Femtoscopic correlation studies between D^0 mesons and charged hadrons in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV by STAR

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Heavy quarks are produced in hard partonic scatterings at the very early stage of heavy-ion collisions and they experience the whole evolution of the Quark-Gluon Plasma medium. Femtoscopic correlations, i.e. two-particle correlations at low relative momentum, are sensitive to the final-state interactions as well as to the extent of the region from which the correlated particles are emitted. A study of such correlations between charmed mesons and identified charged hadrons could shed light on their interactions in the hadronic phase and the interaction of charm quarks with the medium.

In this presentation, we will show the first measurement of femtoscopic correlations between $D^0 - hadron$ pairs at mid-rapidity in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV by the STAR experiment. D^0 mesons are reconstructed via the $K^- - \pi^+$ (and its charge conjugate) decay channel using topological criteria enabled by the Heavy Flavor Tracker with excellent track pointing resolution. We will present the femtoscopic correlation function for D^0 transverse momentum above 1 GeV/c in the $0 - 80\%$ centrality. We will also compare the experimental results with available theoretical models and discuss physical implications.