Measurements of open charm hadrons in Au+Au collisions at $\sqrt{s_{\mathrm{NN}}} = 200$ GeV by the STAR experiment

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At RHIC energies, charm quarks are primarily produced at early stages of ultra-relativistic heavy-ion collisions, in hard partonic scatterings. This makes them an excellent probe of the Quark-Gluon Plasma (QGP) since they experience the whole evolution of the hot and dense medium. STAR is able to measure the production of charm quarks and their interaction with the QGP through direct reconstruction of hadronic decays of $\mathrm{D}^{\pm}$, D^0, $\mathrm{D_S}$, and $\Lambda_\mathrm{c}^{\pm}$ hadrons. This is possible thanks to an excellent vertex resolution provided by the Heavy Flavor Tracker.

In this talk, we will present the most recent results on open charm hadron production from the STAR experiment. In particular, we will discuss the nuclear modification factors of $\mathrm{D}^{\pm}$ and D^0 mesons which give access to the charm quark energy loss in the QGP, and also $\mathrm{D_S}/\mathrm{D}^0$ and $\Lambda_\mathrm{c}^{\pm}/\mathrm{D}^0$ yield ratios as functions of transverse momentum and collision centrality which help us better understand the charm quark hadronization process in heavy-ion collisions. In addition, we will present the rapidity-odd directed flow of D^0 mesons, which can be used to probe the initial tilt of the QGP bulk and effects of early-time magnetic field.