

Measurement of D-meson nuclear modification factor and flow in Pb-Pb collisions with ALICE at the LHC

Tuesday 2 October 2018 11:25 (20 minutes)

Open heavy-flavour mesons are a unique tool to investigate the properties of the Quark-Gluon Plasma (QGP) formed in heavy-ion collisions at high energy. Given their large masses, heavy quarks are produced in the initial stages of the collisions and thus witness the whole system evolution, losing energy interacting with the medium constituents. The measurement of the nuclear modification factor (R_{AA}) of open heavy flavours can provide important information about the colour-charge and parton-mass dependence of the energy loss. The measurement of the elliptic flow (v_2) at low p_T can give insight into the participation of the heavy quarks in the collective expansion of the system and their thermalization in the medium. At high p_T , it allows us to investigate the path-length dependence of parton energy loss. These two observables can also help us to understand possible modifications of heavy-quark hadronization in the medium. In particular, the role of the recombination mechanism can be studied for charm via the comparison of D mesons with and without strange-quark content. Finally, it has been shown that very strong electric and magnetic fields created at early times can affect the charm quarks dynamics. Their effect can be investigated by measuring charm-particle directed flow, v_1 .

In this talk, the latest results on the p_T -differential R_{AA} and v_2 of D^0 , D^+ , D^{*+} and D_s^+ mesons measured at central rapidity in Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV with ALICE will be presented for different centrality classes. The comparison with predictions from theoretical models and the constraints set to charm spatial diffusion coefficient in the medium will be discussed. The final results on the Event-Shape Engineering (ESE) technique applied to the D-meson elliptic flow in semi-central Pb-Pb events will be also presented, to investigate the influence of initial geometry fluctuations to heavy-flavour production. Finally, the status of the measurement of D^0 v_1 will be presented.

Summary

Primary authors: ALICE COLLABORATION; GROSA, Fabrizio (Politecnico di Torino (IT))

Presenter: GROSA, Fabrizio (Politecnico di Torino (IT))

Session Classification: Parallel 3