

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

(ALICE Collaboration) Adam, J.; ...; Antičić, Tome; ...; Erhardt, Filip; ...; Gotovac, Sven; ...; Mudnić, Eugen; ...; ...

Source / Izvornik: **Journal of High Energy Physics, 2017, 2017**

Journal article, Published version

Rad u časopisu, Objavljena verzija rada (izdavačev PDF)

[https://doi.org/10.1007/JHEP06\(2017\)032](https://doi.org/10.1007/JHEP06(2017)032)

Permanent link / Trajna poveznica: <https://um.nsk.hr/um:nbn:hr:217:035474>

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Download date / Datum preuzimanja: **2025-03-29**



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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



ALICE

The ALICE collaboration

E-mail: 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/ψ -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/ψ 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/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 3.4σ , obtained including the systematic uncertainties, and taking into account their correlation between

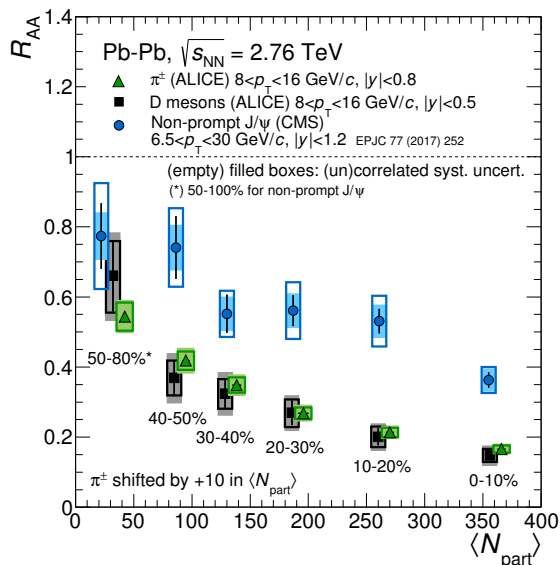


Figure 1. Comparison of the D meson R_{AA} (average of D^0 , D^+ and D^{*+}) in $8 < p_T < 16$ GeV/c [1] and of the R_{AA} of non-prompt J/ ψ mesons in $6.5 < p_T < 30$ GeV/c measured by the CMS collaboration [2]. The vertical bars represent the statistical uncertainties, while the filled (empty) boxes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

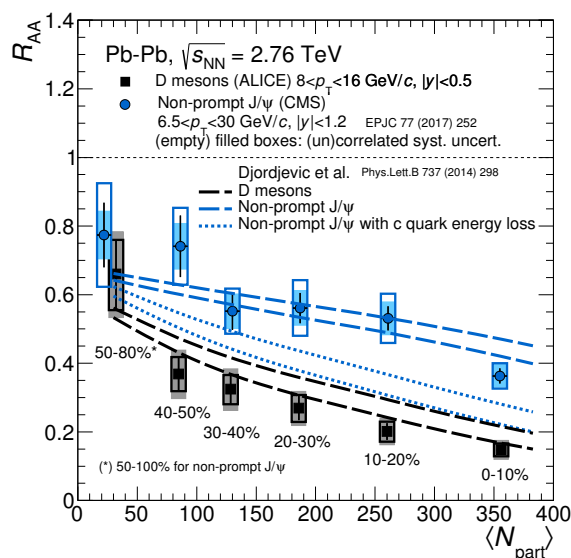


Figure 2. Comparison of the R_{AA} measurements with the calculations by Djordjevic et al. [4] including radiative and collisional energy loss. Lines of the same style enclose a band representing the theoretical uncertainty. For non-prompt J/ ψ mesons in $6.5 < p_T < 30$ GeV/c [2] the model results for 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].

