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Non-identical kaon femtoscopy at STAR experiment

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Experiments with high-energy heavy-ion collisions study properties of nuclear matter and its transition from hadrons to a state of deconfined quarks and gluons called the Quark-gluon plasma. Femtoscopic measurements of two-particle correlations at small relative momenta reveal the space-time characteristics of the system when the particles in the pair are emitted. The correlations result from quantum statistics, final-state Coulomb interactions, and the strong final-state interactions between the emitted particles.

It has been predicted that correlations due to the strong final-state interactions in a system where a narrow resonance is present will be sensitive, in the region of the resonance to the source size and momentum-space correlations. Such a measurement can provide complementary information to the measurements at very low relative momenta. Pair of unlike-sign kaons are ideally suited for such a measurement, since the system contains a narrow $\phi(1020)$ resonance.

This work presents first systematic study of unlike-sign kaon correlation function, including the region of the resonance, using STAR data from Au+Au collisions at $\sqrt{s_{\mathrm{NN}}}$= 200 GeV. The experimental results are compared to theoretical predictions that include the treatment of resonance formation due to final-state interactions.

Sekce

Částicová a jaderná fyzika

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