Available online at www.sciencedirect.com

ScienceDirect

Nuclear Physics A 1005 (2021) 122087

NUCLEAR PHYSICS A

www.elsevier.com/locate/nuclphysa

XXVIIIth International Conference on Ultra-relativistic Nucleus–Nucleus Collisions (Quark Matter 2019)

ALICE Collaboration

S. Acharya [140], D. Adamová [94], A. Adler [73], J. Adolfsson [80], M.M. Aggarwal [99], G. Aglieri Rinella [33], M. Agnello [30], N. Agrawal [53], Z. Ahammed [140], S. Ahmad [16], S.U. Ahn [75], A. Akindinov [91], M. Al-Turany [106], S.N. Alam [140], D.S.D. Albuquerque [121], D. Aleksandrov [87], B. Alessandro [58], H.M. Alfanda [6], R. Alfaro Molina [70], B. Ali [16], Y. Ali [14], A. Alici [26,10,53], A. Alkin [2], J. Alme [21], T. Alt [67], L. Altenkamper [21], I. Altsybeev [112], M.N. Anaam [6], C. Andrei [47], D. Andreou [33], H.A. Andrews [110], A. Andronic [143], M. Angeletti [33], V. Anguelov [103], C. Anson [15], T. Antičić [107], F. Antinori [56], P. Antonioli [53], R. Anwar [124], N. Apadula [79], L. Aphecetche [114], H. Appelshäuser [67], S. Arcelli [26], R. Arnaldi [58], M. Arratia [79], I.C. Arsene [20], M. Arslandok [103], A. Augustinus [33], R. Averbeck [106], S. Aziz [77], M.D. Azmi [16], A. Badalà [55], Y.W. Baek [40], S. Bagnasco [58], X. Bai [106], R. Bailhache [67], R. Bala [100], A. Balbino [30], A. Baldisseri [136], M. Ball [42], S. Balouza [104], D. Banerjee [3], R. Barbera [27], L. Barioglio [25], G.G. Barnaföldi [144], L.S. Barnby [93], V. Barret [133], P. Bartalini [6], K. Barth [33], E. Bartsch [67], F. Baruffaldi [28], N. Bastid [133], S. Basu [142], G. Batigne [114], B. Batyunya [74], D. Bauri [48], J.L. Bazo Alba [111], I.G. Bearden [88], C. Bedda [61], N.K. Behera [60], I. Belikov [135], A.D.C. Bell Hechavarria [143], F. Bellini [33], R. Bellwied [124], V. Belyaev [92], G. Bencedi [144], S. Beole [25], A. Bercuci [47], Y. Berdnikov [97], D. Berenyi [144], R.A. Bertens [129], D. Berzano [58], M.G. Besoiu [66], L. Betev [33], A. Bhasin [100], I.R. Bhat [100], M.A. Bhat [3], H. Bhatt [48], B. Bhattacharjee [41], A. Bianchi [25], L. Bianchi [25], N. Bianchi [51], J. Bielčík [36], J. Bielčíková [94], A. Bilandzic [104], G. Biro [144], R. Biswas [3], S. Biswas [3], J.T. Blair [118], D. Blau [87], C. Blume [67], G. Boca [138], F. Bock [95,33], A. Bogdanov [92], S. Boi [23], L. Boldizsár [144], A. Bolozdynya [92],

https://doi.org/10.1016/S0375-9474(20)30412-7
0375-9474/2020 Published by Elsevier B.V.

