Addendum to: Centrality dependence of high-pT D-meson suppression in Pb-Pb collisions at √sNN=2.76 TeV

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Addendum: Centrality dependence of high-p_T D-meson suppression in Pb–Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV

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Abstract: This is an addendum to the article *JHEP* **11** (2015) 205 [1]. The figures 3 (right), 4 (right) and 5 are updated with published results on non-prompt J/ψ-meson production from the CMS collaboration [2].

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In [1] the average nuclear modification factor R_{AA} of D^0, D^+ and D^{*+} mesons in Pb–Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV measured by ALICE was compared with that of non-prompt J/ψ mesons from B-meson decays measured by the CMS collaboration using 2010 data (7.28 μb^{-1}) [3]. A higher-precision measurement based on 2011 data (152 μb^{-1}) was recently published by the CMS collaboration [2]. The measurement for the p_T interval 6.5–30 GeV/c is carried out in three rapidity intervals, including $|y| < 1.2$, which is more similar to that of D mesons ($|y| < 0.5$).

Figure 1 shows the average of the D^0, D^+ and D^{*+} nuclear modification factors as a function of centrality in $8 < p_T < 16$ GeV/c, compared with the R_{AA} of non-prompt J/ψ mesons with $6.5 < p_T < 30$ GeV/c [2]. The latter is significantly higher than that of the D mesons in the five centrality intervals from 0–10% to 40–50%. For example, the average difference of the R_{AA} values of D mesons and non-prompt J/ψ mesons in the 0–10% and 10–20% centrality classes is larger than zero with a significance of 3.4 σ, obtained including the systematic uncertainties, and taking into account their correlation between

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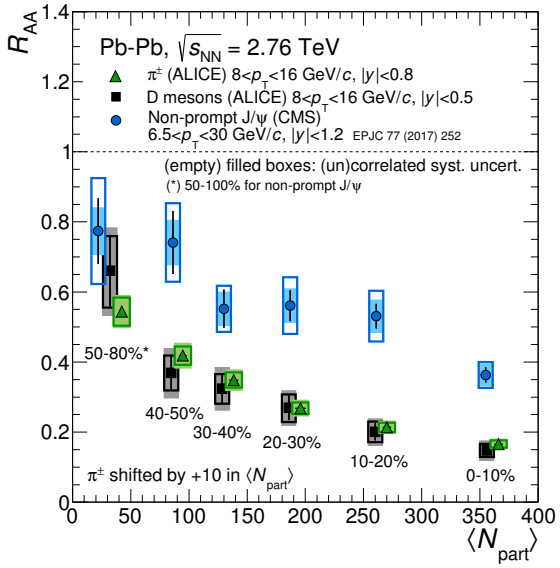

Figure 1. Comparison of the D meson R_{AA} (average of D^0, D^+ and D^{*+}) in $8 < p_{\mathrm{T}} < 16$ GeV/c [1] and of the R_{AA} of non-prompt J/ψ mesons in $6.5 < p_{\mathrm{T}} < 30$ GeV/c measured by the CMS collaboration [2]. The vertical bars represent the statistical uncertainties, while the filled (empty) boxes represent the systematic uncertainties that are correlated (uncorrelated) among centrality intervals. This figure updates figure 3 (right) of [1].

