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Particle identification in the ALICE experiment

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The particle identification capabilities of the ALICE experiment are unique among the four major LHC experiments. The working principles, the strategies for signal extraction, and excellent performance of the central barrel detectors in a high-multiplicity environment will be presented. The particle identification of the Inner Tracking System (ITS) and the Time Projection Chamber (TPC) are based on the specific energy loss whereas the Time-Of-Flight detector (TOF) determines the particle velocity by measuring its flight time. Thus low momenta charged kaons, pions, protons, deuterons, tritons, helium-nuclei, and their respective anti-particles can be identified from 100 MeV/c up to several GeV/c in momentum and the corresponding spectra and yields can be extracted. Weak decays of strange particles can be identified via their particular kink and V0 topologies and the precise determination of the first and secondary vertices. The pT-reach of hadron identification can be extended using Cherenkov-radiation in the High Momentum Particle Identification detector (HMPID) and by the relativistic rise in the ionization measurement of the TPC. Electron identification at higher momenta is achieved by the detection of transition radiation in the Transition Radiation Detector (TRD).

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