M. Bombara [37], G. Bonomi [139], H. Borel [136], A. Borissov [92,143], H. Bossi [145], E. Botta [25], L. Bratrud [67], P. Braun-Munzinger [106], M. Bregant [120], M. Broz [36], E. Bruna [58], G.E. Bruno [105,32], M.D. Buckland [126], D. Budnikov [108], H. Buesching [67], S. Bufalino [30], O. Bugnon [114], P. Buhler [113], P. Buncic [33], Z. Buthelezi [71,130], J.B. Butt [14], J.T. Buxton [96], S.A. Bysiak [117], D. Caffarri [89], A. Caliva [106], E. Calvo Villar [111], R.S. Camacho [44], P. Camerini [24], A.A. Capon [113], F. Carnesecchi [26,10], R. Caron [136], J. Castillo Castellanos [136], A.J. Castro [129], E.A.R. Casula [54], F. Catalano [30], C. Ceballos Sanchez [52], P. Chakraborty [48], S. Chandra [140], W. Chang [6], S. Chapeland [33], M. Chartier [126], S. Chattopadhyay [140], S. Chattopadhyay [109], A. Chauvin [23], C. Cheshkov [134], B. Cheynis [134], V. Chibante Barroso [33], D.D. Chinellato [121], S. Cho [60], P. Chochula [33], T. Chowdhury [133], P. Christakoglou [89], C.H. Christensen [88], P. Christiansen [80], T. Chujo [132], C. Cicalo [54], L. Cifarelli [10,26], F. Cindolo [53], J. Cleymans [123], F. Colamaria [52], D. Colella [52], A. Collu [79], M. Colocci [26], M. Concas [58,II], G. Conesa Balbastre [78], Z. Conesa del Valle [77], G. Contin [24,126], J.G. Contreras [36], T.M. Cormier [95], Y. Corrales Morales [25], P. Cortese [31], M.R. Cosentino [122], F. Costa [33], S. Costanza [138], P. Crochet [133], E. Cuautle [68], P. Cui [6], L. Cunqueiro [95], D. Dabrowski [141], T. Dahms [104], A. Dainese [56], F.P.A. Damas [114,136], M.C. Danisch [103], A. Danu [66], D. Das [109], I. Das [109], P. Das [85], P. Das [3], S. Das [3], A. Dash [85], S. Dash [48], S. De [85], A. De Caro [29], G. de Cataldo [52], J. de Cuveland [38], A. De Falco [23], D. De Gruttola [10], N. De Marco [58], C. De Martin [24], S. De Pasquale [29], S. Deb [49], H.F. Degenhardt [120], K.R. Deja [141], A. Deloff [84], S. Delsanto [130,25], D. Devetak [106], P. Dhankher [48], D. Di Bari [32], A. Di Mauro [33], R.A. Diaz [8], T. Dietel [123], P. Dillenseger [67], Y. Ding [6], R. Divià [33], D.U. Dixit [19], Ø. Djuvsland [21], U. Dmitrieva [62], A. Dobrin [66,33], B. Dönigus [67], O. Dordic [20], A.K. Dubey [140], A. Dubla [106,89], S. Dudi [99], M. Dukhishyam [85], P. Dupieux [133], R.J. Ehlers [95,145], V.N. Eikeland [21], D. Elia [52], E. Epple [145], B. Erazmus [114], F. Erhardt [98], A. Erokhin [112], M.R. Ersdal [21], B. Espagnon [77], G. Eulisse [33], D. Evans [110], S. Evdokimov [90], L. Fabbietti [104], M. Faggin [28], J. Faivre [78], F. Fan [6], A. Fantoni [51], M. Fasel [95], P. Fecchio [30], A. Feliciello [58], G. Feofilov [112], A. Fernández Téllez [44], A. Ferrero [136], A. Ferretti [25], A. Festanti [33], V.J.G. Feuillard [103], J. Figiel [117], S. Filchagin [108], D. Finogeev [62], F.M. Fionda [21], G. Fiorenza [52], F. Flor [124], S. Foertsch [71], P. Foka [106], S. Fokin [87], E. Fragiacomo [59], U. Frankenfeld [106], U. Fuchs [33],

