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Medium response to jet energy loss and redistribution of lost energy via the AMPT model

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Jet-medium interaction has two important aspects: jet energy loss and the medium response to the lost energy/momentum. The study of jet energy loss has been very successful in the explanation of the suppression of high p_T hadron and jet productions as well as the nuclear modification of dihadron, dijet, photo-jet and hadron-jet correlations. The search for the signal of the medium response to jet transport has been a long-standing topic: how does the lost energy from the jets evolve with the dynamical medium and where does it show up in the final state particle distributions and correlations?

We study the medium response and redistribution of the lost energy from hard jets via the AMPT model. In particular, we study asymmetric dijet events in PbPb collisions at 2.76 TeV. We first investigate in detail the contribution from the final charged hadrons carrying different transverse momenta and emitted from different angular directions, the projected transverse momentum $\langle p_T^{||} \rangle$ [1]. It is found that $\langle p_T^{||} \rangle$ in the leading jet direction is mainly contributed by hard hadrons in both peripheral and central PbPb collisions, while the opposite direction in central collisions is dominated by soft hadrons. Our study of the in-cone and out-of-cone contributions to $\langle p_T^{||} \rangle$ shows that these soft hadrons are mostly emitted at large angles away from the dijet axis. These results indicate that in the AMPT model, a large amount of the lost energy from hard jets occurred in the partonic stage is transported by elastic collisions to soft partons at large angles; this is qualitatively consistent with the CMS measurements. To further investigate the signals of the medium response effect and the redistribution of the lost energy at large angles, we also study the jet shape functions with a wide range of r for asymmetric dijet events.

[1] Z. Gao, A. Luo, G. L. Ma, G.Y. Qin, H.Z. Zhang, arXiv:1612.02548 [hep-ph].

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