Partonic effects on the charm azimuthal correlations in relativistic p + p collisions

Wednesday, 14 August 2024 15:10 (15 minutes)

Measurements of heavy flavor quark correlations in heavy-ion collisions are crucial to understand the flavor dependence of quark energy loss mechanisms in hot and dense QCD matter. In addition to the heavy-ion collisions, experimental measurements of heavy flavor correlations in p+p collisions can provide insights into the contributions of perturbative and non-perturbative QCD processes to the correlation functions and further help in interpreting correlation measurements in heavy-ion collisions. In this study, we investigate charm quark and D-meson correlations using PYTHIA Event Generator and a multiphase transport model (AMPT). By introducing a transport model approach with partonic rescatterings connecting to the initial conditions provided by PYTHIA event generator, effects of the partonic collisions on the charm azimuthal correlations in relativistic p+p collisions are investigated. It is found that the partonic collisions during the lifetime of the partons enhance the away-side correlation and suppress the near-side correlation, whereas hadronization and final state hadronic interactions bring tiny effect to the azimuthal correlations. These findings indicate that partonic effect plays an important role in the azimuthal correlations of heavy flavor particles in relativistic p+p collisions. Our study offers insights into the future experimental measurements of heavy quark correlation at RHIC and LHC energies.

Primary author: 虞, 晓宙 (Fudan University)

Co-authors: MA, Long (Fudan University); MA, Guo-Liang (Fudan University); HUANG, Huan Zhong (Fudan University/UCLA)

Presenter: 虞, 晓宙 (Fudan University)

Session Classification: 分会场三

Track Classification: 重离子物理