Contribution ID : **42** Type : **Oral talk**

NON-EQUILIBRIUM HYDRODYNAMIC APPROACH AND EMISSION OF HIGH-ENERGY SECONDARY PARTICLES IN COLLISIONS OF HEAVY IONS OF INTERMEDIATE ENERGIES

Thursday, 1 December 2022 17:30 (15)

A.T. D'yachenko[1,2]

[1] National Research Center "Kurchatov Institute" B.P. Konstantinov Petersburg Nuclear Physics Institute, Gatchina, Russia; [2] Emperor Alexander I Petersburg State Transport University, St. Petersburg, Russia

We managed to completely describe the spectra of cumulative protons, pions and photons for the collision of carbon nuclei with a beryllium target in the energy range of 0.3-3.2 GeV per nucleon obtained in the ITEP experiments [1,2,3]. To do this, it was proposed to solve the kinetic equation together with the solution of the equations of hydrodynamics [4, 5]. When describing these spectra, the correction for the microcanonical distribution [4, 5] was taken into account, and the contribution of the fragmentation process was also taken into account for the proton yields. It is shown that our description of the experimental data is better than the cascade models and the quantum molecular dynamics (QMD) model built into the GEANT4 package and the HSD (hadron string dynamics) model [6]. Our approach is applicable to collisions of both light and heavy nuclei, which can be seen from a comparison of the description of the proton distributions in transverse momentum in the Au+Au reaction at an energy of 1.48 GeV per nucleon with experimental data and other theoretical approaches based on solving the Boltzmann equation, the model of quantuml molecular dynamics, etc. [7]. This can be extended to the energy range of the accelerator complex NICA located at the JINR (Dubna) in order to study the quark-gluon plasma The contribution of the effects of short-range correlations (SRC), which has recently received much attention [8], was also studied by us. As a result, it turned out that these effects are included in our approach, since we successfully describe the experimental data on the spectra of hard photons [9], which are described in [8] with the addition of a high-momentum component.

1.B.M. Abramov et al., Phys. Atom. Nucl. 78, 373 (2015).

2.I.G. Alekseev et al., Phys. Atom. Nucl. 78, 936 (2015)

3 B.M. Abramov et al, Phys. Atom. Nucl. 84, 467 (2021).

4.A. T. D'yachenko, I. A. Mitropolsky, Phys. Atom.Nucl. 83, 558 (2020).

5.A. T. D'yachenko, I. A. Mitropolsky, EPJ Web Conf. 204, 03018 (2019)

6 W. Cassing, E. Bratkovskaya, Phys. Rept. 308, 65 (1999).

7.E. E. Kolomeitsev et al. J Phys. G 31 741(2005)

8.W.M. Guo, B.A. Li, G.C. Yong, Phys. Rev. C 104.034603 (2021)

9.J. Stevenson et al., Phys. Rev. Lett. 57, 555 (1986).

Primary author(s) : Prof. D'YACHENKO, Alexander (Petersburg State Transport University)

Presenter(s) : Prof. D'YACHENKO, Alexander (Petersburg State Transport University)

Session Classification : Heavy Ion Physics

Track Classification : Heavy ion physics