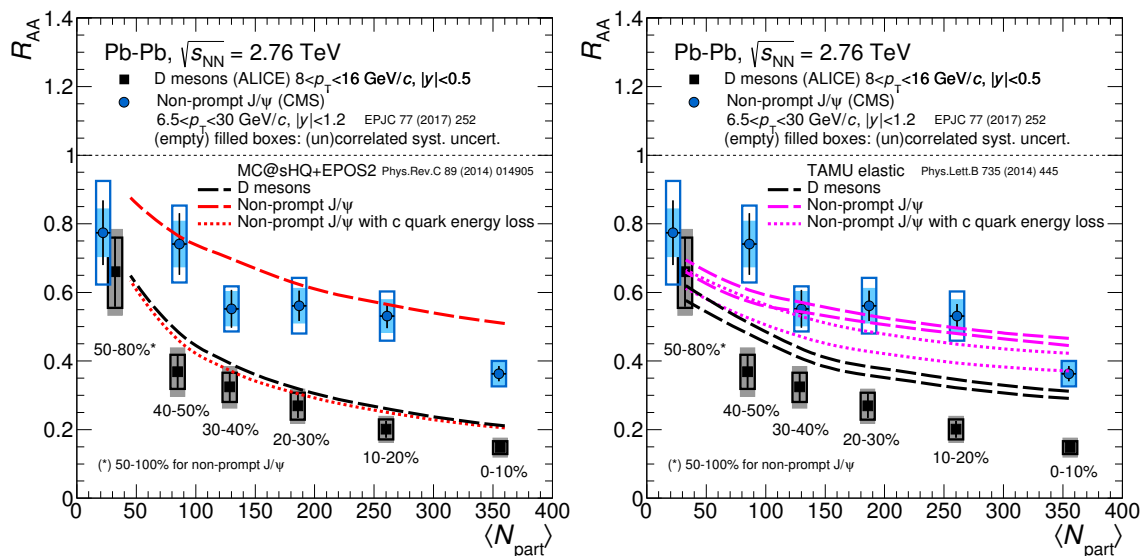


Figure 3. Comparison of the R_{AA} measurements with the $MC@sHQ+EPOS2$ model [5] including radiative and collisional interactions (left) and with the $TAMU\ elastic$ model [6] including collisional interactions via in-medium resonance formation. For both models, results for the case in which the b quark 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/ψ -meson measurements. In particular, the comparison of the D-meson R_{AA} with the non-prompt J/ψ -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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J. Adam⁴⁰, D. Adamová⁸³, M.M. Aggarwal⁸⁷, G. Aglieri Rinella³⁶, M. Agnello¹¹¹, N. Agrawal⁴⁸, Z. Ahammed¹³², S.U. Ahn⁶⁸, I. Aimo^{94,111}, S. Aiola¹³⁷, M. Ajaz¹⁶, A. Akindinov⁵⁸, S.N. Alam¹³², D. Aleksandrov¹⁰⁰, B. Alessandro¹¹¹, D. Alexandre¹⁰², R. Alfaro Molina⁶⁴, A. Alici^{105,12}, A. Alkin³, J.R.M. Almaraz¹¹⁹, J. Alme³⁸, T. Alt⁴³, S. Altinpinar¹⁸, I. Altsybeev¹³¹, C. Alves Garcia Prado¹²⁰, C. Andrei⁷⁸, A. Andronic⁹⁷, V. Anguelov⁹³, J. Anielski⁵⁴, T. Antičić⁹⁸, F. Antinori¹⁰⁸, P. Antonioli¹⁰⁵, L. Aphecetche¹¹³, H. Appelshäuser⁵³, S. Arcelli²⁸, N. Armesto¹⁷, R. Arnaldi¹¹¹, I.C. Arsene²², M. Arslandok⁵³, B. Audurier¹¹³, A. Augustinus³⁶, R. Averbeck⁹⁷, M.D. Azmi¹⁹, M. Bach⁴³, A. Badalà¹⁰⁷, Y.W. Baek⁴⁴, S. Bagnasco¹¹¹, R. Bailhache⁵³, R. Bala⁹⁰, A. Baldisseri¹⁵, F. Baltasar Dos Santos Pedrosa³⁶, R.C. Baral⁶¹, A.M. Barbano¹¹¹, R. Barbera²⁹, F. Barile³³, G.G. Barnaföldi¹³⁶, L.S. Barnby¹⁰², V. Barret⁷⁰, P. Bartalini⁷, K. Barth³⁶, J. Bartke¹¹⁷, E. Bartsch⁵³, M. Basile²⁸, N. Bastid⁷⁰, S. Basu¹³², B. Bathen⁵⁴, G. Batigne¹¹³, A. Batista Camejo⁷⁰, B. Batyunya⁶⁶, P.C. Batzing²², I.G. Bearden⁸⁰, H. Beck⁵³, C. Bedda¹¹¹, N.K. Behera^{48,49}, I. Belikov⁵⁵, F. Bellini²⁸, H. Bello Martinez², R. Bellwied¹²², R. Belmont¹³⁵, E. Belmont-Moreno⁶⁴, V. Belyaev⁷⁶, G. Bencedi¹³⁶, S. Beole²⁷, I. Berceau⁷⁸, A. Bercuci⁷⁸, Y. Berdnikov⁸⁵, D. Berenyi¹³⁶, R.A. Bertens⁵⁷, D. Berzano^{36,27}, L. Betev³⁶, A. Bhasin⁹⁰, I.R. Bhat⁹⁰, A.K. Bhati⁸⁷, B. Bhattacharjee⁴⁵, J. Bhom¹²⁸, L. Bianchi¹²², N. Bianchi⁷², C. Bianchin^{135,57}, J. Bielčík⁴⁰, J. Bielčíková⁸³, A. Bilandzic⁸⁰, R. Biswas⁴, S. Biswas⁷⁹, S. Bjelogrić⁵⁷, F. Blanco¹⁰, D. Blau¹⁰⁰, C. Blume⁵³, F. Bock^{74,93}, A. Bogdanov⁷⁶, H. Bøggild⁸⁰, L. Boldizsár¹³⁶, M. Bombara⁴¹, J. Book⁵³, H. Borel¹⁵, A. Borissov⁹⁶, M. Borri⁸², F. Bossú⁶⁵, E. Botta²⁷, S. Böttger⁵², P. Braun-Munzinger⁹⁷, M. Bregant¹²⁰, T. Breitner⁵², T.A. Broker⁵³, T.A. Browning⁹⁵, M. Broz⁴⁰, E.J. Brucken⁴⁶, E. Bruna¹¹¹, G.E. Bruno³³, D. Budnikov⁹⁹, H. Buesching⁵³, S. Bufalino^{36,111}, P. Buncic³⁶, O. Busch^{93,128}, Z. Buthelezi⁶⁵, J.B. Butt¹⁶, J.T. Buxton²⁰, D. Caffarri³⁶, X. Cai⁷, H. Caines¹³⁷, L. Calero