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Jet quenching and energy loss in CMS

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The energy loss of fast partons in hot and dense nuclear matter is studied in PbPb collisions at a nucleon-nucleon center-of-mass energy of 2.76 TeV with the CMS detector at the LHC. Detailed studies of the dijet momentum balance and angular correlations are performed as a function of collision centrality and leading jet transverse momentum up to 350 GeV/c. Dijets in central collisions are found to be more unbalanced than the corresponding dijets in pp data up to the highest values of the leading jet transverse momenta studied. Concurrently, the dijet angular correlations in PbPb collisions remain consistent with the pp reference. Further, the transverse momentum balance in isolated photon-jet pairs is studied. Using the isolated photon as an unbiased measure of the initial parton energy, the ratio of the jet and photon transverse momenta is studied relative to a corresponding pp reference. A significant decrease of the jet to photon momentum ratio with increasing collision centrality is observed. Track-jet correlations and jet fragmentation functions are also studied. A large fraction of the momentum of unbalanced jets is found to be carried by low-pT particles at large radial distance from the jet axis, while the hard component of the fragmentation function evaluated with respect to the reconstructed jet momentum is not strongly modified in comparison to jet fragmentation in vacuum.

Primary author: ROLAND, Christof (MIT)

Presenter: ROLAND, Christof (MIT)

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