NEUTRAL KAON PRODUCTION IN p+p, d+Au AND Cu+Cu COLLISIONS AT 200 GeV

Kotov D.O.[1], Berdnikov A.Ya.[1], Samsonov V.M.[1,2], Riabov V.G.[2], Riabov Yu.G.[2], Ivanishchev D.A.[2]

[1]*St. Petersburg State Polytechnical University, Saint-Petersburg, Russia;*

[2]*Petersburg Nuclear Physics Institute, Russian Research Center "Kurchatov Institute", Gatchina, Russia*

E-mail: riabovvg@gmail.com

At very high energy densities, exceeding approximately 1 GeV/fm quantum chromodynamics predicts a phase transition from ordinary hadronic nuclear matter to a new state of matter where the degrees of freedom are quarks and gluons. This state of matter exhibits very strong coupling between its constituents and is thus called the strongly coupled Quark-Gluon Plasma [1]. Matter at such high energy density can be produced in laboratory conditions by colliding heavy nuclei at relativistic energies. A wealth of measurements is available from the experiments at the Relativistic Heavy Ion Collider [2].

The PHENIX experiment [3] at the Relativistic Heavy Ion Collider performed a systematic study of the K^0_s and K^{*0} meson production at mid-rapidity in p + p, d+Au and Cu+Cu collisions 200GeV. The measured production spectra are used to determine the nuclear modification factors of K^0_s and K^{*0} mesons in d+Au and Cu+Cu collisions at different centralities. In the d +Au system, the nuclear modification factor of K^0_s and K^{*0} mesons is almost constant as a function of transverse momentum and is consistent with unity showing that cold nuclear matter effects do not play a significant role in the measured kinematic range. In the Cu+Cu system, no nuclear modification is registered in peripheral collisions within the uncertainties. In central collisions, both mesons show suppression relative to the expectations from the p + p yield scaled by the number of binary collisions. In the p_T range 2–5 GeV/c, the strange mesons show an intermediate suppression between the more suppressed light quark mesons and the non-suppressed baryons. At higher transverse momentum all particles, light quark mesons, strange mesons and baryons, show a similar level of suppression.

1. J.Bjorken *et al.* // Phys. Rev. D. 1983. V.27. P.140.
2. G.Baym // Nucl. Phys. A. 2002. V.698. P.23.
3. K.Adcox *et al.* // Nucl. Instrum. Meth. A. 2003. V.499. P.469.