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

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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 deployed using the protoDUNE “cold box” at the CERN neutrino platform imaging a much larger active region of 2mx2m. ARIADNE+ uses 4 Timepix3 cameras imaging the S2 light produced by 16 novel, patented, 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 are not limited to, TPX3Cams, PEN wavelength shifting, a chemically etched stainless steel extraction grid, Invar support structure and a new way to manufacture glass THGEMs. Future plans and a road map towards an even larger demonstration using the ProtoDUNE cryostat itself for a dedicated dual phase optical run will also be discussed.

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