

Strangeness in Quark Matter 2019



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Measurement of non-strange D-meson production and azimuthal anisotropy in Pb-Pb collisions with ALICE at the LHC

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Heavy quarks are effective probes of the properties of the Quark-Gluon Plasma (QGP) created in ultra-relativistic heavy-ion collisions. Charm and beauty quarks, due to their masses, are produced in hard scattering processes on timescales shorter than the QGP formation time. They experience the entire evolution of the medium, interacting with its constituents via in-medium gluon radiation and collisional processes. In addition, due to their formation time, heavy quarks are also ideal candidates to probe the properties of the strong magnetic field created in heavy-ion collisions by the charged nucleons of the colliding nuclei that do not participate in the collision.

The measurement of the nuclear modification factor (R_{AA}) of D mesons provides important information about the microscopic interactions of heavy quarks with the medium constituents, in particular on the colour-charge and parton-mass dependence of heavy-quark energy loss. Azimuthal anisotropy measurements give insight into the participation of low-momentum heavy quarks in the collective expansion of the system and their possible thermalization in the medium. At high transverse momentum, the path-length dependence of parton energy loss mechanisms can be tested. In addition, the measurement of the D-meson directed flow, which is sensitive to the effects of the magnetic field produced in heavy-ion collisions, gives access to fundamental properties of the QGP, such as conductivity and initial density.

In this contribution the latest D-meson R_{AA} , elliptic and directed flow results in Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV with ALICE will be presented. Recent results on the D-meson production and azimuthal anisotropy measured with an Event-Shape Engineering technique will be shown. The comparison of the results with model predictions will be discussed as well.

Collaboration name

ALICE

Track

Heavy Flavour

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