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Application of fuzzy-based pattern recognition techniques
for cluster finding in a preshower detector
in High Energy Heavy Ion Experiments

Content :

In high energy heavy ion collision experiments, preshower detectors are employed for the measurement of photon multiplicities at forward rapidity. In a high granular preshower detectors of 3X0 thickness, photon clusters are affected mostly by 2 to 3 cells. In the forward rapidity region where the particle density is very high, the overlap between showers is too large to be separated, thereby requiring specilised cluster finding algorithm for identification of photons.
We apply Fuzzy C-Mean (FCM) clustering algorithm for the data set consiting of hits in high granular preshower detector used in ALICE experiment at LHC. A set of validity indexes are examined for optimum clustering performances suitable for the particular data set. The performance is also studied for different densities of hit pattern. Using information from one of the validity indexes giving good performance, FCM clustering is also studied for fixed set of parameters. The results compare well with those obtained using iterative optimization.

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