



Contribution ID: 71

Type: Poster

Measurements of open heavy-flavour nuclear modification factors with ALICE at the LHC

ALICE is the LHC experiment dedicated to the study of the Quark-Gluon Plasma (QGP). The QGP is a high energy-density state of strongly-interacting matter in which partons are deconfined. This state of matter can be studied experimentally only via heavy-ion (A-A) collisions where the necessary energy density for the phase transition to the QGP can be attained. Measurements of heavy-flavour production are of particular interest since charm and beauty quark-antiquark pairs are dominantly produced in the early stages of the collision, such that they experience the whole evolution of the system. This makes them sensitive probes of the QGP. The nuclear modification factor, which is defined as the ratio of the p_T -differential yield measured in A-A collisions and the corresponding cross section in pp collisions (multiplied by the average nuclear overlap function), is used to quantify the energy loss in the medium. This same quantity is studied in a control experiment, in p-A collisions, to quantify cold nuclear matter effects. With ALICE, open heavy-flavour production is studied via the measurement of heavy-flavour decay leptons (electrons and muons) and via D mesons reconstructed through their hadronic decay channels. We present the correspondent ALICE nuclear modification factor measurements in pp, p-Pb and Pb-Pb collisions at 7 TeV, 5.02 TeV and 2.76 TeV, respectively.

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Track Classification: Relativistic heavy-ion reactions - new data, analyses and models