An Improved Event Plane Detector for the STAR Experiment

The Beam Energy Scan (BES) program at the Relativistic Heavy-Ion Collider has shown hints of a critical point and first order phase transition at the BES energies. Key measurements for locating the critical point and determining the first order phase transition are limited by poor event plane resolution, limited statistics and a TPC-only centrality determination. Therefore, phase II of the BES program was proposed to take data with upgraded detectors and increased statistics for the further investigation. A new event plane and collision centrality detector (EPD) is planned to replace the existing detector, the Beam-Beam Counter (BBC), with higher granularity and acceptance. The design of the EPD consists of two scintillator discs at z= \pm 3.75m from the center of STAR, covering 2.2 $< \eta <$ 5.1, the same as the BBC. The detector will be read out by silicon photomultipliers (SiPM) - an inexpensive and magnetic field insensitive replacement for the traditional phototube. A prototype of the detector, consisting of a single sector was integrated into STAR during the 2016 run, the results of which will be shown. The geometry and segmentation of the design optimizes event-plane resolution, centrality determination and flow harmonic measurements. We will discuss the plans to install one quarter of a disc into STAR for the 2017 run.

Preferred Track

Future Experimental Facilities, Upgrades, and Instrumentation

Collaboration

STAR

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