

Collision energy dependence of mean transverse momentum fluctuations in Au + Au collisions at STAR

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Abstract

Event-by-event measurements play a crucial role in understanding the high-energy nuclear interaction dynamics and the properties of hot and dense medium. Fluctuations of the event-wise average transverse momentum are related to event-by-event fluctuations of the size and entropy of the initial source. In this poster, we present the first multi-particle cumulant of p_T correlations and its variance, skewness, and kurtosis as a function of event centrality for Au + Au collisions in $\sqrt{s_{NN}}$ = 19.6, 27, 39, 54.4 GeV at high statistics from the first and second phase of RHIC Beam Energy Scan. These results are useful to constrain QGP initial conditions and its fluctuations across different collision energies.



Slight energy dependence is observed in peripheral collisions.

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Collision	Events number	year
54.4 GeV	765 M	2017
39 GeV	105 M	2010
27 GeV	389 M	2018
19.6 GeV	423 M	2019

The STAR detector enables a broad range of physics measurements.



- 1. With increasing charge-multiplicity the normalized correlators of variance and skewness decrease in magnitudes.
- 2. Slight energy dependence is also observed.

Summary

- 1. The energy dependence in the measured correlators is observed: the higher the collision energy, the stronger the correlation.
- 2. All order of the correlators are seen decreased more and more slowly as a function of the collision centrality.
- The results are useful to further understand initial 3. conditions and EbE fluctuations across different collision energies.

References

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