C. Furget [78], A. Furs [62], M. Fusco Girard [29], J.J. Gaardhøje [88], M. Gagliardi [25], A.M. Gago [111], A. Gal [135], C.D. Galvan [119], P. Ganoti [83], C. Garabatos [106], E. Garcia-Solis [11], K. Garg [27], C. Gargiulo [33], A. Garibli [86], K. Garner [143], P. Gasik [104], E.F. Gauger [118], M.B. Gay Ducati [69], M. Germain [114], J. Ghosh [109], P. Ghosh [140], S.K. Ghosh [3], M. Giacalone [26], P. Gianotti [51], P. Giubellino [106,58], P. Giubilato [28], P. Glässel [103], D.M. Goméz Coral [70], A. Gomez Ramirez [73], V. Gonzalez [106], P. González-Zamora [44], S. Gorbunov [38], L. Görlich [117], S. Gotovac [34], V. Grabski [70], L.K. Graczykowski [141], K.L. Graham [110], L. Greiner [79], A. Grelli [61], C. Grigoras [33], V. Grigoriev [92], A. Grigoryan [1,I], S. Grigoryan [74], O.S. Groettvik [21], F. Grosa [30], J.F. Grosse-Oetringhaus [33], R. Grosso [106], R. Guernane [78], M. Guittiere [114], K. Gulbrandsen [88], T. Gunji [131], A. Gupta [100], R. Gupta [100], I.B. Guzman [44], R. Haake [145], M.K. Habib [106], C. Hadjidakis [77], H. Hamagaki [81], G. Hamar [144], M. Hamid [6], R. Hannigan [118], M.R. Haque [85,61], A. Harlenderova [106], J.W. Harris [145], A. Harton [11], J.A. Hasenbichler [33], H. Hassan [95], D. Hatzifotiadou [53,10], P. Hauer [42], S. Hayashi [131], S.T. Heckel [104,67], E. Hellbär [67], H. Helstrup [35], A. Herghelegiu [47], T. Herman [36], E.G. Hernandez [44], G. Herrera Corral [9], F. Herrmann [143], K.F. Hetland [35], H. Hillemanns [33], C. Hills [126], B. Hippolyte [135], B. Hohlweger [104], D. Horak [36], A. Hornung [67], S. Hornung [106], R. Hosokawa [15], P. Hristov [33], C. Huang [77], C. Hughes [129], P. Huhn [67], T.J. Humanic [96], H. Hushnud [109], L.A. Husova [143], N. Hussain [41], S.A. Hussain [14], D. Hutter [38], J.P. Iddon [33,126], R. Ilkaev [108], H. Ilyas [14], M. Inaba [132], G.M. Innocenti [33], M. Ippolitov [87], A. Isakov [36,94], M.S. Islam [109], M. Ivanov [106], V. Ivanov [97], V. Izucheev [90], B. Jacak [79], N. Jacazio [53], P.M. Jacobs [79], S. Jadlovska [116], J. Jadlovsky [116], S. Jaelani [61], C. Jahnke [120], M.J. Jakubowska [141], M.A. Janik [141], T. Janson [73], M. Jercic [98], O. Jevons [110], M. Jin [124], F. Jonas [95,143], P.G. Jones [110], J. Jung [67], M. Jung [67], A. Jusko [110], P. Kalinak [63], A. Kalweit [33], V. Kaplin [92], S. Kar [6], A. Karasu Uysal [76], O. Karavichev [62], T. Karavicheva [62], P. Karczmarczyk [33], E. Karpechev [62], U. Kebschull [73], R. Keidel [46], M. Keil [33], B. Ketzer [42], Z. Khabanova [89], A.M. Khan [6], S. Khan [16], S.A. Khan [140], A. Khanzadeev [97], Y. Kharlov [90], A. Khatun [16], A. Khuntia [117], B. Kileng [35], B. Kim [60], B. Kim [132], D. Kim [146], D.J. Kim [125], E.J. Kim [72], H. Kim [17,146], J. Kim [146], J.S. Kim [40], J. Kim [103], J. Kim [146], J. Kim [72], M. Kim [103], S. Kim [18], T. Kim [146], T. Kim [146], S. Kirsch [67,38], I. Kisel [38], S. Kiselev [91], A. Kisiel [141],

