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# Angular Correlations Study of Identified Hadrons in the STAR Beam Energy Scan Program

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The angular correlation function (CF) refers to the correlation of particles in the relative pseudorapidity ($\Delta\eta$) and relative azimuthal angle ($\Delta\phi$). CF is influenced by various physical phenomena such as conservation laws, collective particle flow, resonance decays, final state interactions, or particle production mechanism - e.g., correlation of particles within the single jet. By analysis of long-range correlations (of pairs with $\Delta\eta \geq$1.0) it is possible to access the early stage of the system created during heavy-ion collision and its longitudinal and azimuthal dynamics.

The STAR Beam Energy Scan data allows one to perform a detailed CF analysis to investigate the phase diagram of strongly interacting matter. Recently [1] STAR reported an angular correlation measurements of $\pi$-$\pi$, K-K, and p-p pairs with $\Delta\eta \leq$1 in 0-5% central Au+Au collision at $\sqrt{s_{NN}}$ = 7.7-200 GeV. These results show a significant difference between CF of given particle species combinations.

In this poster, we extend this results to $\Delta\eta \leq 2$, which allows for analysis of long-range correlations of $\pi$-$\pi$, K-K, and p-p pairs. We describe the data by fitting a multi-component function. Such an approach allows for disentanglement of various correlation sources. The study is conducted in nine centrality classes (70-80%, 60-70%, 50-60%, 40-50%, 30-40%, 20-30%, 10-20%, 5-10% and 0-5%) of Au+Au collisions at $\sqrt{s_{NN}}$ between 7.7 and 200 GeV. The collision energy and centrality dependence of the best fit-to-data function parameters, describing short- and long-range correlations, will be presented.

Reference
[1] S. Jowzaee (for the STAR Collaboration), Nucl. Phys. A967, 792 (2017).

## Content type

Experiment

## Collaboration

STAR

## Centralised submission by Collaboration

Presenter name already specified

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