Discussion points

- Theory/experiment
  - cone algorithms: midpoint or JetClu (which to use?)
    - concrete proposal for improved midpoint algorithm
    - should corrections for cone be done to the data or to the theory, or both (correct data for seeds, correct theory for dark towers)?; even if that means keeping R_{sep} or something similar
- Benchmark studies: use inclusive jets (including MC@NLO!) and W + jets (and/or t-tbar) as benchmark processes (common MC sample for ATLAS and CMS?)
  - experimental corrections and systematic uncertainties for jet algorithms (cone and k_T) for low luminosity and high luminosity running
    - corrections to hadron level
    - corrections to parton level (NLO and LO)
  - tests of fastjet k_T algorithm, including multiple interaction corrections using ghost particles
  - can we benchmark sensitivities to UE, multiple interactions, IR effects, hadronization for the two different algorithms?
  - can we have contact people/working groups from the two experiments?

Solution(s)

- Experimental level
  - run standard (out-of-box) midpoint algorithm
  - after first pass, remove towers clustered into jets
  - run algorithm again on remaining towers
  - merge jet pairs in Region II on left…or
- Theoretical level
  - use appropriate R_{sep} in theory calculation

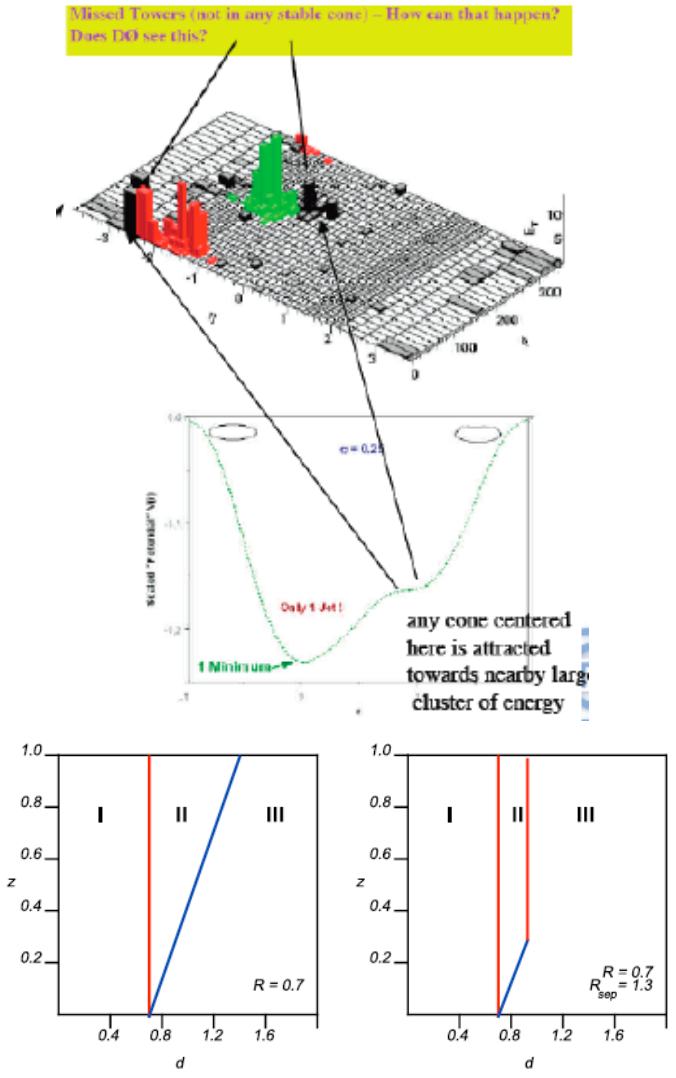
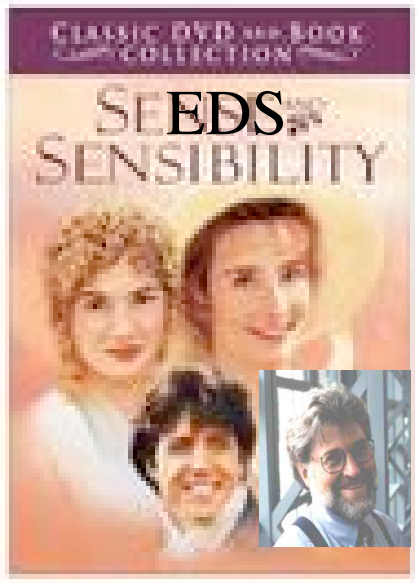


Figure 15. The parameter space (d,Z) for which two partons will be merged into a single jet.