Diaz⁷², A. Caliva⁵⁷, E. Calvo Villar¹⁰³, P. Camerini²⁶, F. Carena³⁶, W. Carena³⁶, J. Castillo Castellanos¹⁵, A.J. Castro¹²⁵, E.A.R. Casula²⁵, C. Cavicchioli³⁶, C. Ceballos Sanchez⁹, J. Cepila⁴⁰, P. Cerello¹¹¹, J. Cerkala¹¹⁵, B. Chang¹²³, S. Chapeland³⁶, M. Chartier¹²⁴, J.L. Charvet¹⁵, S. Chattopadhyay¹³², S. Chattopadhyay¹⁰¹, V. Chelnokov³, M. Cherney⁸⁶, C. Cheshkov¹³⁰, B. Cheynis¹³⁰, V. Chibante Barroso³⁶, D.D. Chinellato¹²¹, P. Chochula³⁶, K. Choi⁹⁶, M. Chojnacki⁸⁰, S. Choudhury¹³², P. Christakoglou⁸¹, C.H. Christensen⁸⁰, P. Christiansen³⁴, T. Chujo¹²⁸, S.U. Chung⁹⁶, Z. Chunhui⁵⁷, C. Cicalo¹⁰⁶, L. Cifarelli^{12,28}, F. Cindolo¹⁰⁵, J. Cleymans⁸⁹, F. Colamaria³³, D. Colella^{36,59,33}, A. Collu²⁵, M. Colocci²⁸, G. Conesa Balbastre⁷¹, Z. Conesa del Valle⁵¹, M.E. Connors¹³⁷, J.G. Contreras^{11,40}, T.M. Cormier⁸⁴, Y. Corrales Morales²⁷, I. Cortés Maldonado², P. Cortese³², M.R. Cosentino¹²⁰, F. Costa³⁶, P. Crochet⁷⁰, R. Cruz Albino¹¹, E. Cuautle⁶³, L. Cunqueiro³⁶, T. Dahms^{92,37}, A. Dainese¹⁰⁸, A. Danu⁶², D. Das¹⁰¹, I. Das^{51,101}, S. Das⁴, A. Dash¹²¹, S. Dash⁴⁸, S. De¹²⁰, A. De Caro^{31,12}, G. de Cataldo¹⁰⁴, J. de Cuveland⁴³, A. De Falco²⁵, D. De Gruttola^{12,31}, N. De Marco¹¹¹, S. De Pasquale³¹, A. Deisting^{97,93}, A. Deloff⁷⁷, E. Dénes¹³⁶, G. D’Erasmus³³, D. Di Bari³³, A. Di Mauro³⁶, P. Di Nezza⁷², M.A. Diaz Corchero¹⁰, T. Dietel⁸⁹, P. Dillenseger⁵³, R. Divià³⁶, Ø. Djuvsland¹⁸, A. Dobrin^{57,81}, T. Dobrowolski^{77,i}, D. Domenicis Gimenez¹²⁰, B. Dönigus⁵³, O. Dordic²², A.K. Dubey¹³², A. Dubla⁵⁷, L. Ducroux¹³⁰, P. Dupieux⁷⁰, R.J. Ehlers¹³⁷, D. Elia¹⁰⁴, H. Engel⁵², B. Erazmus^{36,113}, I. Erdemir⁵³, F. Erhardt¹²⁹, D. Eschweiler⁴³, B. Espagnon⁵¹, M. Estienne¹¹³, S. Esumi¹²⁸, J. Eum⁹⁶, D. Evans¹⁰², S. Evdokimov¹¹², G. Eyyubova⁴⁰, L. Fabbietti^{37,92}, D. Fabris¹⁰⁸, J. Faivre⁷¹, A. Fantoni⁷², M. Fasel⁷⁴, L. Feldkamp⁵⁴, D. Felea⁶², A. Feliciello¹¹¹, G. Feofilov¹³¹, J. Ferencei⁸³, A. Fernández Téllez², E.G. Ferreira¹⁷, A. Ferretti²⁷, A. Festanti³⁰, V.J.G. Feuillard^{15,70}, J. Figiel¹¹⁷, M.A.S. Figueredo¹²⁴,

