Jet Interests and Performance

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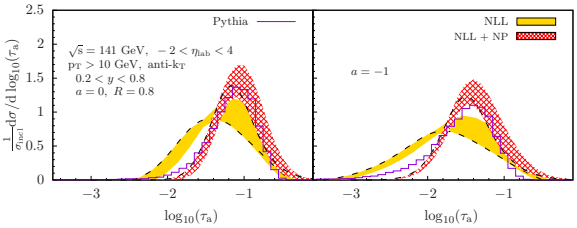
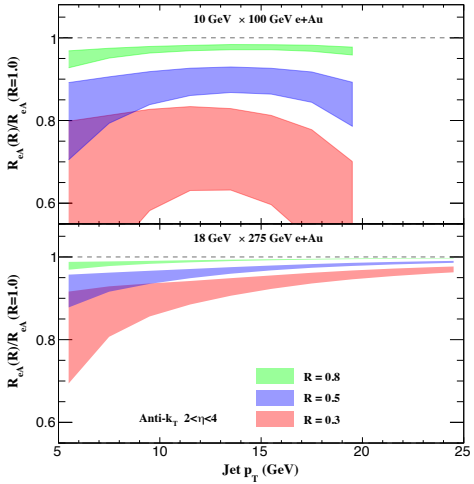
Jet Interests

- Studies of jet modification in the medium, p_T broadening, etc via R_{eA}
- Dijet/dihadron/jet-hadron correlations to access gluon saturation, etc
- Looking further out: TMDs and fundamental QCD such as α_s, via substructure, 1-jettiness, etc.





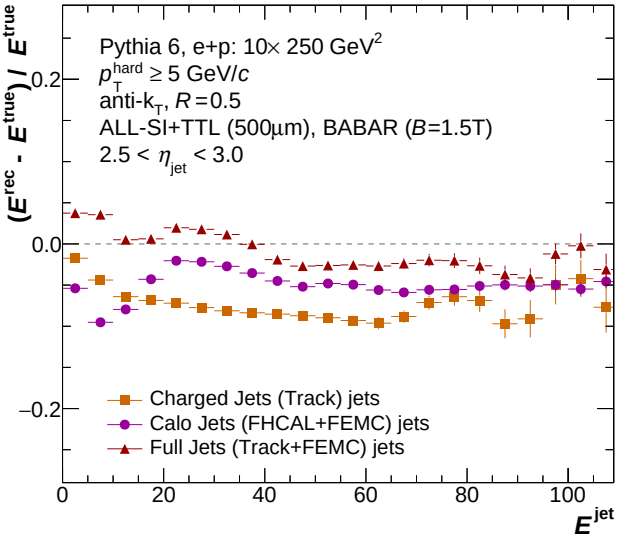
Early jet performance studies

- We already performed some early jet performance studies, focusing on the forward direction
- PYTHIA6 e+p (10 x 250 GeV^2) with ${p_T}^{hard} > 5$ GeV/c w/ All-SI design
- Compared inclusion with and w/out Timing-Tracking Layer (3 layers, 1 after ECal).
- A variety of clusterization algorithms were implemented and considered
  - Includes calibration of cluster energy
- All are performed offline

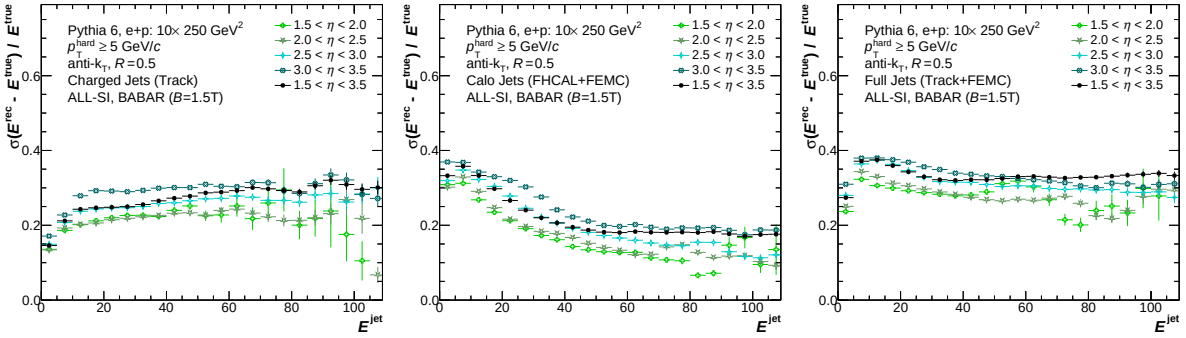
- Studying anti-k_T $R = 0.5$ jets
  - Algorithm and jet R to be updated
  - Some limitations on jet R when going forward and requiring jets fully in acceptance
- Updates are **in progress**
  - Today, just demonstrating capabilities
- Analysis software
  - Based on the Event Evaluator tree.
- Full study details

Jet energy scale

- Considered three classes of jets:
  - Charged-particle "track" jets
  - Calo-only jets
  - "Full" jets (tracks + ECal)
    - Currently contains double counting, but under development
- Calo-only jets perform better than charged-particles jets

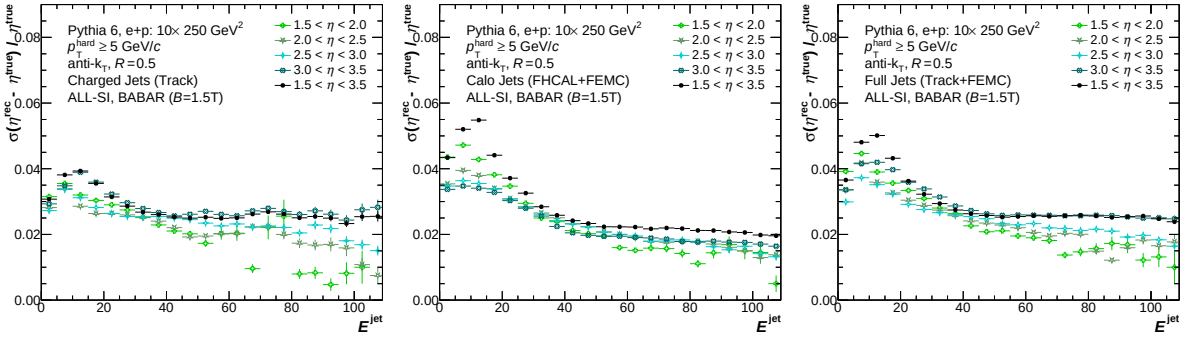


Jet energy resolution



- Resolution gets worse for increasing η
- Calo-jet resolution is better at high E

Jet η resolution



- Weaker η dependence, converged at high E
- Charged-particle jets has improved resolution at lower E

Outlook

- Interested in R_{eA} and jet/hadron correlations
  - Eventually would like to look towards TMDs, α_s, etc
- We have the machinery in place to characterize jet performance (and tracking, and cluster, etc)
  - Straightforward to add jet observables
- Many updates are in progress:
  - Studies over the entire detector (just tweaking analysis parameters)
  - Jet finding efficiency
  - Full position resolution studies
- Adding info needed to construct TopoClusters to the Event Evaluator
- Analysis Software for the Event Evaluator is available
  - Time is short, so the flexibility of re-analysis has been quite helpful

Backup