



Contribution ID: 129

Type: **not specified**

Performance Study of a New Cluster Splitting Algorithm for the Reconstruction of PANDA EMC Data

For high momentum π^0 mesons, the angle between the two final-state photons decreases with the increase of the momentum of the π^0 , which enhances the probability of overlapping electromagnetic showers. The performance of the cluster splitting algorithm in the EMC reconstruction is crucial for the mass resolution measurement of the π^0 at high momenta. If there are several local maxima in a cluster, it is considered as a superposition of multiple showers. It is necessary to split the cluster according to the number of maxima. The classical cluster splitting algorithm is based on the theoretical lateral distribution of electromagnetic showers which can be described as a (multi-)exponential function. In a realistic electromagnetic calorimeter, considering the granularity of the detector, the measured energy in a cell is actually the integral of the theoretical energy deposition, which deviates from the exponential function. Based on the simulation of the barrel EMC of the PANDA experiment, the cluster splitting algorithm is updated using a new lateral energy measurement function which depends on the dedicated granularity of the detector. The mass resolution of the π^0 has been improved in the high momentum range compared with the previously used method.

Authors: ZHANG, Zi-Yu (Nankai University); ZHAO, Guang (IHEP); Prof. SUN, Sheng-Sen (IHEP); Mr PU, Qing; LIU, Chun-Xiu (IHEP); Prof. YU, Chun-Xu (Nankai University)

Co-authors: Prof. HUANG, Guang-Shun (University of Science and Technology of China); Prof. LIU, Bei-Jiang (IHEP); Dr LIU, Dong; QI, Hang (USTC); Prof. SHEN, Xiao-Yan (IHEP); Prof. STOCKMANN, Tobias (GSI); Ms WANG, Fei (University of South China); Ms ZHANG, Yi-Tong (IHEP)

Presenters: ZHANG, Zi-Yu (Nankai University); ZHAO, Guang (IHEP); Prof. SUN, Sheng-Sen (IHEP)