S. Filchagin⁹⁹, D. Finogeev⁵⁶, E.M. Fiore³³, M.G. Fleck⁹³, M. Floris³⁶, S. Foertsch⁶⁵,
P. Foka⁹⁷, S. Fokin¹⁰⁰, E. Fragiaco¹¹⁰, A. Francescon^{30,36}, U. Frankenfeld⁹⁷, U. Fuchs³⁶,
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M. Gallio²⁷, D.R. Gangadharan⁷⁴, P. Ganoti⁸⁸, C. Gao⁷, C. Garabatos⁹⁷, E. Garcia-Solis¹³,
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A. Grigoras³⁶, C. Grigoras³⁶, V. Grigoriev⁷⁶, A. Grigoryan¹, S. Grigoryan⁶⁶, B. Grinyov³,
N. Grion¹¹⁰, J.F. Grosse-Oetringhaus³⁶, J.-Y. Grossiord¹³⁰, R. Grosso³⁶, F. Guber⁵⁶,
R. Guernane⁷¹, B. Guerzoni²⁸, K. Gulbrandsen⁸⁰, H. Gulkanyan¹, T. Gunji¹²⁷, A. Gupta⁹⁰,
R. Gupta⁹⁰, R. Haake⁵⁴, Ø. Haaland¹⁸, C. Hadjidakis⁵¹, M. Haiduc⁶², H. Hamagaki¹²⁷,
G. Hamar¹³⁶, A. Hansen⁸⁰, J.W. Harris¹³⁷, H. Hartmann⁴³, A. Harton¹³, D. Hatzifotiadiou¹⁰⁵,
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Corral¹¹, B.A. Hess³⁵, K.F. Hetland³⁸, T.E. Hilden⁴⁶, H. Hillemanns³⁶, B. Hippolyte⁵⁵,
R. Hosokawa¹²⁸, P. Hristov³⁶, M. Huang¹⁸, T.J. Humanic²⁰, N. Hussain⁴⁵, T. Hussain¹⁹,
D. Hutter⁴³, D.S. Hwang²¹, R. Ilkaev⁹⁹, I. Ilkiv⁷⁷, M. Inaba¹²⁸, M. Ippolitov^{76,100}, M. Irfan¹⁹,
M. Ivanov⁹⁷, V. Ivanov⁸⁵, V. Izucheev¹¹², P.M. Jacobs⁷⁴, S. Jadlovská¹¹⁵, C. Jahnke¹²⁰,
H.J. Jang⁶⁸, M.A. Janik¹³⁴, P.H.S.Y. Jayarathna¹²², C. Jena³⁰, S. Jena¹²², R.T. Jimenez
Bustamante⁹⁷, P.G. Jones¹⁰², H. Jung⁴⁴, A. Jusko¹⁰², P. Kalinak⁵⁹, A. Kalweit³⁶, J. Kamin⁵³,
J.H. Kang¹³⁸, V. Kaplin⁷⁶, S. Kar¹³², A. Karasu Uysal⁶⁹, O. Karavichev⁵⁶, T. Karavicheva⁵⁶,
L. Karayan^{97,93}, E. Karpechev⁵⁶, U. Keschull⁵², R. Keidel¹³⁹, D.L.D. Keijdener⁵⁷,
M. Keil³⁶, K.H. Khan¹⁶, M.M. Khan¹⁹, P. Khan¹⁰¹, S.A. Khan¹³², A. Khanzadeev⁸⁵,
Y. Kharlov¹¹², B. Kileng³⁸, B. Kim¹³⁸, D.W. Kim^{44,68}, D.J. Kim¹²³, H. Kim¹³⁸, J.S. Kim⁴⁴,
M. Kim⁴⁴, M. Kim¹³⁸, S. Kim²¹, T. Kim¹³⁸, S. Kirsch⁴³, I. Kisel⁴³, S. Kiselev⁵⁸, A. Kisiel¹³⁴,
G. Kiss¹³⁶, J.L. Klay⁶, C. Klein⁵³, J. Klein^{36,93}, C. Klein-Bösing⁵⁴, A. Kluge³⁶,
