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Event by event multiplicity fluctuations in the statistical model

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Thermal fluctuations are important baselines in search of the critical point for the RHIC beam energy scan program. In this work, we prove that the traditional Poisson distributions in the statistical model are translated into the negative-binomial-like distributions in the event-by-event measurements. With the modified multiplicity distributions, we suggest how to construct the basic statistical expectations for the high moments of multiplicity distributions in experiment. Meanwhile, we also calculate the approximate solutions of these high moments and show that this solution can qualitatively or quantitatively describe most of the observables related to multiplicity fluctuations (e.g., the scale variance, the mean value saturation and variance decreasing in most central collisions, the centrality resolution effect, et. al.)

On behalf of collaboration:

NONE

Primary author: XU, Haojie

Co-author: SONG, Huichao

Presenter: XU, Haojie

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