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Gamma-hadron spectra in p + Pb collisions at $\sqrt{s_{\rm NN}} = 5.02$ TeV

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Under the assumption that a quark-gluon plasma droplet is produced in p + A collisions, γ-triggered hadron spectra [1,2] 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 [3] and parton energy loss in such a medium is described by the high-twist (HT) approach [4]. The scaled jet transport coefficient $\hat{q}/T^3$ in this HT approach is extracted from single hadron in central A + A collisions because its values from single and dihadron suppressions are similar [5]. Numerical results show that γ-hadron spectra for $p_T^\gamma = 12 - 40$ GeV/c in this scenario are suppressed by 10% $\sim$ 20% in the most central 0 - 10% p + Pb collisions at $\sqrt{s_{\rm NN}} = 5.02$ TeV. The suppression becomes weaker with higher transverse momentum of the triggered-γ. As a comparison, γ-hadron suppression in Pb + Pb collisions at $\sqrt{s_{\rm NN}} = 2.76$ and 5.02 TeV is also predicted.

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Collaboration (if applicable)

Track

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Authors: XIE, Man (Central China Normal University); WANG, Xin-Nian (Central China Normal University (China)) / Lawrence Berkeley Na); ZHANG, Hanzhong (IOPP, CCNU)

Presenter: XIE, Man (Central China Normal University)

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