

# 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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ALICE

The ALICE collaboration

*E-mail:* [ALICE-publications@cern.ch](mailto:ALICE-publications@cern.ch)

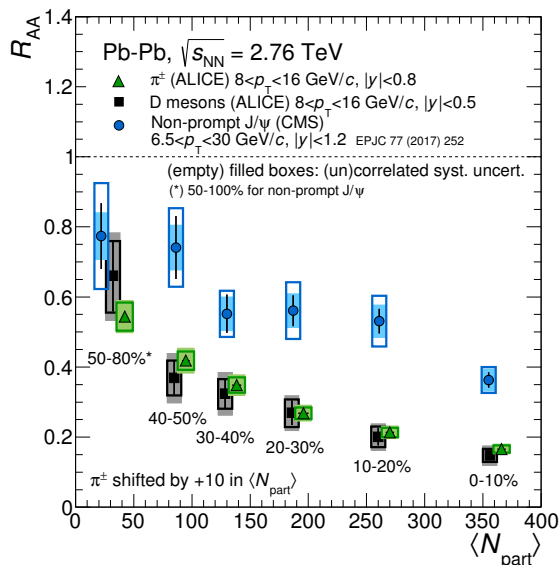
ADDENDUM TO: [JHEP11\(2015\)205](#)

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].

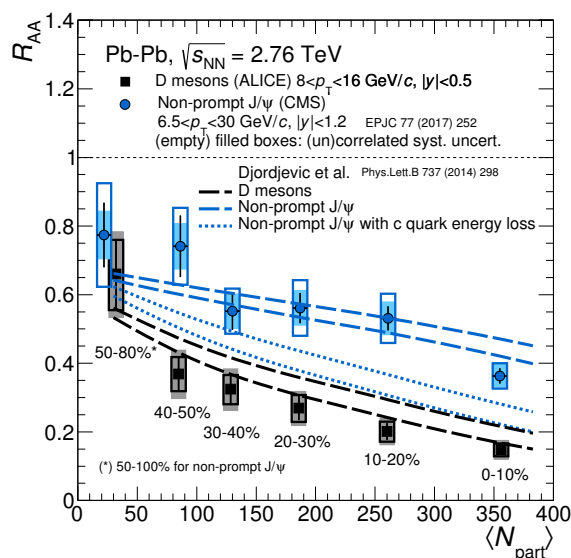
ARXIV EPRINT: [1506.06604](#)

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 ( $7.28 \mu\text{b}^{-1}$ ) [3]. A higher-precision measurement based on 2011 data ( $152 \mu\text{b}^{-1}$ ) 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

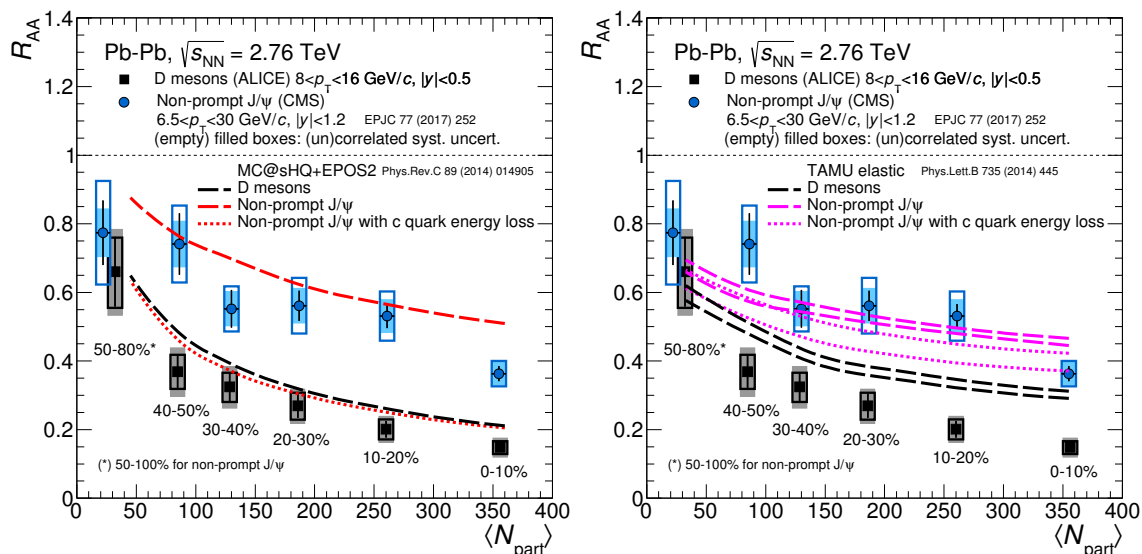


**Figure 1.** Comparison of the D meson  $R_{AA}$  (average of  $D^0$ ,  $D^+$  and  $D^{*+}$ ) in  $8 < p_T < 16$  GeV/c [1] and of the  $R_{AA}$  of non-prompt J/ $\psi$  mesons in  $6.5 < p_T < 30$  GeV/c measured by the CMS collaboration [2]. The vertical bars represent the statistical uncertainties, 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 two centrality classes. In figures 2 and 3 these measurements are compared with model calculations [4–6], as originally done in [1].



