

Feasability study for a Muon Forward Tracker in ALICE

ALICE is the experiment dedicated to the study of the quark gluon plasma in heavy-ion collisions at the LHC. Improvement of ALICE sub-detectors for the upgrade plans of the year 2017 are ongoing. The Muon Forward Tracker (MFT) is a proposal in view of this upgrade. The MFT is a silicon pixels detector added in the Muon Spectrometer acceptance ($-4 < \eta < -2.5$) upstream of the hadronic absorber. The MFT upgrade is motivated by several physics improvements. The measurement of the DCA (Distance of Closest Approach) of single muons and secondary vertex from dimuons will permit the identification of open charm ($c\tau \sim 150\mu\text{m}$) and beauty ($c\tau \sim 500\mu\text{m}$) mesons. The MFT, thanks to its tracking capabilities, will allow to improve the mass resolution of the resonances for a better separation between ρ/ω and ϕ , J/ψ and ψ' , and v family resonances. In addition, it will help to reject a large fraction of muons coming from pion and kaon decays, improving the signal over background ratio. Moreover, the MFT will lead to the direct multiplicity measurement, event by event, of charged particles within the spectrometer acceptance. In order to evaluate the feasibility of this upgrade, a setup composed by five silicon planes was simulated within the AliRoot framework. A detailed study of the influence of the beam pipe geometry on secondary particles production was performed. The method used for tracking in the planes and attaching the MFT clusters to the muon tracks will be presented, together with the performances of the MFT in terms of occupancy rate in the pixel planes, secondary vertex measurement, improvement of the dimuon invariant mass resolution.

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Classification de thématique: Detector R & D and data handling