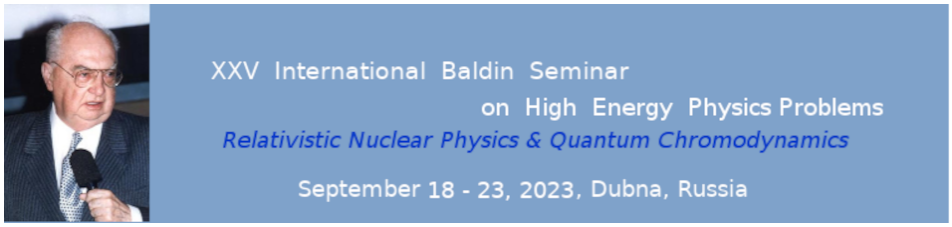

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On a signature of phase transition in heavy ion nuclear matter

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We present some results of analysis of hadron production in pp and AA collisions obtained in the framework of z-scaling and discuss a possible signatures of a phase transition in nuclear matter. This approach allows to systematically analyze experimental data on inclusive cross sections over a wide range of the collision energies, multiplicity densities, transverse momenta, and angles of various particles. The concept of the z-scaling is based on the principles of self-similarity, locality and fractality reflecting general features of particle interactions. The self-similarity variable z is a function of the momentum fractions x_1 and~x_2 of the colliding objects carried by interacting hadron constituents and depends on the fractions y_a and y_b of the scattered and recoil constituents carried by the inclusive particle and its recoil counterpart. The scaling function $\psi(z)$ is expressed via inclusive cross-section, multiplicity density and three model parameters. Structure of the colliding objects and fragmentation processes is characterized by the structural and fragmentation fractal dimensions δ and ϵ, respectively.
The produced medium is described by a "specific heat" c.

The energy and centrality dependence of K^0_S-meson spectra measured by the STAR Collaboration at RHIC in $Au + Au$ collisions over a wide range of $\sqrt{s_{NN}} = 7.7 - 200$~GeV was studied in the z-scaling approach. The scaling function $\psi(z)$ was constructed and the self-similarity of K^0_S-meson production was confirmed. Anomalous behavior of "specific heat" c_{AuAu} and fractal entropy in dependence of collision energy was found. The non-trivial dependence of c_{AuAu} on the collision energy shows that K^0_S meson is much more sensitive to properties of nuclear medium than a non-identified negative hadron A non-trivial dependence of fractal entropy $S_{\delta,\epsilon}$ on the collision energy with decreasing p_T was found. It reflects the irregularity of the behavior of the specific heat c_{AuAu}. The irregularities in the behavior of specific heat parameter c_{AuAu} and fractal entropy $S_{\delta,\epsilon}$ considered as a possible indication of phase transition in nuclear matter are discussed.

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