**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].

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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## The ALICE collaboration

J. Adam<sup>40</sup>, D. Adamová<sup>83</sup>, M.M. Aggarwal<sup>87</sup>, G. Aglieri Rinella<sup>36</sup>, M. Agnello<sup>111</sup>, N. Agrawal<sup>48</sup>, Z. Ahammed<sup>132</sup>, S.U. Ahn<sup>68</sup>, I. Aimo<sup>94,111</sup>, S. Aiola<sup>137</sup>, M. Ajaz<sup>16</sup>, A. Akindinov<sup>58</sup>, S.N. Alam<sup>132</sup>, D. Aleksandrov<sup>100</sup>, B. Alessandro<sup>111</sup>, D. Alexandre<sup>102</sup>, R. Alfaro Molina<sup>64</sup>, A. Alici<sup>105,12</sup>, A. Alkin<sup>3</sup>, J.R.M. Almaraz<sup>119</sup>, J. Alme<sup>38</sup>, T. Alt<sup>43</sup>, S. Altinpinar<sup>18</sup>, I. Altsybeev<sup>131</sup>, C. Alves Garcia Prado<sup>120</sup>, C. Andrei<sup>78</sup>, A. Andronic<sup>97</sup>, V. Anguelov<sup>93</sup>, J. Anielski<sup>54</sup>, T. Antičić<sup>98</sup>, F. Antinori<sup>108</sup>, P. Antonioli<sup>105</sup>, L. Aphecetche<sup>113</sup>, H. Appelshäuser<sup>53</sup>, S. Arcelli<sup>28</sup>, N. Armesto<sup>17</sup>, R. Arnaldi<sup>111</sup>, I.C. Arsene<sup>22</sup>, M. Arslandok<sup>53</sup>, B. Audurier<sup>113</sup>, A. Augustinus<sup>36</sup>, R. Averbeck<sup>97</sup>, M.D. Azmi<sup>19</sup>, M. Bach<sup>43</sup>, A. Badalà<sup>107</sup>, Y.W. Baek<sup>44</sup>, S. Bagnasco<sup>111</sup>, R. Bailhache<sup>53</sup>, R. Bala<sup>90</sup>, A. Baldisseri<sup>15</sup>, F. Baltasar Dos Santos Pedrosa<sup>36</sup>, R.C. Baral<sup>61</sup>, A.M. Barbano<sup>111</sup>, R. Barbera<sup>29</sup>, F. Barile<sup>33</sup>, G.G. Barnaföldi<sup>136</sup>, L.S. Barnby<sup>102</sup>, V. Barret<sup>70</sup>, P. Bartalini<sup>7</sup>, K. Barth<sup>36</sup>, J. Bartke<sup>117</sup>, E. Bartsch<sup>53</sup>, M. Basile<sup>28</sup>, N. Bastid<sup>70</sup>, S. Basu<sup>132</sup>, B. Bathen<sup>54</sup>, G. Batigne<sup>113</sup>, A. Batista Camejo<sup>70</sup>, B. Batyunya<sup>66</sup>, P.C. Batzing<sup>22</sup>, I.G. Bearden<sup>80</sup>, H. Beck<sup>53</sup>, C. Bedda<sup>111</sup>, N.K. Behera<sup>48,49</sup>, I. Belikov<sup>55</sup>, F. Bellini<sup>28</sup>, H. Bello Martinez<sup>2</sup>, R. Bellwied<sup>122</sup>, R. Belmont<sup>135</sup>, E. Belmont-Moreno<sup>64</sup>, V. Belyaev<sup>76</sup>, G. Bencedi<sup>136</sup>, S. Beole<sup>27</sup>, I. Berceau<sup>78</sup>, A. Bercuci<sup>78</sup>, Y. Berdnikov<sup>85</sup>, D. Berenyi<sup>136</sup>, R.A. Bertens<sup>57</sup>, D. Berzano<sup>36,27</sup>, L. Betev<sup>36</sup>, A. Bhasin<sup>90</sup>, I.R. Bhat<sup>90</sup>, A.K. Bhati<sup>87</sup>, B. Bhattacharjee<sup>45</sup>, J. Bhom<sup>128</sup>, L. Bianchi<sup>122</sup>, N. Bianchi<sup>72</sup>, C. Bianchin<sup>135,57</sup>, J. Bielčik<sup>40</sup>, J. Bielčíková<sup>83</sup>, A. Bilandžić<sup>80</sup>, R. Biswas<sup>4</sup>, S. Biswas<sup>79</sup>, S. Bjelogrić<sup>57</sup>, F. Blanco<sup>10</sup>, D. Blau<sup>100</sup>, C. Blume<sup>53</sup>, F. Bock<sup>74,93</sup>, A. Bogdanov<sup>76</sup>, H. Bøggild<sup>80</sup>, L. Boldizsár<sup>136</sup>, M. Bombara<sup>41</