

Measurement of directed flow of D^0 and \bar{D}^0 mesons in 200 GeV Au+Au collisions at RHIC using the STAR detector

Tuesday 2 October 2018 10:45 (20 minutes)

Charm quarks, owing to their large mass, are produced predominantly during the initial hard scatterings in heavy-ion collisions and therefore can be a valuable tool to study the early time dynamics of these collisions. The rapidity odd directed flow of particles produced at mid-rapidity in heavy-ion collisions originates from a tilt in the reaction plane of the thermalized medium caused by the asymmetry between number of participants from projectile and target nuclei as a function of rapidity. Recently, it has been predicted that the slope of the directed flow at mid-rapidity for D^0 mesons, arising from the transport of charm quarks in the tilted medium, can be several times larger than that of light flavor hadrons. The magnitude of the slope is expected to be sensitive to the magnitude of the tilt and the charm quark drag coefficient in the medium. It has also been predicted that the transient electromagnetic field generated at early time can induce a much larger directed flow for heavy quarks than for light quarks. In this talk, we will report on the first measurement of the directed flow for the D^0 and \bar{D}^0 mesons as a function of rapidity in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV using high statistics data collected with the Heavy Flavor Tracker in 2014 and 2016 RHIC runs. The results will be compared to those of light flavor hadrons and model predictions, and the physics implications of these measurements will be discussed.

Summary

Author: HE, Liang (Purdue University)

Presenter: HE, Liang (Purdue University)

Session Classification: Parallel 3