

Abstract Submitted  
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**Two-Stage Cerenkov Radiation Shifting Liquid Zero Degree Calorimeter for  $pp$ -Run at ATLAS<sup>1</sup>** DANIEL LI, MATTHIAS PERDEKAMP, University of Illinois at Urbana-Champaign, ZVI CITRON, Weizmann Institute of Science, ATLAS ZDC TEAM — The Liquid Zero Degree Calorimeter (LqZDC) is an electromagnetic sampling calorimeter that transmits Cerenkov radiation produced by incoming scattered particles using a two-stage wavelength shifting process. The first iteration of the LqZDC was irradiated by a Pb-nuclei beam at the SPS to test the validity of a liquid two-stage shifting process. The first stage transmitted Cerenkov radiation transversely (horizontal) in the active region which consisted of an organic wavelength shifter (WLS), Alexa Fluor 430, dissolved in LAB oil. The second stage transmitted the shifted Cerenkov light transversely (vertical) within a quartz capillary immersed at opposite ends of the active region which consisted of the WLS POPOP dissolved in DMSO. The signal produced by the two-stage process transmits through an incident PMMA fiber to a silicon photomultiplier-equipped pre-amplifier and processed using DRS4/RCDAQ software. However, for the LqZDC to withstand the high radiation environment (1.8 Grad) environment at ATLAS, quantum dots (QD) will replace the organic WLS. The degradative effects and byproducts of QD under large neutron flux ( $10^{14}$  n/cm<sup>2</sup>) are undescribed in literature, thus are the current focus of this research.

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