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Open charm production measurements in pp, Pb-Pb and p-Pb collisions with the ALICE detector at the LHC

Heavy quarks (charm and beauty) are effective probes to investigate the properties of the hot and dense strongly-interacting medium created in heavy-ion collisions as they are produced in partonic scattering processes occurring in the early stages of the collision. Due to their long life time, they probe all the stages of the medium evolution and they interact with its constituents, losing energy via gluon radiation and elastic collisions. The measurement of the nuclear modification factor of the D-mesons provides a key test of parton energy-loss models. These models predict that beauty quarks lose less energy than charm quarks and the latter experience less in-medium energy loss than light quarks and gluons. Furthermore, the production of D-mesons in pp collisions at the LHC provides an important test of pQCD calculations and also serves as an essential reference for understanding the results from heavy-ion collisions. The study of D-meson production in p-Pb collisions is necessary to disentangle the hot and cold nuclear matter effects in Pb-Pb collisions.
D-meson production has been measured with ALICE in pp, Pb-Pb and p-Pb collisions at different energies. After reviewing the ALICE results on D-meson production in pp collisions, the latest results from the analysis of the Pb-Pb data sample will be discussed. Finally, the recent results on D-meson production in p-Pb collisions will also be presented.

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