J.L. Klay [5], C. Klein [67], J. Klein [58], S. Klein [79], C. Klein-Bösing [143], M. Kleiner [67], T. Klemenz [104], A. Kluge [33], M.L. Knichel [33], A.G. Knospe [124], C. Kobdaj [115], M.K. Köhler [103], T. Kollegger [106], A. Kondratyev [74], N. Kondratyeva [92], E. Kondratyuk [90], J. Konig [67], P.J. Konopka [33], L. Koska [116], O. Kovalenko [84], V. Kovalenko [112], M. Kowalski [117], I. Králik [63], A. Kravčáková [37], L. Kreis [106], M. Krivda [110,63], F. Krizek [94], K. Krizkova Gajdosova [36], M. Kroesen [103], M. Krüger [67], E. Kryshen [97], M. Krzewicki [38], A.M. Kubera [96], V. Kučera [60], C. Kuhn [135], P.G. Kuijer [89], L. Kumar [99], S. Kundu [85], P. Kurashvili [84], A. Kurepin [62], A.B. Kurepin [62], A. Kuryakin [108], S. Kushpil [94], J. Kvapil [110], M.J. Kweon [60], J.Y. Kwon [60], Y. Kwon [146], S.L. La Pointe [38], P. La Rocca [27], Y.S. Lai [79], R. Langoy [128], K. Lapidus [33], A. Lardeux [20], P. Larionov [51], E. Laudi [33], R. Lavicka [36], T. Lazareva [112], R. Lea [24], L. Leardini [103], J. Lee [132], S. Lee [146], F. Lehas [89], S. Lehner [113], J. Lehrbach [38], R.C. Lemmon [93], I. León Monzón [119], E.D. Lesser [19], M. Lettrich [33], P. Lévai [144], X. Li [12], X.L. Li [6], J. Lien [128], R. Lietava [110], B. Lim [17], V. Lindenstruth [38], S.W. Lindsay [126], C. Lippmann [106], M.A. Lisa [96], A. Liu [19], S. Liu [96], W.J. Llope [142], I.M. Lofnes [21], V. Loginov [92], C. Loizides [95], P. Loncar [34], J.A. Lopez [103], X. Lopez [133], E. López Torres [8], J.R. Luhder [143], M. Lunardon [28], G. Luparello [59], Y.G. Ma [39], A. Maevskaya [62], M. Mager [33], S.M. Mahmood [20], T. Mahmoud [42], A. Maire [135], R.D. Majka [145,I], M. Malaev [97], Q.W. Malik [20], L. Malinina [74,III], D. Mal'Kevich [91], P. Malzacher [106], G. Mandaglio [55], V. Manko [87], F. Manso [133], V. Manzari [52], Y. Mao [6], M. Marchisone [134], J. Mareš [65], G.V. Margagliotti [24], A. Margotti [53], J. Margutti [61], A. Marín [106], C. Markert [118], M. Marquard [67], N.A. Martin [103], P. Martinengo [33], J.L. Martinez [124], M.I. Martínez [44], G. Martínez García [114], M. Martinez Pedreira [33], S. Masciocchi [106], M. Masera [25], A. Masoni [54], L. Massacrier [77], E. Masson [114], A. Mastroserio [137,52], A.M. Mathis [104], O. Matonoha [80], P.F.T. Matuoka [120], A. Matyja [117], C. Mayer [117], F. Mazzaschi [25], M. Mazzilli [52], M.A. Mazzoni [57], A.F. Mechler [67], F. Meddi [22], Y. Melikyan [62,92], A. Menchaca-Rocha [70], C. Mengke [6], E. Meninno [113,29], M. Meres [13], S. Mhlanga [123], Y. Miake [132], L. Micheletti [25], D.L. Mihaylov [104], K. Mikhaylov [74,91], A. Mischke [61,I], A.N. Mishra [68], D. Miśkowiec [106], A. Modak [3], N. Mohammadi [33], A.P. Mohanty [61], B. Mohanty [85], M. Mohisin Khan [16,IV], C. Mordasini [104], D.A. Moreira De Godoy [143],

