Femtoscopic probes in collisions of small and large systems from STAR

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One of the goals of ion-ion collision studies is to understand mechanism of particle production and reveal the properties of particle-emitting source. A quark-gluon matter, produced in collisions of relativistic heavy ions at high energies ($\sqrt{s_{NN}}$≥62.4 GeV), undergoes a rapid transition to the hadronic matter known as crossover [1]. At lower collision energies it is expected that the phase transition will be of the first order [2] that also implies an existence of the critical point [3]. The change of phase transition type may be imprinted on the spatial and temporal properties of the particle-emitting source. The correlation femtoscopy method, based on the measurement of two-particle momentum correlations arising due to the quantum statistical correlations, is designed to access space-time extents of the fireball [4]. In addition to the large collision systems, it is also important to obtain the information about the particle production mechanism in small collision systems.

In this talk, we report the results of the two-particle femtoscopic correlations measured in collisions of small and large systems (including p+Au and Au+Au) from the STAR experiment at RHIC. The physics implications will be discussed.

References:

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