

New centrality determination for Beam Energy Scan II at STAR and its effect on measurements of fluctuations

Yuri Sato (for the STAR Collaboration)

Fluctuations of conserved quantities, such as net baryon, net charge or net strangeness are considered to be a powerful tool to search for the critical point on the QCD phase diagram. STAR reported a non-monotonic energy dependence of the forth-order net-proton fluctuations at $\sqrt{s_{NN}} = 7.7 - 39$ GeV, which could be a signature of the critical point.

In order to further investigate this behavior, Beam Energy Scan II (BES-II) has been carried out since 2019, focusing on lower collision energies. In BES-II, for improved physics measurements that depend on collision centrality and reaction plane angle, the Event Plane Detector (EPD) is newly installed in forward and backward rapidity regions, which is expected to be a new centrality detector having less autocorrelation effect with respect to the measurements at midrapidity. In this presentation, new centrality determinations by the EPD and its influences on fluctuation measurements will be discussed for Au+Au collisions at $\sqrt{s_{NN}} = 27$ GeV.