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## Study of $R_{AA}$ and $v_2$ of non-strange D mesons and D-jet production in Pb–Pb collisions with ALICE

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The LHC heavy-ion physics program aims at investigating the properties of the Quark-Gluon Plasma (QGP) formed in such collisions. Heavy quarks (charm and beauty) are regarded as efficient probes to study and characterize the QGP, as they are created on a very short time scale in initial hard processes and subsequently experience the entire system evolution interacting with the medium constituents.

The measurement of the nuclear modification factor,  $R_{AA}$ , of heavy-flavour particles gives important information about the colour-charge and parton-mass dependence of the energy loss as well as about possible modifications of heavy-quark hadronization in the medium. The heavy-flavour elliptic flow,  $v_2$ , provides insights on the degree of thermalization of heavy quarks in the medium at low  $p_T$  and the path-length dependence of parton energy loss at high  $p_T$ , respectively. In addition, the study of heavy-flavour jets gives more direct access to the initial parton kinematics and can provide further constraints for heavy-quark energy loss mechanisms, in particular concerning the dissipation of the radiated energy in the medium.

In this talk, the latest results on the  $p_T$ -differential  $R_{AA}$  and  $v_2$  of non-strange D mesons in Pb–Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV performed with ALICE will be presented for different centrality classes and compared with theoretical model predictions. The results obtained with the Event-Shape Engineering (ESE) technique applied to the D-meson elliptic flow in semi-central Pb–Pb events to investigate the influence of initial geometry fluctuations on heavy-flavour production will be shown. Finally, the measurements of D-tagged jets in Pb–Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV will be discussed.

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