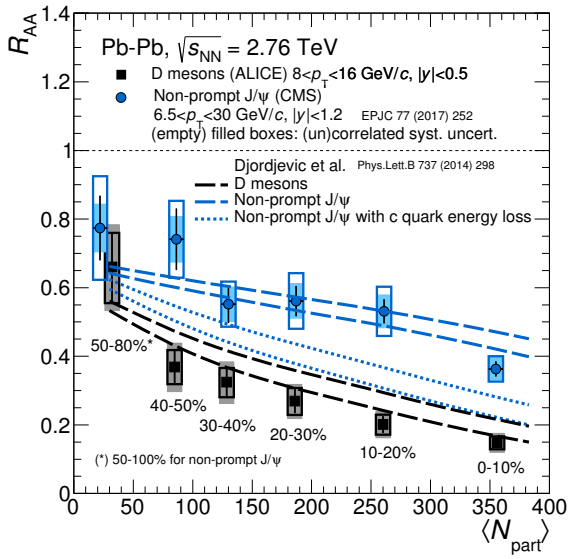

Figure 2. Comparison of the R_{AA} measurements with the calculations by Djordjevic et al. [4] including radiative and collisional energy loss. Lines of the same style enclose a band representing the theoretical uncertainty. For non-prompt J/ψ mesons in $6.5 < p_{\mathrm{T}} < 30$ GeV/c [2] the model results for the case in which the b quark interactions are calculated using the c quark mass are shown as well [7]. This figure updates figure 4 (right) of [1].

the two centrality classes. In figures 2 and 3 these measurements are compared with model calculations [4–6], as originally done in [1].

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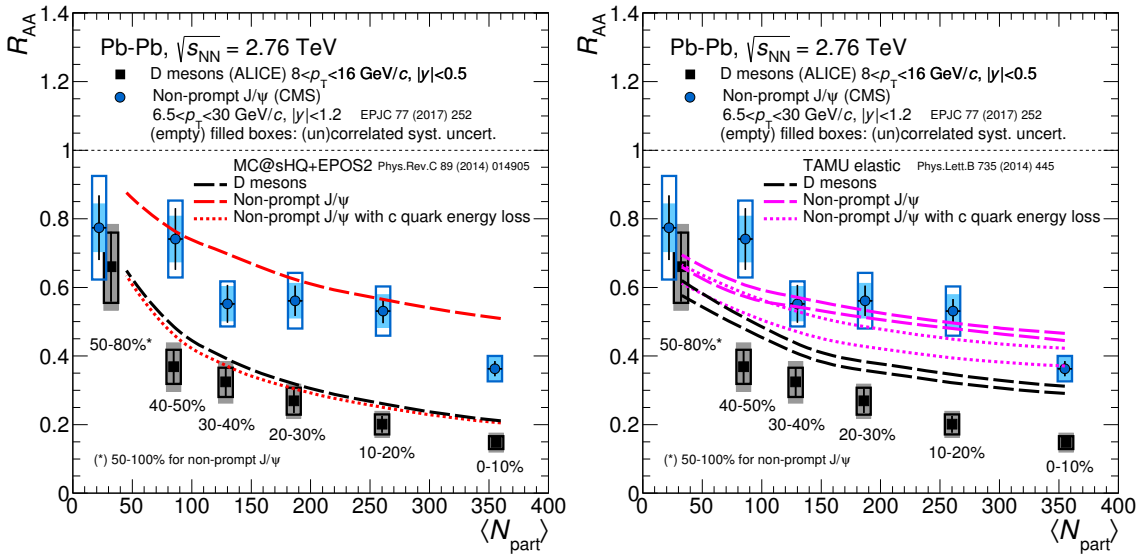

Figure 3. Comparison of the $R_{\rm AA}$ measurements with the *MC@sHQ+EPOS2* model [5] including radiative and collisional interactions (left) and with the *TAMU elastic* model [6] including collisional interactions via in-medium resonance formation. For both models, results for the case in which the b quark interactions are calculated using the c quark mass are shown as well [7]. In the right-hand panel, the band between lines with the same style represents the theoretical uncertainty. This figure updates figure 5 of [1].

The conclusions of the original publication [1] are confirmed by the comparisons that consider the new J/ψ-meson measurements. In particular, the comparison of the D-meson $R_{\rm AA}$ with the non-prompt J/ψ-meson $R_{\rm AA}$ shows a difference in the suppression of particles originating from c and b quarks in the most central collisions. This observation is described by theoretical calculations in which in-medium parton energy loss decreases with increasing quark mass.

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