

# Centrality Determination for fluctuation measurements in

$\sqrt{s_{NN}} = 27$  GeV Au+Au Collisions at RHIC-STAR

## Experiment

Yuri Sato (for the STAR Collaboration)

University of Tsukuba

1 Event-by-event fluctuations of conserved quantities such as net baryon, net strangeness  
2 or net charge is considered to be a powerful tool to find the critical point (CP) on the  
3 Quantum Chromodynamics (QCD) phase diagram. To map out the QCD phase diagram,  
4 the Beam Energy Scan I (BES-I) program was performed at RHIC and non-monotonic  
5 energy dependence of the forth-order net proton fluctuations was found around low  
6 collision energy, which could be a signature of the CP.

7 In order to further investigate the behavior of conserved quantities, BES-II has been  
8 carried out since 2019 focusing on lower collision energies. For the experiment, a new  
9 detector named Event Plane Detector (EPD) was installed. The EPD is a scintillation  
10 detector located in the forward rapidity region and expected to be a new centrality detector  
11 with less autocorrelation effect in the fluctuation measurements. In this presentation, results  
12 of fluctuation measurements in Au+Au collisions at  $\sqrt{s_{NN}} = 27$  GeV will be shown and new  
13 centrality determination with the EPD will be discussed.