

Quantifying jet quenching and medium response with two particle correlations with PHENIX

Wednesday 8 January 2025 09:30 (30 minutes)

As energetic partons produced in heavy-ion collisions traverse the quark-gluon plasma, they lose energy before fragmenting into a jet of particles such that the observed jet is modified compared to jets produced in p+p collisions. In heavy-ion collisions, the number of jets observed is suppressed and the distribution of particles or energy within the jet is modified compared to expectations from p+p collisions. In addition, the parent partons of jets can influence the QGP as they traverse it, eliciting medium responses also measurable in jet observables.

By measuring all the hadrons associated with a high momentum photon or jet constituent, we can access both the jet particles and the correlated medium effects. Free from any biases introduced by a jet finding algorithm, PHENIX studies dijet and direct photon-jet pairs via two-particle correlations. In 2014 PHENIX collected its largest data set for 200 GeV Au+Au collisions. Neutral pion-hadron correlations have been published from this data set and the yield of pion-hadron pairs as a function of the azimuthal difference ($\delta\phi$) in Au+Au collisions relative to p+p collisions are compared to the Hybrid model with and without medium response. The data are well described by the model when medium effects (the “wake”) are included. This study will be extended to direct photon hadron correlations which can directly access evidence of an additional emergent phenomenon known as the diffusion wake.

Author: HODGES, Anthony (Univ. Illinois at Urbana Champaign (US))

Presenter: HODGES, Anthony (Univ. Illinois at Urbana Champaign (US))

Session Classification: Morning Session