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Heavy-flavour production in pp, p-Pb and Pb-Pb collisions with ALICE at the LHC

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Heavy-flavour hadrons containing charm and beauty quarks are unique probes of the properties of the hot and dense QCD medium produced in heavy-ion collisions. Due to their large masses, heavy quarks are produced at the initial stage of the collision, almost exclusively via hard partonic scattering processes. Therefore, they are expected to experience the full collision history propagating through and interacting with the QCD medium. Such interaction modifies the phase-space distribution of heavy quarks in Pb-Pb collisions with respect to pp collisions. The measurement of this modification, referred as nuclear modification factor, is sensitive to the transport coefficients of the produced medium. A qualitative and quantitative understanding of the measurement of the nuclear modification factor requires reference measurements in pp and p-Pb collisions. Besides being the reference for Pb-Pb studies, pp heavy-flavour measurements constitute a powerful QCD test tool. The study of their production as a function of multiplicity of charged particles produced in the collision can give insights into multi-parton interaction phenomena. Finally the p-Pb reference measurement is important to disentangle hot medium effects from initial-state effects due to cold nuclear matter.
The ALICE collaboration has measured the production of open heavy-flavour hadrons via their hadronic and semi-leptonic decays at mid-rapidity and in the semi-muonic decay channel at forward rapidity in pp, p-Pb and Pb-Pb collisions at 7, 5.02 and 2.76 TeV respectively. In this talk the latest experimental results are presented.

Primary author: GRELLI, Alessandro (University of Utrecht (NL))

Presenter: GRELLI, Alessandro (University of Utrecht (NL))

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