M.L. Knichel⁹³, A.G. Knospe¹¹⁸, T. Kobayashi¹²⁸, C. Kobdaj¹¹⁴, M. Kofarago³⁶,
T. Kollegger^{97,43}, A. Kolojvari¹³¹, V. Kondratiev¹³¹, N. Kondratyeva⁷⁶, E. Kondratyuk¹¹²,
A. Konevskikh⁵⁶, M. Kopicik¹¹⁵, M. Kour⁹⁰, C. Kouzinopoulos³⁶, O. Kovalenko⁷⁷,
V. Kovalenko¹³¹, M. Kowalski¹¹⁷, G. Koyithatta Meethalevedu⁴⁸, J. Kral¹²³, I. Králik⁵⁹,
A. Kravčáková⁴¹, M. Krelina⁴⁰, M. Kretz⁴³, M. Krivda^{102,59}, F. Krizek⁸³, E. Kryshen³⁶,
M. Krzewicki⁴³, A.M. Kubera²⁰, V. Kučera⁸³, T. Kugathasan³⁶, C. Kuhn⁵⁵, P.G. Kuijer⁸¹,
I. Kulakov⁴³, A. Kumar⁹⁰, J. Kumar⁴⁸, L. Kumar^{79,87}, P. Kurashvili⁷⁷, A. Kurepin⁵⁶,
A.B. Kurepin⁵⁶, A. Kuryakin⁹⁹, S. Kushpil⁸³, M.J. Kweon⁵⁰, Y. Kwon¹³⁸, S.L. La Pointe¹¹¹,
P. La Rocca²⁹, C. Lagana Fernandes¹²⁰, I. Lakomov³⁶, R. Langoy⁴², C. Lara⁵², A. Lardeux¹⁵,
A. Lattuca²⁷, E. Laudi³⁶, R. Lea²⁶, L. Leardini⁹³, G.R. Lee¹⁰², S. Lee¹³⁸, I. Legrand³⁶,
F. Lehas⁸¹, R.C. Lemmon⁸², V. Lenti¹⁰⁴, E. Leogrande⁵⁷, I. León Monzón¹¹⁹, M. Leoncino²⁷,
P. Lévai¹³⁶, S. Li^{7,70}, X. Li¹⁴, J. Lien⁴², R. Lietava¹⁰², S. Lindal²², V. Lindenstruth⁴³,
C. Lippmann⁹⁷, M.A. Lisa²⁰, H.M. Ljunggren³⁴, D.F. Lodato⁵⁷, P.I. Loenne¹⁸, V. Loginov⁷⁶,
C. Loizides⁷⁴, X. Lopez⁷⁰, E. López Torres⁹, A. Lowe¹³⁶, P. Luettig⁵³, M. Lunardon³⁰,
G. Luparello²⁶, P.H.F.N.D. Luz¹²⁰, A. Maevskaya⁵⁶, M. Mager³⁶, S. Mahajan⁹⁰,
S.M. Mahmood²², A. Maire⁵⁵, R.D. Majka¹³⁷, M. Malaev⁸⁵, I. Maldonado Cervantes⁶³,
L. Malinina^{ii,66}, D. Mal'Kevich⁵⁸, P. Malzacher⁹⁷, A. Mamonov⁹⁹, V. Manko¹⁰⁰, F. Manso⁷⁰,
V. Manzari^{36,104}, M. Marchisone²⁷, J. Mareš⁶⁰, G.V. Margagliotti²⁶, A. Margotti¹⁰⁵,
J. Margutti⁵⁷, A. Marín⁹⁷, C. Markert¹¹⁸, M. Marquard⁵³, N.A. Martin⁹⁷, J. Martin
Blanco¹¹³, P. Martinengo³⁶, M.I. Martínez², G. Martínez García¹¹³, M. Martinez Pedreira³⁶,
Y. Martynov³, A. Mas¹²⁰, S. Masciocchi⁹⁷, M. Maserà²⁷, A. Masoni¹⁰⁶, L. Massacrier¹¹³,
A. Mastroserio³³, H. Masui¹²⁸, A. Matyja¹¹⁷, C. Mayer¹¹⁷, J. Mazer¹²⁵, M.A. Mazzone¹⁰⁹,
D. McDonald¹²², F. Meddi²⁴, Y. Melikyan⁷⁶, A. Menchaca-Rocha⁶⁴, E. Meninno³¹, J. Mercado

