

Abstract Submitted  
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**A Centrality and Event Plane Detector for STAR to Complete the Phase Diagram of Quantum Chromodynamics.** GEORGE HALAL, Lehigh University, STAR COLLABORATION — The properties of the nearly perfect liquid, Quark Gluon Plasma (QGP), which filled the universe a microsecond after the Big Bang are studied by colliding heavy-ions at relativistic energies. Our project focuses on building and testing an Event Plane Detector (EPD) for the STAR experiment and analyzing the data collected from collisions. When a minimum ionizing particle hits one of the optically-isolated tiles of this detector, which are made of scintillator plastic, it lights up. The light then travels through a wavelength-shifting fiber embedded in the tile to a clear optical fiber to be detected by silicon photo-multipliers. This detector is an improved version of the Beam-Beam Counter, which is currently at STAR. It will help us measure the centrality and event plane of collisions with more precision. Data collected will aid us in mapping out the transition phase between the QGP and hadronic matter, which evolved into the chemical elements we see today, and in searching for a unique critical point in the phase diagram of Quantum Chromodynamics matter. In 2017, a commissioning run has taken place at RHIC, colliding protons at 510 GeV and gold ions at 54.4 GeV. Some data analysis from one eighth of the EPD that is installed will also be discussed.

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