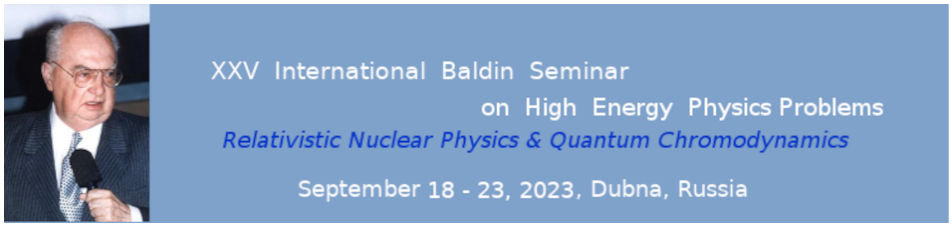

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Model investigation of transverse cumulants of different orders in nuclear-nuclear collisions

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The study of the correlation between the multiplicity of charged particles and the average transverse momentum was carried out in proton-proton and nucleus-nucleus collisions from the SPS energy to the LHC energy [1]. Extending the experimental data from negative correlations at energies $\sqrt{s}$ = 17–40 GeV to lower energies can lead to significant limitations for various theoretical models. Previously, in the SMASH, EPOS, UrQMD, and PHSD models for proton-proton collisions, nontrivial dependences of strongly intense variables on the collision energy were obtained, namely, for Δ[pt, N] [2] and <N>D [pt, N] [3]. The analysis also included the study of second and third order cumulants for the transverse momentum. Their energy dependences deviate from the model of independent sources, which is confirmed by experimental data obtained as a result of an Au+Au collision at an energy of 200 MeV [4]. In the SMASH model for proton-proton collisions, both for strongly intense variables and for cumulants, a certain "wave"appears, which can be evidence of a transition from resonance to strings. In this paper, we will study the dependences of strongly intense variables and cumulants on the energy of nucleus-nucleus in collisions, namely Bi+Bi. Two research methods for highly intense variables and cumulants will be proposed: a direct method for studying correlations and a sub-event method. The direct method of research has already been carried out earlier: in this method, research is carried out over the entire interval of pseudorapidity. In the subevent method, it is supposed to analyze strongly intense variables and cumulants of the second and third order in two different intervals in terms of pseudorapidity, as well as their dependence with a change in the distance between these two intervals, which will allow us to estimate the contribution of short-range correlations. A comparison of these two methods will be presented for all four models: SMASH [5], EPOS [6], UrQMD [7], and PHSD [8].

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1. N. Armesto, D. A. Derkach, G. A. Feofilov, p(t)-multiplicity correlations in a multi-Pomeron-exchange model with string collective effects // Phys. Atom. Nucl. 2008. V. 71 P. 2087
2. M. I. Gorenstein, M. Gaździcki, Strongly intensive quantities // Phys. Rev. C, 2011, V. 84, P. 014904
3. X.-N. Wang, M. Gyulassy, HIJING: A Monte Carlo model for multiple jet production in pp pA and collisions //Phys. Rev. D., 1992, V. 44. P. 3501
4. M. Cody, S. Gavin et. al., Complementary Two-Particle Correlation Observables for Relativistic Nuclear Collisions // Phys. Rev. C, 2023, V. 107, P. 014909
5. J. Weil, V. Steinberg et. al., Particle production and equilibrium properties within a new hadron transport approach for heavy-ion collisions // Phys. Rev. C, 2016, V. 94, P. 054905
6. T. Pierog, I. Karpenko et. al. , EPOS LHC: Test of collective hadronization with data measured at the CERN large hadron collider // Phys. Rev. C, 2015. V. 92 P.034906
7. M. Bleicher, E. Zabrodin et. al., Relativistic hadron-hadron collisions in the ultra-relativistic quantum molecular dynamics model // Jour. of Phys. G, 1999, V. 25, P. 1859.

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