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Overview on heavy-flavour results from the ALICE experiment

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Heavy-flavour quarks (charm and beauty) are excellent probes for the study of the properties of the quark-gluon plasma (QGP), a colour-deconfined medium produced in ultra-relativistic heavy-ion collisions. Being produced on shorter time scales than the typical QGP formation time and having negligible thermal production and in-medium annihilation rates, heavy quarks experience the full QGP evolution, interacting with its partonic constituents while traversing it and losing energy through radiative and collisional processes. Measurements of their final-state hadrons provide thus fundamental information on these partonic interactions.

The study of heavy-flavour hadrons in proton-proton and proton-nucleus collisions allows us to obtain a reference for probing QGP effects on heavy quarks, as well as to test perturbative QCD calculations at the LHC energies and study cold-nuclear-matter effects. The study of charm baryon production in proton-proton collisions is particularly relevant for investigating charm-quark hadronisation mechanisms, as recent measurements have demonstrated the breaking of the universality of heavy-quark fragmentation fractions among different collision systems.

The ALICE experiment can profit of excellent tracking, vertexing and particle identification performance to reconstruct heavy-flavour hadrons from hadronic and semileptonic decay channels at central rapidity, as well as electrons and muons produced from heavy-flavour hadron decays at central and forward rapidity, respectively.

Recent highlights from ALICE heavy-flavour measurements in pp, p-Pb and Pb-Pb collision systems will be presented. In particular, the prompt and non-prompt D-meson production cross sections, and baryon-over-meson production ratios for various charmed hadrons in pp collisions will be discussed. A selection of recent results in p-Pb and Pb-Pb collision systems, including measurements of nuclear modification factor and elliptic-flow coefficient, will also be shown. These observables will be compared to predictions from several models implementing different descriptions of the in-medium charm-quark interactions.

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