

# Likelihood-based Particle Flow Algorithm at CDF for Accurate Energy Measurement and Identification of Hadronically Decaying Tau Leptons

*Tuesday, February 23, 2010 2:00 PM (25 minutes)*

We present a new technique for accurate energy measurement of hadronically decaying tau leptons. The technique was developed and tested at CDF experiment at the Tevatron. The technique employs a particle flow algorithm complemented with a likelihood-based method for separating contributions of overlapping energy depositions of spatially close particles. In addition to superior energy resolution provided by the method and improved discrimination against backgrounds, this technique provides a direct estimate of the uncertainty in the energy measurement of each individual hadronic tau jet. The estimate of the likelihood of the observed detector response for a given particle hypothesis allows improving rejection against difficult light lepton backgrounds. This new technique is now being deployed to improve sensitivity of the  $H \rightarrow \tau\tau$  search at the Tevatron. With appropriate adjustments, the algorithm can be further extended to the case of generic (quark or gluon) jets as well as adopted at other experiments.

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