Event-by-Event Fluctuations in Relativistic Heavy-Ion Collisions

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Abstract

Event-by-event fluctuations in ultrarelativistic heavy-ion collisions are calculated for particle multiplicities, ratios, transverse momenta, rapidity, etc. in participant nucleon as well as thermal models. These models apply to peripheral and central collisions respectively and the centrality dependence can determine the degree of thermalization. Comparison to SPS data and predictions for RHIC and LHC energies are given. The centrality dependence with and without a phase transition to a quark-gluon plasma is discussed - in particular, how the physical quantities are expected to display a qualitative different behavior in case of a phase transition, signaled by anomalous fluctuations and correlations in a number of observables.

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