

ID de Contribution: 197

Type: Talk

[*] First measurement of heavy flavour femtoscopy using D^0 mesons and charged hadrons in Au+Au collisions at $\sqrt{s_{NN}} = 200\sim\text{GeV}$ by STAR

mardi 4 juin 2024 17:10 (20 minutes)

Heavy quarks are produced in hard partonic scatterings at the very early stage of heavy-ion collisions and 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 and to the space-time extent of the region from which the correlated particles are emitted. A study of such correlations between the 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 - charged hadron pairs at mid-rapidity in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV using the data taken in the years 2014 and 2016 by the STAR experiment. D^0 (\bar{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 compare the experimental results with available theoretical models to discuss their physics implications.

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Classification de Session: Track2-HF&Q

Classification de thématique: Heavy-Flavours & Quarkonia