sup>, J. Book<sup>53</sup>, H. Borel<sup>15</sup>, A. Borissov<sup>96</sup>, M. Borri<sup>82</sup>, F. Bossú<sup>65</sup>, E. Botta<sup>27</sup>, S. Böttger<sup>52</sup>, P. Braun-Munzinger<sup>97</sup>, M. Bregant<sup>120</sup>, T. Breitner<sup>52</sup>, T.A. Broker<sup>53</sup>, T.A. Browning<sup>95</sup>, M. Broz<sup>40</sup>, E.J. Brucken<sup>46</sup>, E. Bruna<sup>111</sup>, G.E. Bruno<sup>33</sup>, D. Budnikov<sup>99</sup>, H. Buesching<sup>53</sup>, S. Bufalino<sup>36,111</sup>, P. Buncic<sup>36</sup>, O. Busch<sup>93,128</sup>, Z. Buthelezi<sup>65</sup>, J.B. Butt<sup>16</sup>, J.T. Buxton<sup>20</sup>, D. Caffarri<sup>36</sup>, X. Cai<sup>7</sup>, H. Caines<sup>137</sup>, L. Calero Diaz<sup>72</sup>, A. Caliva<sup>57</sup>, E. Calvo Villar<sup>103</sup>, P. Camerini<sup>26</sup>, F. Carena<sup>36</sup>, W. Carena<sup>36</sup>, J. Castillo Castellanos<sup>15</sup>, A.J. Castro<sup>125</sup>, E.A.R. Casula<sup>25</sup>, C. Cavicchioli<sup>36</sup>, C. Ceballos Sanchez<sup>9</sup>, J. Cepila<sup>40</sup>, P. 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Contreras<sup>11,40</sup>, T.M. Cormier<sup>84</sup>, Y. Corrales Morales<sup>27</sup>, I. Cortés Maldonado<sup>2</sup>, P. Cortese<sup>32</sup>, M.R. Cosentino<sup>120</sup>, F. Costa<sup>36</sup>, P. Crochet<sup>70</sup>, R. Cruz Albino<sup>11</sup>, E. Cuautle<sup>63</sup>, L. Cunqueiro<sup>36</sup>, T. Dahms<sup>92,37</sup>, A. Dainese<sup>108</sup>, A. Danu<sup>62</sup>, D. Das<sup>101</sup>, I. Das<sup>51,101</sup>, S. Das<sup>4</sup>, A. Dash<sup>121</sup>, S. Dash<sup>48</sup>, S. De<sup>120</sup>, A. De Caro<sup>31,12</sup>, G. de Cataldo<sup>104</sup>, J. de Cuveland<sup>43</sup>, A. De Falco<sup>25</sup>, D. De Gruttola<sup>12,31</sup>, N. De Marco<sup>111</sup>, S. De Pasquale<sup>31</sup>, A. Deisting<sup>97,93</sup>, A. Deloff<sup>77</sup>, E. Dénes<sup>136</sup>, G. D’Erasmus<sup>33</sup>, D. Di Bari<sup>33</sup>, A. Di Mauro<sup>36</sup>, P. Di Nezza<sup>72</sup>, M.A. Diaz Corchero<sup>10</sup>, T. Dietel<sup>89</sup>, P. Dillenseger<sup>53</sup>, R. 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C. Furget<sup>71</sup>, A. Furs<sup>56</sup>, M. Fusco Girard<sup>31</sup>, J.J. Gaardhøje<sup>80</sup>, M. Gagliardi<sup>27</sup>, A.M. Gago<sup>103</sup>,  
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G. Kiss<sup>136</sup>, J.L. Klay<sup>6</sup>, C. Klein<sup>53</sup>, J. Klein<sup>36,93</sup>, C. Klein-Bösing<sup>54</sup>, A. Kluge<sup>36</sup>,  
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M. Krzewicki<sup>43</sup>, A.M. Kubera<sup>20</sup>, V. Kučera<sup>83</sup>, T. Kugathasan<sup>36</sup>, C. Kuhn<sup>55</sup>, P.G. Kuijjer<sup>81</sup>,  
I. Kulakov<sup>43</sup>, A. Kumar<sup>90</sup>, J. Kumar<sup>48</sup>, L. Kumar<sup>79,87</sup>, P. Kurashvili<sup>77</sup>, A. Kurepin<sup>56</sup>,  
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 K. Oyama<sup>93</sup>, M. Ozdemir<sup>53</sup>, Y. Pachmayer<sup>93</sup>, P. Pagano<sup>31</sup>, G. Paić<sup>63</sup>, C. Pajares<sup>17</sup>,  
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<sup>i</sup> Deceased

