Addendum to

Centrality dependence of high-pT D-meson suppression in Pb-Pb collisions at sNN = 2.76 Tev

Adam, J.; Adamova, D.; Aggarwal, MM.; Rinella, G.A.; Agnello, A.; Agrawl, N.; Ahammed, Z.; Ahn, S.U.; Aimo, I.; Aiola, S.; Ajaz, M.; Akindinov, A.; Alam, SN; Aleksandrov, D.; Alessandro, B.; Alexandre, D.; Alfaro-Molina; Alici, A.; Alkin, A.; Almaraz, J.R.M.; Alme, J.; Bearden, Ian; Pacik, Vojtech; Zhou, You; Gajdosova, Katarina; Chojnacki, Marek; Gaardhøje, Jens Jørgen; Christensen, Christian Holm; Nielsen, Børge Svane; Bourjau, Christian Alexander; bsm989, bsm989; Pimentel, Lais Ozelin de Lima; Thoresen, Freja; Bilandzic, Ante; Zaccolo, Valentina; Bøggild, Hans

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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

The ALICE collaboration

E-mail: ALICE-publications@cern.ch

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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 $J/\psi$-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 $J/\psi$ mesons from B-meson decays measured by the CMS collaboration using 2010 data (7.28 $\mu$b$^{-1}$) [3]. A higher-precision measurement based on 2011 data (152 $\mu$b$^{-1}$) 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 $J/\psi$ 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 $J/\psi$ mesons in the 0–10% and 10–20% centrality classes is larger than zero with a significance of 3.4 $\sigma$, obtained including the systematic uncertainties, and taking into account their correlation between...
Figure 1. Comparison of the D meson $R_{AA}$ (average of $D^0$, $D^+$ and $D^{**+}$) in $8 < p_T < 16$ GeV/c [1] and of the $R_{AA}$ of non-prompt $J/\psi$ mesons in $6.5 < p_T < 30$ 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 $J/\psi$ mesons in $6.5 < p_T < 30$ 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 conclusions of the original publication [1] are confirmed by the comparisons that consider the new $J/\psi$-meson measurements. In particular, the comparison of the D-meson $R_{AA}$ with the non-prompt $J/\psi$-meson $R_{AA}$ 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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**References**


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**Figure 3.** Comparison of the $R_{AA}$ 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].


