

Abstract Submitted
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Readout and Data Acquisition for a Liquid Radiator Radiation Exposure Test CHAD LANTZ, University of Illinois Urbana-Champaign — The ATLAS Zero Degree Calorimeter (ZDC) prototype is a tungsten-sampling, oil/quartz radiating calorimeter placed on each side of the interaction point. The ZDC is used in heavy ion runs for centrality measurements. The UIUC group develops a ZDC that is significantly more radiation hard than the currently employed detector. The current ZDC uses scintillating quartz rods placed directly in the beamline whose optical transmission is known to degrade as a function of radiation dosage. Our prototype uses organic wavelength shifters (WLS) dissolved in oil in two stages to take Cherenkov light produced in the oil by the particle shower and guide it to a photodetector. This design allows the quartz rods be located away from the beam center to experience a lower radiation dose, and the oil containing WLS can be replaced periodically to negate radiation damage. Quantum dots are studied as a more radiation hard alternative to WLS. This increase in radiation hardness will allow ATLAS to operate the ZDC after the luminosity upgrades planned for the LHC. A test setup has been developed for the study of radiation hardness of liquid Cherenkov radiators and wavelength shifters. The setup will be described in this presentation with a focus on the readout electronics and data acquisition.

Chad Lantz
University of Illinois Urbana-Champaign

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