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Centrality determination with the Event Plane Detector for fluctuation measurements from STAR

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Event-by-event fluctuation of conserved quantities such as net baryon, net strangeness or net charge is considered to be a powerful tool to find the critical point (CP) on the Quantum Chromodynamics (QCD) phase diagram. To map out the QCD phase diagram, the Beam Energy Scan I (BES-I) program has been carried out at RHIC and non-monotonic behavior of the 4th-order net-proton cumulants was found around low collision energy, which could be a signature of the CP. In order to further investigate the behavior of conserved quantities, BES-II has started in 2019 focusing on lower collision energies. For the experiment, a new detector named Event Plane Detector (EPD) was installed. The EPD is a scintillation detector located in the large rapidity region and expected to improve the determination of collision centrality with less self-correlation effect in the fluctuation measurements. In this poster, results of fluctuation measurements in Au+Au collisions at $\sqrt{s_{\mathrm{NN}}} = 27$ GeV will be shown and new centrality determination with the EPD will be discussed.

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