<sup>ii</sup> Also at: M.V. Lomonosov Moscow State University, D.V. Skobeltsyn Institute of Nuclear Physics, Moscow, Russia

<sup>iii</sup> Also at: University of Kansas, Lawrence, Kansas, United States

<sup>1</sup> A.I. Alikhanyan National Science Laboratory (Yerevan Physics Institute) Foundation, Yerevan, Armenia

<sup>2</sup> Benemérita Universidad Autónoma de Puebla, Puebla, Mexico

<sup>3</sup> Bogolyubov Institute for Theoretical Physics, Kiev, Ukraine

<sup>4</sup> Bose Institute, Department of Physics and Centre for Astroparticle Physics and Space Science (CAPSS), Kolkata, India

<sup>5</sup> Budker Institute for Nuclear Physics, Novosibirsk, Russia

<sup>6</sup> California Polytechnic State University, San Luis Obispo, California, United States

<sup>7</sup> Central China Normal University, Wuhan, China

<sup>8</sup> Centre de Calcul de l'IN2P3, Villeurbanne, France

<sup>9</sup> Centro de Aplicaciones Tecnológicas y Desarrollo Nuclear (CEADEN), Havana, Cuba

<sup>10</sup> Centro de Investigaciones Energéticas Medioambientales y Tecnológicas (CIEMAT), Madrid, Spain

<sup>11</sup> Centro de Investigación y de Estudios Avanzados (CINVESTAV), Mexico City and Mérida, Mexico

<sup>12</sup> Centro Fermi - Museo Storico della Fisica e Centro Studi e Ricerche "Enrico Fermi", Rome, Italy

<sup>13</sup> Chicago State University, Chicago, Illinois, U.S.A.



- 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 Física de Partículas 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 Elettrotecnica 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*

