

Quark Matter 2019 - the XXVIIIth International Conference on Ultra-relativistic Nucleus-Nucleus Collisions



Contribution ID: 361

Type: Oral Presentation

The QCD phase diagram and statistics friendly distributions

Wednesday 6 November 2019 10:00 (20 minutes)

We demonstrate that the bimodal proton multiplicity distribution, possibly present close to the QCD first order phase transition (or the QCD critical point), reproduces the preliminary data for the proton cumulants measured by the STAR collaboration at 7.7 GeV very well. This model then predicts very large values for the fifth, sixth and higher order factorial cumulants. We argue that the bimodal distribution is statistics friendly and can be successfully measured in terms of the factorial cumulants of surprisingly high orders with a relatively small number of events.

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Session Classification: Parallel Session - Search for the CP II

Track Classification: Search for the critical end point