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Measurement of beauty-hadron decay electrons in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$TeV with ALICE

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The ALICE Collaboration at the LHC studies nucleus-nucleus collisions with the aim of investigating the properties of the high energy-density state of strongly-interacting matter produced in heavy-ion collisions, the Quark Gluon Plasma (QGP). Heavy quarks (charm and beauty) are an effective probe to investigate the properties of the QGP. They are produced almost exclusively in the initial partonic scattering processes and they interact strongly with the surrounding matter throughout its evolution losing energy via elastic and inelastic interactions with the medium constituents. The in-medium parton energy loss is expected to depend both on the parton mass and its colour charge making flavour-separated measurements of charm and beauty useful to test models of in-medium energy loss.
Experimentally one way to study heavy quarks is via measurements of electrons from semileptonic decays of heavy-flavour hadrons. The comparison of the p_{T}-differential invariant yields of heavy-flavour decay electrons in pp and Pb-Pb collisions gives insight into the energy loss of heavy quarks in the QGP. Electrons are reconstructed in the central rapidity region and identified using the excellent particle identification capabilities of ALICE. To achieve a flavour-separated measurement, additional information is necessary. This separation is done statistically based on the impact parameter of tracks identified as electrons. The absolute value of the impact parameter is typically larger for electrons originating from the decay of hadrons containing a beauty quark due to their larger mean proper decay length ($c\tau \approx 500\mu$m) compared to other hadrons decaying into electrons. In this talk the measurement of the beauty decay electrons is presented for pp collisions at $\sqrt{s} = 7$TeV and for Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$TeV and both are compared via the nuclear modification factor. The latter describes the change in the p_{T}-differential cross-section in Pb-Pb collisions compared nucleon-nucleon collisions in a vacuum - adequately normalized to the average number of nucleon-nucleon collisions in a given centrality class and it is thus sensitive to the in-medium energy loss of partons.

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