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Probing transport properties with boson-Jet correlations in heavy-ion collisions

Summary

We present here the extraction of QGP's transport properties by utilizing correlations between jets and a neutral boson produced in heavy-ion collisions. It is well know that the azimuthal angular distribution and the transverse momentum imbalance distribution of jet correlated hard probes reflects directly on the jet quenching effects.

In extreme limits of the phase space such as $\Delta\phi \approx \pi$ or $x_J \approx 1$ where conventional perturbative calculations would fail to converge, it is imperative to employ the TMD resummation formalism to correctly take into account soft radiations. However, pQCD would still be valid at describing higher order hard splittings where multi-jet final state contributions become necessary.

In this study, we discuss the use of neutral boson (γ, Z, H) tagged jets as probes in the study of transport properties of the QGP. We began with the formalism analysis on the $\Delta\phi$ and x_J distribution in pp collisions as our basis calculation. Then introduced an energy loss mechanism in comparison with 5.02 ATeV $PbPb$ data at the LHC to extract the so-called $\hat{q}$ variable.

There are many advantages of using a neutral bosonic trigger and it serves complimentarily to the existing jet(hadron) trigger studies in heavy-ion collisions.

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