XLVII International Symposium on
Multiparticle Dynamics (ISMD2017)
September 11-15, 2017, Tlaxcala City, Mexico

Contribution ID : **75** Type : **not specified**

Bayesian parameter estimation for heavy-ion collisions: inferring properties of the quark-gluon plasma

Thursday, 14 September 2017 12:15 (0:25)

Content

Relativistic heavy-ion collisions provide an optimal test bed to study bulk and collective properties of hot and dense nuclear matter above the QCD critical point where hadrons melt to form a quark-gluon plasma. Simulations of the collisions, which couple relativistic hydrodynamics to microscopic transport models, allow theorists to recreate the full spacetime evolution of the events and determine the effect of tuneable theory parameters on observed particle spectra and multiparticle correlations. In this talk, I describe efforts to run the modeling problem in reverse, and use experimental measurements to determine the physical properties of QCD matter using Bayesian methodology. Specifically, I focus on the methodology's application to studying the initial stages of the collision where theoretical uncertainties in underlying particle production mechanisms are large. Our results indicate that these entropy deposition mechanisms are highly constrained by experimental measurements once analyzed within a global statistical framework.

Session

Collectivity in high energy collisions

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Session Classification : Collectivity in high energy collisions: jets, flow and other aspects (II)