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gamma-hadron spectra in p+Pb collisions at 5.02 TeV and in O+O collisions at 7 TeV

Under the assumption that a quark-gluon plasma droplet is produced in p+A collisions, γ -triggered hadron spectra are studied within a next-to-leading-order perturbative QCD parton model with the medium-modified parton fragmentation functions in p+Pb collisions at $\sqrt{s_{\rm NN}} = 5.02$ TeV.

The initial conditions and space-time evolution of the small system of hot and dense medium is simulated by superSONIC hydrodynamic model and parton energy loss in such a medium is described by the high-twist (HT) approach.

The scaled jet transport coefficient \hat{q}/T^3 in this HT approach is extracted from single hadron suppression in central A+A collisions with similar initial medium temperature as in p+A collisions.

Numerical results for this scenario show that γ -hadron spectra at $p_T^{\gamma} = 12 - 40 \text{ GeV}/c$ are suppressed by 5-15% in the most central 0-10% *p*+Pb collisions at $\sqrt{s_{\text{NN}}} = 5.02$ TeV.

The suppression becomes weaker at higher transverse momentum of the γ trigger. As a comparison, γ -hadron suppression in Pb+Pb collisions at $\sqrt{s_{\text{NN}}} = 2.76$ and 5.02 TeV is also predicted.

Furthermore, as a bridge between large system of heavy A+A collisions and small system of p+A collisions, γ -hadron suppression in light nucleus O+O collisions at $\sqrt{s_{NN}} = 7$ TeV is also studied.

Primary authors: Mr ZHANG, Han-Zhong (CCNU); Ms XIE, Man (Central China Normal University); Prof. WANG, Xin-Nian (Central China Normal University/Lawrence Berkeley National Laboratory)

Presenter: Ms XIE, Man (Central China Normal University)