

Holistic Evaluation of Jet Performance at FCC-ee

(Gregor and Ariel - poster)

Jet energy and mass resolution are key figures of merit to evaluate FCC-ee detector concepts as well as particle flow and event reconstruction methods. In contrast to the LHC, at e^+e^- colliders, every final state particle needs to be assigned to jets which calls for the use of exclusive or large-radius jet finding algorithms. As a result, misassociation of particles to jets becomes a source of fluctuation in the measured jet energy resolution. Since such fluctuations are physics dependent, it is imperative to evaluate jet performance in a variety of physics topologies as well as to disentangle the physics from the experimental sources contributing to physics performance. A common set of performance plots and metrics can also provide a framework to compare the performance of different particle flow reconstruction algorithms and calorimeter designs. We present a comprehensive jet-performance toolkit built within the Key4HEP software stack and the FCCAnalyses framework. The design makes it straightforward to add new reconstruction methods, clustering algorithms, detector concepts, and metrics. Our toolkit measures jet energy mass resolution in 2-, 4-, and 6-jet final state processes, and provides metrics to separate the impact of detector and physics components to the resolution.