Seeds and sensibility

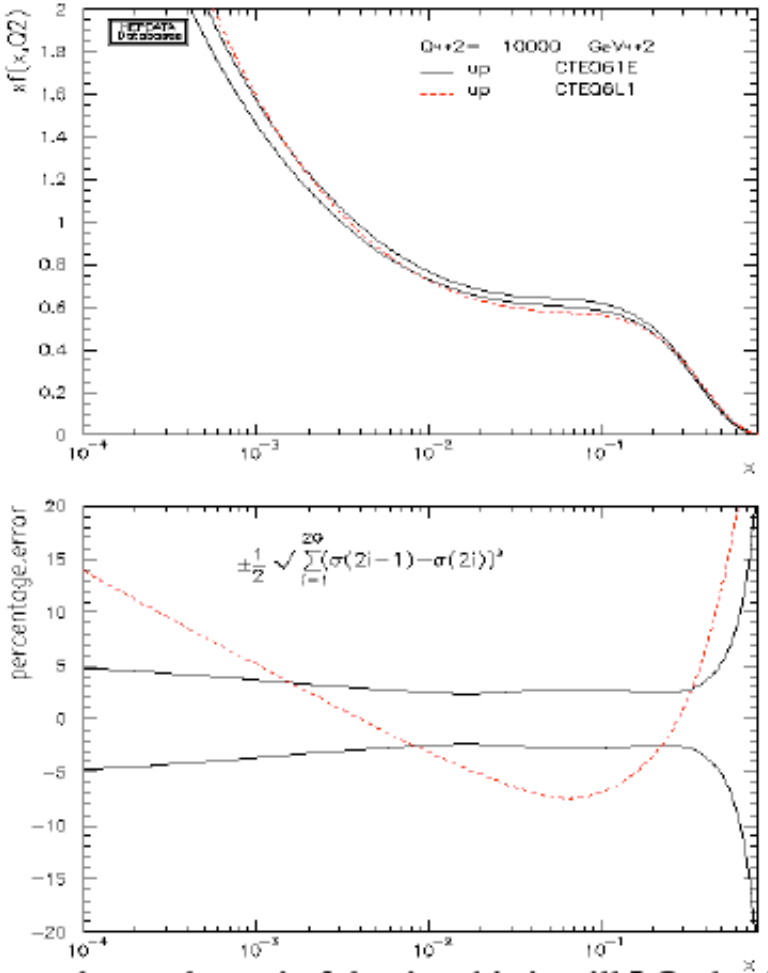
- To save on computer time, experiments require seeds for initiation of jet cone searches
  - impact on experimental cross section compared to seedless algorithm is small
- Seeds have also been used in the theoretical calculations, but here the number of potential seeds is small
  - the requirement for seeds introduces a dependence on soft gluon emission
  - the midpoint algorithm removes this (logarithmic) dependence to NNLO, but not for higher orders
- Steve's suggestion: if you must use seeds in your experimental algorithm, correct to seedless level before comparison to data



- much larger corrections already performed by experiments

NLO pdf's in MC's

- For NLO calculations, use NLO pdf's (duh)
- What about for parton shower Monte Carlos?
  - somewhat arbitrary assumptions (for example fixing Drell-Yan normalization) have to be made in LO pdf fits
  - DIS data in global fits affect LO pdf's in ways that may not directly transfer to LO hadron collider predictions
  - LO pdf's for the most part are outside the NLO pdf error band
  - LO matrix elements for many of the processes that we want to calculate are not so different from NLO matrix elements
  - by adding parton showers, we are partway towards NLO anyway
  - any error is formally of NLO
- (my recommendation) use NLO pdf's
  - pdf's must be + definite in regions of application (CTEQ is so by def'n)
- Note that this has implications for MC tuning, i.e. Tune A uses CTEQ5L
  - need tunes for NLO pdf's



. . . but at the end of the day this is still LO physics;
There's no substitute for honest-to-god NLO.

Can we generate samples using NLO pdf's for ATLAS/CMS?