

Abstract Submitted
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A New Reaction Plane Detector for ATLAS Heavy Ion Physics Program in Run 3¹ FARAH MOHAMMED RAFEE, University of Illinois at Urbana-Champaign, ATLAS COLLABORATION — The ATLAS Zero Degree Calorimeter (ZDC) is installed in the Target Absorber for Neutrals of the Large Hadron Collider (LHC) during the Heavy Ion data taking. Each of the two ATLAS ZDCs comprises one electromagnetic (EM) and three hadronic (HAD) modules. By measuring the energy deposited by spectator neutrons, the ZDC can determine the spectators multiplicity and therefore the events centrality. The University of Illinois at Urbana-Champaign (UIUC) is developing and constructing a new Reaction Plane Detector (RPD) to be installed downstream of the ZDC EM module in Run 3. The RPD will map the transverse profile of the spectators shower, which is directly related to the reaction plane that characterizes each collision. The detector consists of 256 fused silica core optical fibers, grouped into 16 channels. The fibers have four different lengths and are arranged according to a periodic staggered pattern, developed to be paired to a machine learning-based reconstruction algorithm. In this contribution, we present the design of the RPD prototype, built at UIUC for the 2021 test beam at the CERN North Area, and the final design for Run 3. Details about the fused silica fibers properties and the photomultiplier tubes will also be discussed.

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