Pion femtoscopy in Au+Au collisions at $\sqrt{s_{NN}} = 3$ GeV in the STAR experiment

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There is a method that allows directly measuring the spatio-temporal extent of the region where hadrons are emitted and the parameters of the nuclear-nuclear interaction, called femtoscopic correlation [1]. In heavy-ion collisions, femtoscopy is an important tool for studying the geometric and dynamic characteristics of the emission region.

Two-particle momentum correlations of identical particles in nuclear-nuclear collisions make it possible to extract femtoscopic parameters (radii of emission region, R, and correlation strength, λ) [2]. Reaction dynamic is reflected in the femtoscopic radii dependence on pair transverse momentum, k_T.

This work is devoted to the study of two-particle momentum correlations of identical pions produced in collisions of gold nuclei in the STAR experiment at the RHIC at $\sqrt{s_{NN}} = 3$ GeV. The extracted three-dimensional femtoscopic radii (R_{out}, R_{side}, R_{long}) are measured as a function of collision centrality and transverse momentum of the pairs.

References:

[1] Podgoretsky M.I. Interference correlations of identical pions, Sov. J. Nucl. Phys. – 1989. – V.20. – P.3.

[2] Lisa M.A. et al. Femtoscopy in relativistic heavy ion collisions: two decades of progress, Annu. Rev. Nucl. Part. Sci. – 2005. – V.55. – P.357.