14 China Institute of Atomic Energy, Beijing, China  
15 Commissariat à l’Energie Atomique, IRFU, Saclay, France  
16 COMSATS Institute of Information Technology (CIIT), Islamabad, Pakistan  
17 Departamento de Fisica de Particulas and IGFAE, Universidad de Santiago de Compostela, Santiago de Compostela, Spain  
18 Department of Physics and Technology, University of Bergen, Bergen, Norway  
19 Department of Physics, Aligarh Muslim University, Aligarh, India  
20 Department of Physics, Ohio State University, Columbus, Ohio, United States  
21 Department of Physics, Sejong University, Seoul, South Korea  
22 Department of Physics, University of Oslo, Oslo, Norway  
23 Dipartimento di Eletrotecnica ed Elettronica del Politecnico, Bari, Italy  
24 Dipartimento di Fisica dell’Università ‘La Sapienza’ and Sezione INFN Rome, Italy  
25 Dipartimento di Fisica dell’Università and Sezione INFN, Cagliari, Italy  
26 Dipartimento di Fisica dell’Università and Sezione INFN, Trieste, Italy  
27 Dipartimento di Fisica dell’Università and Sezione INFN, Turin, Italy  
28 Dipartimento di Fisica e Astronomia dell’Università and Sezione INFN, Bologna, Italy  
29 Dipartimento di Fisica e Astronomia dell’Università and Sezione INFN, Catania, Italy  
30 Dipartimento di Fisica e Astronomia dell’Università and Sezione INFN, Padova, Italy  
31 Dipartimento di Fisica ‘E.R. Caianiello’ dell’Università and Gruppo Collegato INFN, Salerno, Italy  
32 Dipartimento di Scienze e Innovazione Tecnologica dell’Università del Piemonte Orientale and Gruppo Collegato INFN, Alessandria, Italy  
33 Dipartimento Interateneo di Fisica ‘M. Merlin’ and Sezione INFN, Bari, Italy  
34 Division of Experimental High Energy Physics, University of Lund, Lund, Sweden  
35 Eberhard Karls Universität Tübingen, Tübingen, Germany  
36 European Organization for Nuclear Research (CERN), Geneva, Switzerland  
37 Excellence Cluster Universe, Technische Universität München, Munich, Germany  
38 Faculty of Engineering, Bergen University College, Bergen, Norway  
39 Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava, Slovakia  
40 Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, Prague, Czech Republic  
41 Faculty of Science, P.J. Šafárik University, Košice, Slovakia  
42 Faculty of Technology, Buskerud and Vestfold University College, Vestfold, Norway  
43 Frankfurt Institute for Advanced Studies, Johann Wolfgang Goethe-Universität Frankfurt, Frankfurt, Germany  
44 Gangneung-Wonju National University, Gangneung, South Korea  
45 Gauhati University, Department of Physics, Guwahati, India  
46 Helsinki Institute of Physics (HIP), Helsinki, Finland  
47 Hiroshima University, Hiroshima, Japan  
48 Indian Institute of Technology Bombay (IIT), Mumbai, India  
49 Indian Institute of Technology Indore, Indore (IITI), India  
50 Inha University, Incheon, South Korea  
51 Institut de Physique Nucléaire d’Orsay (IPNO), Université Paris-Sud, CNRS-IN2P3, Orsay, France  
52 Institut für Informatik, Johann Wolfgang Goethe-Universität Frankfurt, Frankfurt, Germany  
53 Institut für Kernphysik, Johann Wolfgang Goethe-Universität Frankfurt, Frankfurt, Germany  
54 Institut für Kernphysik, Westfälische Wilhelms-Universität Münster, Münster, Germany  
55 Institut pluridisciplinaire Hubert Curien (IPHC), Université de Strasbourg, CNRS-IN2P3, Strasbourg, France  
56 Institute for Nuclear Research, Academy of Sciences, Moscow, Russia  
57 Institute for Subatomic Physics of Utrecht University, Utrecht, Netherlands  
58 Institute for Theoretical and Experimental Physics, Moscow, Russia  
59 Institute of Experimental Physics, Slovak Academy of Sciences, Košice, Slovakia  
60 Institute of Physics, Academy of Sciences of the Czech Republic, Prague, Czech Republic  
61 Institute of Physics, Bhubaneswar, India
SSC IHEP of NRC Kurchatov institute, Protvino, Russia
SUBATECH, Ecole des Mines de Nantes, Université de Nantes, CNRS-IN2P3, Nantes, France
Suranaree University of Technology, Nakhon Ratchasima, Thailand
Technical University of Košice, Košice, Slovakia
Technical University of Split FESB, Split, Croatia
The Henryk Niewodniczanski Institute of Nuclear Physics, Polish Academy of Sciences, Cracow, Poland
The University of Texas at Austin, Physics Department, Austin, Texas, U.S.A.
Universidad Autonoma de Sinaloa, Culiacan, Mexico
Universidade de S~ao Paulo (USP), S~ao Paulo, Brazil
Universidade Estadual de Campinas (UNICAMP), Campinas, Brazil
University of Houston, Houston, Texas, United States
University of Jyväskylä, Jyväskylä, Finland
University of Liverpool, Liverpool, United Kingdom
University of Tennessee, Knoxville, Tennessee, United States
University of the Witwatersrand, Johannesburg, South Africa
University of Tokyo, Tokyo, Japan
University of Tsukuba, Tsukuba, Japan
University of Zagreb, Zagreb, Croatia
Université de Lyon, Université Lyon 1, CNRS/IN2P3, IPN-Lyon, Villeurbanne, France
V. Fock Institute for Physics, St. Petersburg State University, St. Petersburg, Russia
Variable Energy Cyclotron Centre, Kolkata, India
Vinča Institute of Nuclear Sciences, Belgrade, Serbia
Warsaw University of Technology, Warsaw, Poland
Wayne State University, Detroit, Michigan, United States
Wigner Research Centre for Physics, Hungarian Academy of Sciences, Budapest, Hungary
Yale University, New Haven, Connecticut, United States
Yonsei University, Seoul, South Korea
Zentrum für Technologietransfer und Telekommunikation (ZTT), Fachhochschule Worms, Worms, Germany