Pérez⁹³, M. Meres³⁹, Y. Miake¹²⁸, M.M. Mieskolainen⁴⁶, K. Mikhaylov^{58,66}, L. Milano³⁶,
 J. Milosevic^{22,133}, L.M. Minervini^{104,23}, A. Mischke⁵⁷, A.N. Mishra⁴⁹, D. Miśkowiec⁹⁷,
 J. Mitra¹³², C.M. Mitu⁶², N. Mohammadi⁵⁷, B. Mohanty^{132,79}, L. Molnar⁵⁵, L. Montaña
 Zetina¹¹, E. Montes¹⁰, M. Morando³⁰, D.A. Moreira De Godoy^{113,54}, S. Moretto³⁰,
 A. Morreale¹¹³, A. Morsch³⁶, V. Muccifora⁷², E. Mudnic¹¹⁶, D. Mühlheim⁵⁴, S. Muhuri¹³²,
 M. Mukherjee¹³², J.D. Mulligan¹³⁷, M.G. Munhoz¹²⁰, S. Murray⁶⁵, L. Musa³⁶, J. Musinsky⁵⁹,
 B.K. Nandi⁴⁸, R. Nania¹⁰⁵, E. Nappi¹⁰⁴, M.U. Naru¹⁶, C. Natrass¹²⁵, K. Nayak⁷⁹,
 T.K. Nayak¹³², S. Nazarenko⁹⁹, A. Nedosekin⁵⁸, L. Nellen⁶³, F. Ng¹²², M. Nicassio⁹⁷,
 M. Niculescu^{62,36}, J. Niedziela³⁶, B.S. Nielsen⁸⁰, S. Nikolaev¹⁰⁰, S. Nikulin¹⁰⁰, V. Nikulin⁸⁵,
 F. Noferini^{105,12}, P. Nomokonov⁶⁶, G. Nooren⁵⁷, J.C.C. Noris², J. Norman¹²⁴, A. Nyanin¹⁰⁰,
 J. Nystrand¹⁸, H. Oeschler⁹³, S. Oh¹³⁷, S.K. Oh⁶⁷, A. Ohlson³⁶, A. Okatan⁶⁹, T. Okubo⁴⁷,
 L. Olah¹³⁶, J. Oleniacz¹³⁴, A.C. Oliveira Da Silva¹²⁰, M.H. Oliver¹³⁷, J. Onderwaater⁹⁷,
 C. Oppedisano¹¹¹, R. Orava⁴⁶, A. Ortiz Velasquez⁶³, A. Oskarsson³⁴, J. Otwinowski¹¹⁷,
 K. Oyama⁹³, M. Ozdemir⁵³, Y. Pachmayer⁹³, P. Pagano³¹, G. Paić⁶³, C. Pajares¹⁷,
 S.K. Pal¹³², J. Pan¹³⁵, A.K. Pandey⁴⁸, D. Pant⁴⁸, P. Papcun¹¹⁵, V. Papikyan¹,
 G.S. Pappalardo¹⁰⁷, P. Pareek⁴⁹, W.J. Park⁹⁷, S. Parmar⁸⁷, A. Passfeld⁵⁴, V. Paticchio¹⁰⁴,
 R.N. Patra¹³², B. Paul¹⁰¹, T. Peitzmann⁵⁷, H. Pereira Da Costa¹⁵, E. Pereira De Oliveira
 Filho¹²⁰, D. Peresunko^{100,76}, C.E. Pérez Lara⁸¹, E. Perez Lezama⁵³, V. Peskov⁵³, Y. Pestov⁵,
 V. Petráček⁴⁰, V. Petrov¹¹², M. Petrovici⁷⁸, C. Petta²⁹, S. Piano¹¹⁰, M. Pikna³⁹, P. Pillot¹¹³,
 O. Pinazza^{105,36}, L. Pinsky¹²², D.B. Piyarathna¹²², M. Płoskoń⁷⁴, M. Planinic¹²⁹, J. Pluta¹³⁴,
 S. Pochybova¹³⁶, P.L.M. Podesta-Lerma¹¹⁹, M.G. Poghosyan^{84,86}, B. Polichtchouk¹¹²,
 N. Poljak¹²⁹, W. Poonsawat¹¹⁴, A. Pop⁷⁸, S. Porteboeuf-Houssais⁷⁰, J. Porter⁷⁴, J. Pospisil⁸³,
 S.K. Prasad⁴, R. Preghenella^{105,36}, F. Prino¹¹¹, C.A. Pruneau¹³⁵, I. Pshenichnov⁵⁶,
 M. Puccio¹¹¹, G. Puddu²⁵, P. Pujahari¹³⁵, V. Punin⁹⁹, J. Putschke¹³⁵, H. Qvigstad²²,
 A. Rachevski¹¹⁰, S. Raha⁴, S. Rajput⁹⁰, J. Rak¹²³, A. Rakotozafindrabe¹⁵, L. Ramello³²,
