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Kaon femtoscopy at the STAR experiment

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The properties of the quark-gluon plasma have been extensively studied in high-energy nuclear collisions at RHIC. In particular the Beam Energy Scan, a research program capitalizing on RHIC's unique capability to vary the collision energy from 7.7 to 200GeV, presents an unprecedented opportunity to study the phase diagram of the strongly interacting matter.

Femtoscopic measurements of two-particle correlations at small relative momenta reveal the space-time characteristics of the system at the moment of particle emission.
In comparison to analyses using the most abundant pions, like-sign kaons provide a cleaner probe of the emission source as they less frequently result from resonance weak decays. Additionally, kaons contain strange quarks so these measurements can be sensitive to different effects and earlier collision stages.

Pairs of like-sign kaons exhibit correlations due to Coulomb interactions and Bose-Einstein quantum statistics. The system of unlike-sign kaons contains a narrow $\phi(1020)$ resonance in the final state. Femtoscopic measurements have been predicted to be particularly sensitive to the source size and momentum-space correlations in the region of this resonance.

In this talk I will present the STAR preliminary results on femtoscopic correlations of like-sign kaons in Au+Au collisions from the RHIC Beam Energy
Scan program. I will also report on STAR analysis of unlike-sign kaons femtoscopic correlations in Au+Au collisions at $\sqrt{s_{\rm NN}} = 200$ GeV. The experimental results will be compared to theoretical predictions.

Summary

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