Measurement of $D^{\pm}$ meson production in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV with the STAR experiment

Jan Vanek
(for the STAR collaboration)

Nuclear Physics Institute,
Czech Academy of Sciences

Charm quarks are an excellent probe of the quark-gluon plasma created in heavy-ion collisions as they are produced at very early stages of such collisions and subsequently experience the whole evolution of the system. At STAR experiment, charm quark production can be accessed by direct topological reconstruction of open-charm hadrons thanks to an excellent track pointing resolution provided by the Heavy Flavor Tracker.

In this talk, we will present a measurement of $D^{\pm}$ meson production in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV by STAR using data collected in 2014 and 2016. Supervised machine-learning techniques were used to optimize the yield extraction from the three body hadronic decay channel $D^{\pm} \to K^{\mp}\pi^{\pm}\pi^{\pm}$. The $D^{\pm}$ invariant spectra were then obtained in 0-10%, 10-40%, and 40-80% central Au+Au collisions. The measured nuclear modification factor R_{AA} as a function of transverse momentum (p_T) reveals a significant suppression of high-p_T $D^{\pm}$ mesons in central and mid-central Au+Au collisions with respect to p+p collisions. The $(D^+ + D^-)/(D^0 + \overline{D^0})$ yield ratio has also been extracted and compared to that from PYTHIA calculations.