

Abstract Submitted  
for the DNP17 Meeting of  
The American Physical Society

**GEANT Simulation of the ATLAS Zero Degree Calorimeter**

JOSEPH BRYANT, University of Illinois at Urbana-Champaign — The University of Illinois at Urbana-Champaign (UIUC) in collaboration with the ATLAS group at CERN is developing an improved Zero Degree Calorimeter (ZDC) to replace the current ZDC in the ATLAS experiment. The prototype ZDC is a four module detector each made up of 11 alternating layers of tungsten and a liquid active region filled with quantum dots as wavelength shifter and mineral oil solution. When neutrons from the beam collide with the ZDC, the charged hadrons that result from the particle showers produce Cherenkov radiation. This Cherenkov radiation is absorbed and reemitted in a longer wavelength. The re-emitted light is then re-absorbed by second stage wavelength shifters inside hollow quartz rods. The radiation reemitted in the quartz rods is read out through silicon photomultipliers. As a part of ongoing changes to the LHC, the space available between beam pipes is being reduced from 100 mm to 60 mm. Due to this space restriction's effect on the width of the ZDC, there are concerns about the detector's ability to measure the full transverse profile of the particle showers it is designed to contain. The paper will present the results of computer simulations and analysis that were carried out to study the ZDC performance with reduced detector width.

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Date submitted: 01 Aug 2017

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