 R. Raniwala⁹¹, S. Raniwala⁹¹, S.S. Räsänen⁴⁶, B.T. Rascanu⁵³, D. Rathee⁸⁷, K.F. Read¹²⁵,
 J.S. Real⁷¹, K. Redlich⁷⁷, R.J. Reed¹³⁵, A. Rehman¹⁸, P. Reichelt⁵³, F. Reidt^{93,36}, X. Ren⁷,
 R. Renfordt⁵³, A.R. Reolon⁷², A. Reshetin⁵⁶, F. Rettig⁴³, J.-P. Revol¹², K. Reygers⁹³,
 V. Riabov⁸⁵, R.A. Ricci⁷³, T. Richert³⁴, M. Richter²², P. Riedler³⁶, W. Riegler³⁶, F. Riggi²⁹,
 C. Ristea⁶², A. Rivetti¹¹¹, E. Rocco⁵⁷, M. Rodríguez Cahuantzi², A. Rodríguez Manso⁸¹,
 K. Røed²², E. Rogochaya⁶⁶, D. Rohr⁴³, D. Röhrich¹⁸, R. Romita¹²⁴, F. Ronchetti⁷²,
 L. Ronflette¹¹³, P. Rosnet⁷⁰, A. Rossi^{30,36}, F. Roukoutakis⁸⁸, A. Roy⁴⁹, C. Roy⁵⁵, P. Roy¹⁰¹,
 A.J. Rubio Montero¹⁰, R. Rui²⁶, R. Russo²⁷, E. Ryabinkin¹⁰⁰, Y. Ryabov⁸⁵, A. Rybicki¹¹⁷,
 S. Sadovsky¹¹², K. Šafařík³⁶, B. Sahlmuller⁵³, P. Sahoo⁴⁹, R. Sahoo⁴⁹, S. Sahoo⁶¹,
 P.K. Sahu⁶¹, J. Saini¹³², S. Sakai⁷², M.A. Saleh¹³⁵, C.A. Salgado¹⁷, J. Salzwedel²⁰,
 S. Sambyal⁹⁰, V. Samsonov⁸⁵, X. Sanchez Castro⁵⁵, L. Šándor⁵⁹, A. Sandoval⁶⁴, M. Sano¹²⁸,
 D. Sarkar¹³², E. Scapparone¹⁰⁵, F. Scarlassara³⁰, R.P. Scharenberg⁹⁵, C. Schiaua⁷⁸,
 R. Schicker⁹³, C. Schmidt⁹⁷, H.R. Schmidt³⁵, S. Schuchmann⁵³, J. Schukraft³⁶, M. Schulc⁴⁰,
 T. Schuster¹³⁷, Y. Schutz^{113,36}, K. Schwarz⁹⁷, K. Schweda⁹⁷, G. Scioli²⁸, E. Scomparin¹¹¹,
 R. Scott¹²⁵, K.S. Seeder¹²⁰, J.E. Seger⁸⁶, Y. Sekiguchi¹²⁷, D. Sekihata⁴⁷, I. Selyuzhenkov⁹⁷,
 K. Senosi⁶⁵, J. Seo^{96,67}, E. Serradilla^{64,10}, A. Sevcenco⁶², A. Shabanov⁵⁶, A. Shabetai¹¹³,
 O. Shadura³, R. Shahoyan³⁶, A. Shangaraev¹¹², A. Sharma⁹⁰, M. Sharma⁹⁰, M. Sharma⁹⁰,
 N. Sharma^{125,61}, K. Shigaki⁴⁷, K. Shtejer^{9,27}, Y. Sibirak¹⁰⁰, S. Siddhanta¹⁰⁶,
 K.M. Sielewicz³⁶, T. Siemiarczuk⁷⁷, D. Silvermyr^{84,34}, C. Silvestre⁷¹, G. Simatovic¹²⁹,
 G. Simonetti³⁶, R. Singaraju¹³², R. Singh⁷⁹, S. Singha^{132,79}, V. Singhal¹³², B.C. Sinha¹³²,
 T. Sinha¹⁰¹, B. Sitar³⁹, M. Sitta³², T.B. Skaali²², M. Slupecki¹²³, N. Smirnov¹³⁷,
 R.J.M. Snellings⁵⁷, T.W. Snellman¹²³, C. Sogaard³⁴, R. Soltz⁷⁵, J. Song⁹⁶, M. Song¹³⁸,
 Z. Song⁷, F. Soramel³⁰, S. Sorensen¹²⁵, M. Spacek⁴⁰, E. Spiriti⁷², I. Sputowska¹¹⁷,
 M. Spyropoulou-Stassinaki⁸⁸, B.K. Srivastava⁹⁵, J. Stachel⁹³, I. Stan⁶², G. Stefanek⁷⁷,

