

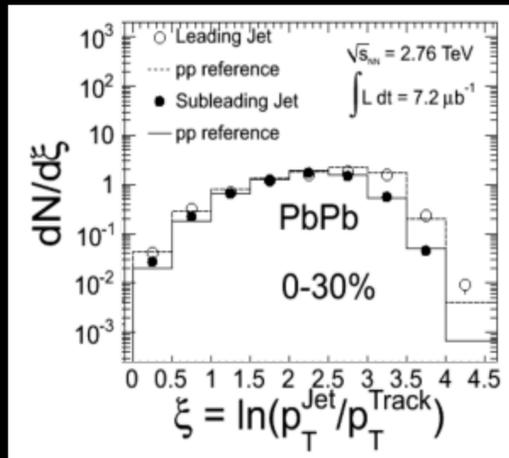


Jet Quenching in Heavy Ion Collisions with CMS

Yetkin Yilmaz (MIT)
on behalf of the CMS Collaboration

What happens to the quenched jet?

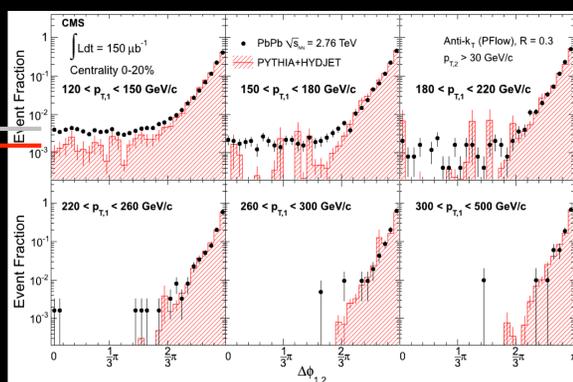
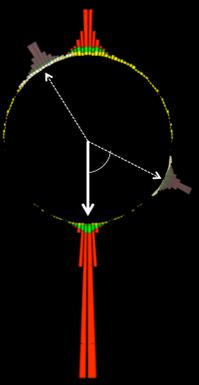
One can correlate the tracks within the jet cone to the reconstructed momentum of the jet.



Fragmentation patterns (charged particle composition) of the jets are very similar to those in vacuum.

Jets fragment as if they left the medium, without remembering how much energy they initially had.

Dijet angular correlations

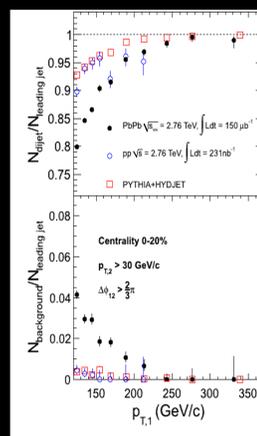


Background due to underlying event fluctuations is subtracted by the sideband ($\Delta\phi < \frac{2}{3}\pi$, same method being applied also in MC).

At high p_T , all true subleading jets are found, with negligible background.

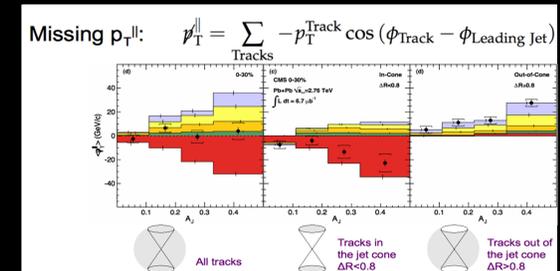
No significant angular de-correlation in any p_T .

Look at dijets with different leading jet p_T



What happens to the lost energy?

One can add (vectorially) momenta of all tracks in the event. Although this sum would have large variance due to fluctuations in the underlying event, the average value is determined by the energy loss process.



When summing up all tracks, there is no global imbalance although the reconstructed jets are imbalanced (black points).

