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Heavy quark production at forward rapidity with ALICE at the LHC

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Abstract :

The study of matter under extreme conditions known as the quark gluon plasma (QGP) is key to the understanding of the early universe. QGP is a high density Quantum Chromodynamics (QCD) medium of “free” quarks and gluons (deconfinement), expected to form at high temperature and density where quark and gluon degrees of freedom dominate. At the LHC, ALICE (A Large Ion Collider Experiment) is a general purpose heavy-ion detector with the main physics goal to study the formation and properties of the QGP in heavy-ion collisions. ALICE is also studying proton-proton collisions both as a comparison with heavy-ion collisions and in physics areas where ALICE is competitive with other LHC experiments. Due to large masses heavy quarks (charm and beauty) are formed in the initial stage of the collision via hard scattering processes with short formation time. The study of heavy quark production in proton-proton collisions at LHC energies provides an important test for pQCD calculations and constitutes an essential baseline for the corresponding measurements in heavy ion collisions. Since heavy quarks are produced in the early stages of the collision they interact and lose energy in the QGP medium, therefore, they experience the full evolution of the QGP. Thus they are effective probes of the QGP. In proton-nucleus collisions heavy quarks are used to investigate cold nuclear matter (CNM) effects. In ALICE heavy quarks can be measured at forward rapidity exploiting their muonic decays using the muon spectrometer. In this talk a selection of recent measurements in pp, pPb and PbPb collisions will be shown and compared to various theoretical calculations.

Award :

Yes

Level :

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