

QGP physics at forward rapidity with the ALICE detector upgrade

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ALICE is the experiment specifically designed for the study of the Quark-Gluon Plasma in heavy-ion collisions at the CERN LHC. The ALICE detector will be upgraded during the LHC Long Shutdown 2, planned for 2019-2020, in order to fully exploit the large integrated luminosity that will be provided by the LHC in Run 3 and Run 4.

The Muon Forward Tracker (MFT), an internal tracker added in the acceptance of the existing Muon Spectrometer and designed to cover the pseudorapidity range $2.5 < \eta < 3.6$, will be part of the ALICE detector upgrade programme, allowing for a crucial improvement of the measurements presently done with the Muon Spectrometer, and giving access to new measurements. The precise measurement of the offset to the primary vertex for the muon tracks, in particular, will permit for the first time in ALICE the statistical separation of open charm ($c\tau \sim 120 - 300 \mu\text{m}$) and beauty ($c\tau \sim 500 \mu\text{m}$) production at forward rapidity, rejecting at the same time a large fraction of background muons coming from pion and kaon decays.

The setup of the MFT is an assembly of circular planes made of Monolithic Active Pixel Sensors (MAPS), to be installed between the interaction point and the hadron absorber of the Muon Spectrometer. The total material budget of the MFT tracking planes, the radiation hardness of their components, coupled with the high granularity of the pixel sensors and the envisaged readout speed, fulfil the conditions for the operation at the energies and luminosities foreseen for the LHC Run 3 heavy-ion programme. The ambitious programme of high-precision measurements expected to characterise the ALICE muon physics after 2020, will also impose the upgrade of the front-end and readout electronics of the existing Muon Spectrometer. A selection of results from the physics performance studies will be presented, together with an overview of the technical aspects of the upgrade project.

List of tracks

Upgrades and new experiments

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