

XIV Polish Workshop on Relativistic Heavy-Ion Collisions: Interplay between soft and hard probes of heavy-ion collisions



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Multiplicity fluctuations in the dynamical clusterization model

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We discuss the recently measured event-by-event multiplicity fluctuations in relativistic heavy-ion collisions. It is shown that the observed non-monotonic behaviour of the scaled variance of multiplicity distribution as a function of collision centrality (such effect is not observed in a widely used string-hadronic models of nuclear collisions) can be fully explained by the correlations between produced particles promoting cluster formation. We define a cluster as a quasi-neutral gas of charged and neutral particles which exhibits collective behaviour. The characteristic space scale of this shielding is the Debye length. We split a Canonical Ensemble or a Micro Canonical Ensemble with a very large volume into cluster, which is by definition, a Grand Canonical Ensemble, with the rest of the system acting as a reservoir. $P(N)$ in a cluster is given by Negative Binomial distribution while the rest (reservoir), treated as a superposition of elementary collisions, is described by Binomial distribution. The ability to generate spatial structures (cluster phase) sign the propensity to self-organize of hadronic matter.

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