

# Quark Matter 2019 - the XXVIIIth International Conference on Ultra-relativistic Nucleus-Nucleus Collisions



Contribution ID: 179

Type: **Poster Presentation**

## D-meson production in Pb–Pb collisions with ALICE at the LHC

Monday 4 November 2019 17:40 (20 minutes)

The production of charm quarks occurs predominantly in hard scattering processes in the earliest stages of a heavy-ion collision, and due to their relatively long lifetimes they experience the full evolution of the system. In ALICE, charmed mesons ( $D^0, D^+, D^{*+}$  and  $D_s^+$ ) are reconstructed in their hadronic decay channels, allowing the full kinematic information of the original particle to be retained. Their nuclear modification factor ( $R_{AA}$ ) evaluated as the modification of the D meson production  $p_T$  spectra in Pb–Pb collisions with respect to the one in proton–proton collisions gives insight into the energy loss mechanisms charm quark undergoes as it traverses the strongly interacting medium (QGP). In particular comparisons with lighter hadrons give insight into the possible mass and flavour dependence of the in-medium energy loss. Comparative studies between particle species in Pb–Pb and pp collision systems allow us to test possible differences in the production of different charge states and resonances such as  $D^{*+}$ .

Furthermore, charmed hadrons with strangeness content, such as  $D_s^+$ , are of particular interest as they allow us to probe the effect of the hot and dense medium on charm hadronisation such as the possible recombination of charm and strange quarks in the strangeness-rich QGP. In this case one expects a difference in the  $R_{AA}$  of strange and non-strange D mesons.

In this contribution will be presented the latest ALICE results for the production of strange and non-strange D mesons in Pb–Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV, using the data provided by the 2018 run of the LHC. The nuclear modification factor of strange and non-strange D-mesons will be shown, along with the relative production ratios of the strange and non-strange D-meson species. Of particular interest is the extremely low  $p_T$  reach ALICE is able to achieve on the measurement of the production of  $D^0$  mesons in Pb–Pb collisions that allows to evaluate the  $D^0 R_{AA}$  down to  $\sim 0$   $p_T$  and opens the possibility to determine the total  $D^0$  production cross-section in heavy-ion collisions.

Finally, comparisons of the measurements with theoretical model calculations and lighter-flavour particles will be discussed.

**Primary author:** TROGOLO, Stefano (Universita e INFN, Padova (IT))

**Presenter:** TROGOLO, Stefano (Universita e INFN, Padova (IT))

**Session Classification:** Poster Session

**Track Classification:** Heavy flavor and quarkonium