

1 First measurement of heavy flavour femtoscopy  
2 using  $D^0$  mesons and charged hadrons in Au+Au  
3 collisions at  $\sqrt{s_{NN}} = 200$  GeV by STAR

4 Priyanka Roy Chowdhury (for the STAR collaboration)

5 Warsaw University of Technology, Poland

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

14 In this presentation, we will show the first measurement of femtosopic cor-  
15 relations between  $D^0$ - charged hadron pairs at mid-rapidity in Au+Au collisions  
16 at  $\sqrt{s_{NN}} = 200$  GeV using the data taken in the years 2014 and 2016 by the  
17 STAR experiment.  $D^0$  ( $\bar{D}^0$ ) mesons are reconstructed via the  $K^- - \pi^+$  (and its  
18 charge conjugate) decay channel using topological criteria enabled by the Heavy  
19 Flavor Tracker with excellent track pointing resolution. We will present the fem-  
20 toscopic correlation function for  $D^0$  transverse momentum above 1 GeV/c in  
21 the 0 – 80% centrality. We will compare the experimental results with available  
22 theoretical models to discuss their physics implications.