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Studies of the ALICE material budget between TPC and TOF — •Oscar Castro Serrano and Ivan Vorobyev for the ALICE-Collaboration — Technische Universität München

The material located between the Time Projection Chamber (TPC) and Time-of-Flight (TOF) detectors is one of the most dense parts of the ALICE apparatus at mid-rapidity, with the main contribution coming from the Transition Radiation Detector (TRD). However, the description of this material budget used in Monte Carlo simulations was not yet validated with experimental data. The knowledge of this material budget plays significant role in various ALICE analyses which employ TOF detector for particle identification.

In this talk we show the method which facilitates validation of the ALICE detector material between TPC and TOF with pure sample of protons and pions, for which the inelastic cross sections for interactions with matter are well known from the experiment. The analysis is performed in p-Pb collisions at 5.02 TeV using pure samples of protons from lambda decays and pions from K0 decays reconstructed with the Inner Tracking System (ITS) and TPC detector. The number of protons and pions matched to a hit in the TOF detector is compared with the number of protons and pions in the TPC. The obtained TOF/TPC matching efficiency is compared to the results from full-scale ALICE simulations using GEANT3 and Geant4 toolkits for propagation of particles through the ALICE detector. As a result, the material budget between TPC and TOF can be validated in the momentum range of $0.5<p<5.0$ GeV/c within ~5% precision.

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