

# First measurement of $D^0 - \bar{D}^0$ azimuthal correlations in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV at STAR

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1 Heavy quarks are produced at the very early stage of heavy-ion collision, and they experience  
2 the whole evolution of the system created in this reaction. Thus, they are excellent probes that can  
3 be used to study various stages of the collision, such as the Quark-Gluon Plasma (QGP) phase,  
4 the hadronization mechanism, and more. So far, measurements of the nuclear modification factor  
5 and elliptic flow of charmed mesons in heavy-ion collisions at the Relativistic Heavy Ion Collider  
6 (RHIC) and the Large Hadron Collider indicate that charm quarks interact strongly with the QGP.  
7 However, the nature of the charm-medium interaction has not yet been completely understood.  
8 Thus, new observables are needed to constrain theoretical models and the charm quark diffusion  
9 coefficient in the QGP.

10 Measurements of azimuthal correlations of charmed mesons in high-energy heavy-ion collisions  
11 can shed light on the transport properties of the QGP. They may help to pin down the relative  
12 role of the energy loss mechanisms for charm quarks. The STAR experiment at RHIC collected  
13 in 2014 and 2016 a large sample of Au+Au reactions at  $\sqrt{s_{NN}} = 200$  GeV, making such a study  
14 possible.

15 We will present the azimuthal correlations of  $D^0 - \bar{D}^0$  pairs measured by the STAR experiment  
16 at mid-rapidity in Au+Au collisions at  $\sqrt{s_{NN}} = 200$  GeV using high-statistics data collected in  
17 2014 and 2016. We will compare the experimental results with Monte-Carlo model predictions and  
18 discuss their physics implications.