits that come with these technologies. These include, but is not limited too, TPX3Cams, the PEN wavelength shifting, a chemically etched stainless steel extraction grid, Invar support structure and a new way to manufacture glass THGEMs. I will also be presenting a gallery of cosmic muon events along with a breakdown of our mechanisms for analysis allowing us to arrive at an energy calibration and resolution.

Attendance type

In-person presentation

Primary author: LOWE, Adam (University of Liverpool)

Presenter: LOWE, Adam (University of Liverpool)

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