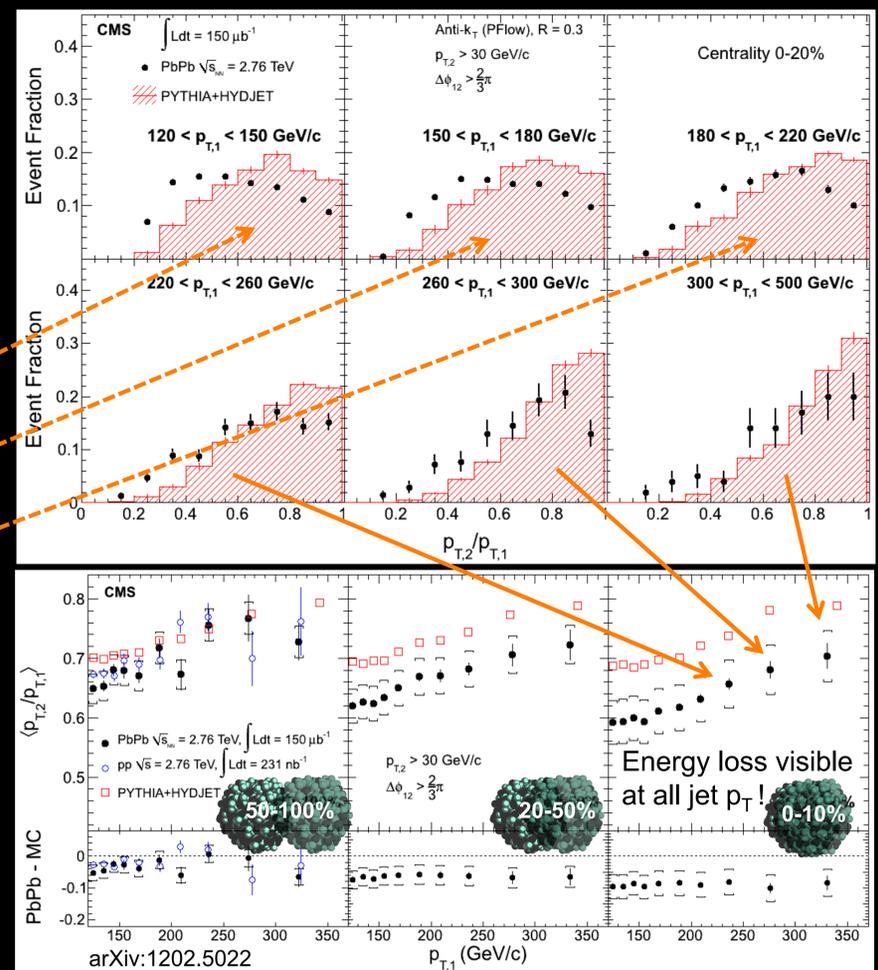
When summing up tracks only within a p_T bin, the energy re-distribution due to quenching is visible (colored histograms).

The comparison of energy re-distribution between in and out of jet cone illustrates the range that the lost energy is dissipated over (panel b vs c).

6.8 μb^{-1} (2010)
Quenching is observed through momentum imbalance of dijets.
Jet-Track correlations revealed details on the form of the energy loss.

150 μb^{-1} (2011)
Momentum dependence of jet quenching...

Momentum dependence of dijet imbalance



Quenching exists at all values of jet p_T , with a very delicate or no dependence of fraction of lost energy on on jet p_T .

From:

"Observation and studies of jet quenching in PbPb collisions at nucleon-nucleon center-of-mass energy = 2.76 TeV", CMS Collaboration, Phys.Rev.C84:024906,2011, arXiv:1102.1957v2

"Measurement of the hard component of jet fragmentation functions in PbPb collisions at 2.76 TeV", CMS Collaboration, CMS-PAS-HIN-11-004

"Jet momentum dependence of jet quenching in PbPb collisions at sqrt(sNN)=2.76 TeV", CMS Collaboration, submitted to PLB ,2012, arXiv:1202.5022