

Neutral pion identification at Future Circular Collider

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Future Circular Collider (FCC) is a 100 km long particle collider to be built around the year 2040 in the CERN laboratory. The first stage of operation is going to be a lepton collider FCC-ee which aims to test the Standard model with unprecedented precision at maximal central energies of 365 GeV. Neutral pions originating from such collisions are crucial for reconstructions of particles such as the τ lepton and their identification poses a challenge for detectors. Neutral pions decay almost immediately into a pair of photons separated by a small angle and can be easily misidentified as a single photon. We should be able to distinguish the signal of a neutral pion from the signal of a single photon with a fine segmented calorimeter. In the thesis we worked with the FCC-ee noble liquid calorimeter design. The main goal of the thesis was to understand the geometry of the calorimeter planned for FCC-ee experiment and investigate the options offered by multivariate analysis methods for the reconstruction and identification of neutral pions against a single photon background.

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