

5th International workshop on heavy quark production in heavy-ion collisions



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D meson nuclear modification factors and D meson elliptic flow in Pb–Pb collisions at $\sqrt{s}_{\text{NN}} = 2.76$ TeV with the ALICE detector

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The properties of the hot and dense QCD medium formed in ultra-relativistic heavy-ion collisions, as well as the mechanism of in-medium partonic energy loss, can be accessed via the measurement of the nuclear modification factor of particle production. The measurement of D meson production provides key tests of parton energy-loss models, which predict that charm quarks should experience less in-medium energy loss than light quarks and gluons. Moreover if in-medium hadronization is the dominant mechanism of charm hadron formation at low p_{T} then the production of charm strange hadrons, like $D_{\text{s}}^{\{+\}}$, is expected to be largely enhanced. Finally the elliptic flow v_2 of D meson compared to that of light hadrons is expected to bring insights into the degree of thermalization of charm quarks within the quark gluon plasma.

The ALICE experiment has measured the production of prompt $D^{\{0\}}$, $D^{\{+\}}$ and $D^{\{*\,+}}$ and $D^{\{+\}}\{s\}$ mesons in pp and $Pb\text{-}Pb$ collisions at the LHC at $\sqrt{s} = 7$ and 2.76 TeV and at $\sqrt{s}_{\text{NN}} = 2.76$ TeV, respectively, via the exclusive reconstruction of their hadronic decay. The p_{T} -differential production yields in the range $1 < p_{\text{T}} < 36$ GeV/c ($4 < p_{\text{T}} < 12$ GeV/c in the case of $D^{\{+\}}\{s\}$) at central rapidity, $|y| < 0.5$, were used to calculate the nuclear modification factor. A suppression of a factor 4-5 for $p_{\text{T}} \geq 10$ GeV/c in the 7.5% most central collisions was observed. The measurement of the D meson elliptic flow in semi-central (30-50%) Pb-Pb collisions will be presented.

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