A Jet Clustering Figure of Merit

Bruce Knuteson
University of Chicago
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- Previous clustering algorithm comparisons have proven inconclusive (despite real effort)
- These comparisons have been hampered (and conclusions softened) by lack of a definite figure of merit $\mathcal{M}$
- The choice of $\mathcal{M}$ is subjective
- The choice of $\mathcal{M}$ is necessary
  - Most Run II analyses will all use a single default algorithm $\mathfrak{A}$
- The choice of $\mathcal{M}$ should reflect the needs of these analyses
- $\mathcal{M}$ + a week's worth of work determines $\mathfrak{A}$

Example/Proposal for $\mathcal{M}$

Use 3 Monte Carlo samples:

(1) $Z \to b\bar{b}$ (2) $WW \to 4j$ (3) $t\bar{t} \to 6j$

$$d(x,x') = \frac{(E-E')}{\sqrt{E}} \oplus \frac{(\phi-\phi')}{(0.2\ \mathrm{rad})} \oplus \frac{(\theta-\theta')}{(0.2\ \mathrm{rad})}$$

MC quark Reconstructed jet

$$\mathcal{M} = \frac{1}{3} \sum_{\text{samples}} \frac{1}{N} \sum_{\text{events}} \frac{2}{n_x + n_{x'}} \sum_{\{x\}} \max_{\{x'\}} e^{-d(x,x')}$$

Note: $0 < \mathcal{M} < 1$, $\mathcal{M} \to 1$ for an ideal algorithm $\mathfrak{A}$

http://hep.uchicago.edu/~knuteson/tmp/jetClustering.ps