M. Steinpreis²⁰, E. Stenlund³⁴, G. Steyn⁶⁵, J.H. Stiller⁹³, D. Stocco¹¹³, P. Strmen³⁹,
A.A.P. Suaide¹²⁰, T. Sugitate⁴⁷, C. Suire⁵¹, M. Suleymanov¹⁶, R. Sultanov⁵⁸, M. Šumbera⁸³,
T.J.M. Symons⁷⁴, A. Szabo³⁹, A. Szanto de Toledo¹²⁰,ⁱ, I. Szarka³⁹, A. Szczepankiewicz³⁶,
M. Szymanski¹³⁴, J. Takahashi¹²¹, N. Tanaka¹²⁸, M.A. Tangaro³³, J.D. Tapia Takaki^{iii,51},
A. Tarantola Peloni⁵³, M. Tarhini⁵¹, M. Tariq¹⁹, M.G. Tarzila⁷⁸, A. Tauro³⁶, G. Tejada
Muñoz², A. Telesca³⁶, K. Terasaki¹²⁷, C. Terrevoli^{30,25}, B. Teyssier¹³⁰, J. Thäder^{74,97},
D. Thomas¹¹⁸, R. Tieulent¹³⁰, A.R. Timmins¹²², A. Toia⁵³, S. Trogolo¹¹¹, V. Trubnikov³,
W.H. Trzaska¹²³, T. Tsuji¹²⁷, A. Tumkin⁹⁹, R. Turrisi¹⁰⁸, T.S. Tveter²², K. Ullaland¹⁸,
A. Uras¹³⁰, G.L. Usai²⁵, A. Utrobicic¹²⁹, M. Vajzer⁸³, M. Vala⁵⁹, L. Valencia Palomo⁷⁰,
S. Vallero²⁷, J. Van Der Maarel⁵⁷, J.W. Van Hoorne³⁶, M. van Leeuwen⁵⁷, T. Vanat⁸³,
P. Vande Vyvre³⁶, D. Varga¹³⁶, A. Vargas², M. Vargyas¹²³, R. Varma⁴⁸, M. Vasileiou⁸⁸,
A. Vasiliev¹⁰⁰, A. Vauthier⁷¹, V. Vechernin¹³¹, A.M. Veen⁵⁷, M. Veldhoen⁵⁷, A. Velure¹⁸,
M. Venaruzzo⁷³, E. Vercellin²⁷, S. Vergara Limón², R. Vernet⁸, M. Verweij^{135,36},
L. Vickovic¹¹⁶, G. Viesti³⁰,ⁱ, J. Viinikainen¹²³, Z. Vilakazi¹²⁶, O. Villalobos Baillie¹⁰²,
A. Vinogradov¹⁰⁰, L. Vinogradov¹³¹, Y. Vinogradov⁹⁹,ⁱ, T. Virgili³¹, V. Vislavicius³⁴,
Y.P. Viyogi¹³², A. Vodopyanov⁶⁶, M.A. Völkl⁹³, K. Voloshin⁵⁸, S.A. Voloshin¹³⁵,
G. Volpe^{136,36}, B. von Haller³⁶, I. Vorobyev^{37,92}, D. Vranic^{36,97}, J. Vrláková⁴¹,
B. Vulpescu⁷⁰, A. Vyushin⁹⁹, B. Wagner¹⁸, J. Wagner⁹⁷, H. Wang⁵⁷, M. Wang^{7,113},
Y. Wang⁹³, D. Watanabe¹²⁸, Y. Watanabe¹²⁷, M. Weber³⁶, S.G. Weber⁹⁷, J.P. Wessels⁵⁴,
U. Westerhoff⁵⁴, J. Wiechula³⁵, J. Wikne²², M. Wilde⁵⁴, G. Wilk⁷⁷, J. Wilkinson⁹³,
M.C.S. Williams¹⁰⁵, B. Windelband⁹³, M. Winn⁹³, C.G. Yaldo¹³⁵, H. Yang⁵⁷, P. Yang⁷,
S. Yano⁴⁷, Z. Yin⁷, H. Yokoyama¹²⁸, I.-K. Yoo⁹⁶, V. Yurchenko³, I. Yushmanov¹⁰⁰,
A. Zaborowska¹³⁴, V. Zaccolo⁸⁰, A. Zaman¹⁶, C. Zampolli¹⁰⁵, H.J.C. Zanolli¹²⁰,
S. Zaporozhets⁶⁶, N. Zardoshti¹⁰², A. Zarochentsev¹³¹, P. Závada⁶⁰, N. Zaviyalov⁹⁹,
H. Zbroszczyk¹³⁴, I.S. Zgura⁶², M. Zhalov⁸⁵, H. Zhang^{18,7}, X. Zhang⁷⁴, Y. Zhang⁷,
C. Zhao²², N. Zhigareva⁵⁸, D. Zhou⁷, Y. Zhou^{80,57}, Z. Zhou¹⁸, H. Zhu^{18,7}, J. Zhu^{113,7},
X. Zhu⁷, A. Zichichi^{12,28}, A. Zimmermann⁹³, M.B. Zimmermann^{54,36}, G. Zinovjev³,
M. Zyzak⁴³

ⁱ Deceased

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

ⁱⁱⁱ Also at: University of Kansas, Lawrence, Kansas, United States

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

² Benemérita Universidad Autónoma de Puebla, Puebla, Mexico

³ Bogolyubov Institute for Theoretical Physics, Kiev, Ukraine

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

⁵ Budker Institute for Nuclear Physics, Novosibirsk, Russia

⁶ California Polytechnic State University, San Luis Obispo, California, United States

⁷ Central China Normal University, Wuhan, China

⁸ Centre de Calcul de l'IN2P3, Villeurbanne, France

⁹ Centro de Aplicaciones Tecnológicas y Desarrollo Nuclear (CEADEN), Havana, Cuba

¹⁰ Centro de Investigaciones Energéticas Medioambientales y Tecnológicas (CIEMAT), Madrid, Spain

¹¹ Centro de Investigación y de Estudios Avanzados (CINVESTAV), Mexico City and Mérida, Mexico

¹² Centro Fermi - Museo Storico della Fisica e Centro Studi e Ricerche “Enrico Fermi”, Rome, Italy

¹³ 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*