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Measurement of the D+-meson production in p-Pb and Pb-Pb collisions with ALICE

Open heavy-flavor mesons (particles made of a heavy quark, i.e. charm or beauty, and a light quark) are a unique tool to study and characterize the properties of the Quark-Gluon Plasma (QGP). Heavy quarks are produced in the initial stages of the collisions, and they experience the whole system evolution, interacting with the medium constituents. Since charm and beauty quarks have different mass, their in-medium energy loss is predicted to be different. Therefore, for charmed hadrons, it is crucial to distinguish prompt hadrons (which derive directly from the hadronization of a c-quark or from the decay of excited open charm and charmonium states) from those coming from B-hadron decays. The parton energy loss can be studied by measuring the nuclear modification factor R_{AA}, defined as the ratio of the measured yield in nucleus-nucleus collisions to the one in proton-proton interactions, scaled by the average number of binary nucleon-nucleon collisions. Another interesting observable is the elliptic flow v_2 at low transverse momentum, which can give insight into the possible participation of heavy quarks in the collective expansion of the medium.
Furthermore, the study of open heavy-flavor hadrons in proton-nucleus collisions, in which the formation of an extended QGP is not expected, can provide an important measurement of the Cold Nuclear Matter (CNM) effects, which is crucial for the interpretation of the results from nucleus-nucleus collisions.

In this contribution, the results on D^+-meson production in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ and 5.02 TeV and p-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV, are presented. In the latter case, a particular focus on the extraction of the fraction of prompt D^+-mesons with a data-driven approach will be given.

Preferred Track

Open Heavy Flavors

Collaboration

ALICE

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