- 62 *Institute of Space Science (ISS), Bucharest, Romania*  
63 *Instituto de Ciencias Nucleares, Universidad Nacional Autónoma de México, Mexico City, Mexico*  
64 *Instituto de Física, Universidad Nacional Autónoma de México, Mexico City, Mexico*  
65 *iThemba LABS, National Research Foundation, Somerset West, South Africa*  
66 *Joint Institute for Nuclear Research (JINR), Dubna, Russia*  
67 *Konkuk University, Seoul, South Korea*  
68 *Korea Institute of Science and Technology Information, Daejeon, South Korea*  
69 *KTO Karatay University, Konya, Turkey*  
70 *Laboratoire de Physique Corpusculaire (LPC), Clermont Université, Université Blaise Pascal, CNRS-IN2P3, Clermont-Ferrand, France*  
71 *Laboratoire de Physique Subatomique et de Cosmologie, Université Grenoble-Alpes, CNRS-IN2P3, Grenoble, France*  
72 *Laboratori Nazionali di Frascati, INFN, Frascati, Italy*  
73 *Laboratori Nazionali di Legnaro, INFN, Legnaro, Italy*  
74 *Lawrence Berkeley National Laboratory, Berkeley, California, United States*  
75 *Lawrence Livermore National Laboratory, Livermore, California, United States*  
76 *Moscow Engineering Physics Institute, Moscow, Russia*  
77 *National Centre for Nuclear Studies, Warsaw, Poland*  
78 *National Institute for Physics and Nuclear Engineering, Bucharest, Romania*  
79 *National Institute of Science Education and Research, Bhubaneswar, India*  
80 *Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark*  
81 *Nikhef, Nationaal instituut voor subatomaire fysica, Amsterdam, Netherlands*  
82 *Nuclear Physics Group, STFC Daresbury Laboratory, Daresbury, United Kingdom*  
83 *Nuclear Physics Institute, Academy of Sciences of the Czech Republic, Řež u Prahy, Czech Republic*  
84 *Oak Ridge National Laboratory, Oak Ridge, Tennessee, United States*  
85 *Petersburg Nuclear Physics Institute, Gatchina, Russia*  
86 *Physics Department, Creighton University, Omaha, Nebraska, United States*  
87 *Physics Department, Panjab University, Chandigarh, India*  
88 *Physics Department, University of Athens, Athens, Greece*  
89 *Physics Department, University of Cape Town, Cape Town, South Africa*  
90 *Physics Department, University of Jammu, Jammu, India*  
91 *Physics Department, University of Rajasthan, Jaipur, India*  
92 *Physik Department, Technische Universität München, Munich, Germany*  
93 *Physikalisches Institut, Ruprecht-Karls-Universität Heidelberg, Heidelberg, Germany*  
94 *Politecnico di Torino, Turin, Italy*  
95 *Purdue University, West Lafayette, Indiana, United States*  
96 *Pusan National University, Pusan, South Korea*  
97 *Research Division and ExtreMe Matter Institute EMMI, GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany*  
98 *Rudjer Bošković Institute, Zagreb, Croatia*  
99 *Russian Federal Nuclear Center (VNIIEF), Sarov, Russia*  
100 *Russian Research Centre Kurchatov Institute, Moscow, Russia*  
101 *Saha Institute of Nuclear Physics, Kolkata, India*  
102 *School of Physics and Astronomy, University of Birmingham, Birmingham, United Kingdom*  
103 *Sección Física, Departamento de Ciencias, Pontificia Universidad Católica del Perú, Lima, Peru*  
104 *Sezione INFN, Bari, Italy*  
105 *Sezione INFN, Bologna, Italy*  
106 *Sezione INFN, Cagliari, Italy*  
107 *Sezione INFN, Catania, Italy*  
108 *Sezione INFN, Padova, Italy*  
109 *Sezione INFN, Rome, Italy*  
110 *Sezione INFN, Trieste, Italy*  
111 *Sezione INFN, Turin, Italy*

- 112 *SSC IHEP of NRC Kurchatov institute, Protvino, Russia*  
113 *SUBATECH, Ecole des Mines de Nantes, Université de Nantes, CNRS-IN2P3, Nantes, France*  
114 *Suranaree University of Technology, Nakhon Ratchasima, Thailand*  
115 *Technical University of Košice, Košice, Slovakia*  
116 *Technical University of Split FESB, Split, Croatia*  
117 *The Henryk Niewodniczanski Institute of Nuclear Physics, Polish Academy of Sciences, Cracow, Poland*  
118 *The University of Texas at Austin, Physics Department, Austin, Texas, U.S.A.*  
119 *Universidad Autónoma de Sinaloa, Culiacán, Mexico*  
120 *Universidade de São Paulo (USP), São Paulo, Brazil*  
121 *Universidade Estadual de Campinas (UNICAMP), Campinas, Brazil*  
122 *University of Houston, Houston, Texas, United States*  
123 *University of Jyväskylä, Jyväskylä, Finland*  
124 *University of Liverpool, Liverpool, United Kingdom*  
125 *University of Tennessee, Knoxville, Tennessee, United States*  
126 *University of the Witwatersrand, Johannesburg, South Africa*  
127 *University of Tokyo, Tokyo, Japan*  
128 *University of Tsukuba, Tsukuba, Japan*  
129 *University of Zagreb, Zagreb, Croatia*  
130 *Université de Lyon, Université Lyon 1, CNRS/IN2P3, IPN-Lyon, Villeurbanne, France*  
131 *V. Fock Institute for Physics, St. Petersburg State University, St. Petersburg, Russia*  
132 *Variable Energy Cyclotron Centre, Kolkata, India*  
133 *Vinča Institute of Nuclear Sciences, Belgrade, Serbia*  
134 *Warsaw University of Technology, Warsaw, Poland*  
135 *Wayne State University, Detroit, Michigan, United States*  
136 *Wigner Research Centre for Physics, Hungarian Academy of Sciences, Budapest, Hungary*  
137 *Yale University, New Haven, Connecticut, United States*  
138 *Yonsei University, Seoul, South Korea*  
139 *Zentrum für Technologietransfer und Telekommunikation (ZTT), Fachhochschule Worms, Worms, Germany*