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Electron reconstruction and identification capabilities of the CBM Experiment at FAIR

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The Compressed Baryonic Matter (CBM) experiment at the future FAIR facility at Darmstadt will measure dileptons emitted from the hot and dense phase in heavy-ion collisions. In case of an electron measurement, a high purity of identified electrons is required in order to suppress the background. Electron identification in CBM will be performed by a Ring Imaging Cherenkov (RICH) detector and Transition Radiation Detectors (TRD).

In this contribution, algorithms which were developed for the electron reconstruction and identification in RICH and TRD detectors are presented. A fast RICH ring recognition algorithm based on the Hough Transform was implemented. An ellipse fitting algorithm was elaborated because most of the CBM RICH rings have elliptic shapes. An efficient algorithm based on the Artificial Neural Network is implemented for electron identification in RICH. In TRD track reconstruction algorithm which is based on track following and Kalman Filter methods was implemented. Several algorithms for electron identification in TRD were developed and investigated. The best-performed algorithm is based on the special transformation of energy losses measured in TRD and usage of the Boosted Decision Tree (BDT) as classifier. Results and comparison of different methods of electron identification and pion suppression are presented.

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