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Electron Identification Performance of the ALICE Experiment

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High-precision measurements of charmonium states in proton-proton collisions at the ALICE experiment at LHC necessitate robust electron identification and background suppression. A comprehensive analysis of electron identification performance within the ALICE experiment is presented, utilizing Run 3 proton-proton collision data at $\sqrt{s} = 13.6$ TeV. Electron identification is based on specific ionization energy loss in the Time Projection Chamber (TPC) in conjunction with time-of-flight measurements from the TOF detector. A complementary method involving the matching of TPC tracks to electromagnetic clusters in the Photon Spectrometer (PHOS) enhances the electron identification. The efficiency of electron identification is evaluated using the data-driven tag-and-probe algorithm using $J/\psi \rightarrow e^+e^-$ decays. Data from the PHOS detector is used for estimation of residual hadron contamination of the electron sample. The reported electron ID performance is essential for charmonium measurement in ongoing ALICE Run 3 analyses.

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