L.A.P. Moreno [44], I. Morozov [62], A. Morsch [33], T. Mrnjavac [33], V. Muccifora [51], E. Mudnic [34], D. Mühlheim [143], S. Muhuri [140], J.D. Mulligan [79], M.G. Munhoz [120], R.H. Munzer [67], H. Murakami [131], S. Murray [123], L. Musa [33], J. Musinsky [63], C.J. Myers [124], J.W. Myrcha [141], B. Naik [48], R. Nair [84], B.K. Nandi [48], R. Nania [53,10], E. Nappi [52], M.U. Naru [14], A.F. Nassirpour [80], C. Nattrass [129], R. Nayak [48], T.K. Nayak [85], S. Nazarenko [108], A. Neagu [20], R.A. Negrao De Oliveira [67], L. Nellen [68], S.V. Nesbo [35], G. Neskovic [38], D. Nesterov [112], L.T. Neumann [141], B.S. Nielsen [88], S. Nikolaev [87], S. Nikulin [87], V. Nikulin [97], F. Noferini [53,10], P. Nomokonov [74], J. Norman [126,78], N. Novitzky [132], P. Nowakowski [141], A. Nyanin [87], J. Nystrand [21], M. Ogino [81], A. Ohlson [80,103], J. Oleniacz [141], A.C. Oliveira Da Silva [129,120], M.H. Oliver [145], C. Oppedisano [58], R. Orava [43], A. Ortiz Velasquez [68], A. Oskarsson [80], J. Otwinowski [117], K. Oyama [81], Y. Pachmayer [103], V. Pacik [88], D. Pagano [139], G. Paić [68], J. Pan [142], A.K. Pandey [48], S. Panebianco [136], P. Pareek [140,49], J. Park [60], J.E. Parkkila [125], S. Parmar [99], S.P. Pathak [124], R.N. Patra [140], B. Paul [23], H. Pei [6], T. Peitzmann [61], X. Peng [6], L.G. Pereira [69], H. Pereira Da Costa [136], D. Peresunko [87], G.M. Perez [8], E. Perez Lezama [67], V. Peskov [67], Y. Pestov [4], V. Petráček [36], M. Petrovici [47], R.P. Pezzi [69], S. Piano [59], M. Pikna [13], P. Pillot [114], O. Pinazza [53,33], L. Pinsky [124], C. Pinto [27], S. Pisano [10,51], D. Pistone [55], M. Płoskoń [79], M. Planinic [98], F. Pliquett [67], J. Pluta [141], S. Pochybova [144,I], M.G. Poghosyan [95], B. Polichtchouk [90], N. Poljak [98], A. Pop [47], H. Poppenborg [143], S. Porteboeuf-Houssais [133], V. Pozdniakov [74], S.K. Prasad [3], R. Preghenella [53], F. Prino [58], C.A. Pruneau [142], I. Pshenichnov [62], M. Puccio [33,25], J. Putschke [142], L. Quaglia [25], R.E. Quishpe [124], S. Ragoni [110], S. Raha [3], S. Rajput [100], J. Rak [125], A. Rakotozafindrabe [136], L. Ramello [31], F. Rami [135], R. Raniwala [101], S. Raniwala [101], S.S. Räsänen [43], R. Rath [49], V. Ratza [42], I. Ravasenga [89,30], K.F. Read [95,129], A.R. Redelbach [38], K. Redlich [84,V], A. Rehman [21], P. Reichelt [67], F. Reidt [33], X. Ren [6], R. Renfordt [67], Z. Rescakova [37], J.-P. Revol [10], K. Reygers [103], V. Riabov [97], T. Richert [80,88], M. Richter [20], P. Riedler [33], W. Riegler [33], F. Riggi [27], C. Ristea [66], S.P. Rode [49], M. Rodríguez Cahuantzi [44], K. Røed [20], R. Rogalev [90], E. Rogochaya [74], D. Rohr [33], D. Röhrich [21], P.S. Rokita [141], F. Ronchetti [51], A. Rosano [55], E.D. Rosas [68], K. Roslon [141], A. Rossi [56,28], A. Rotondi [138], A. Roy [49], P. Roy [109], O.V. Rueda [80], R. Rui [24], B. Rumyantsev [74], A. Rustamov [86],

E. Ryabinkin [87], Y. Ryabov [97], A. Rybicki [117], H. Rytkonen [125], O.A.M. Saarimaki [43], S. Sadhu [140], S. Sadovsky [90], K. Šafařík [36], S.K. Saha [140], B. Sahoo [48], P. Sahoo [48], R. Sahoo [49], S. Sahoo [64], P.K. Sahu [64], J. Saini [140], S. Sakai [132], S. Sambyal [100], V. Samsonov [97,92], D. Sarkar [142], N. Sarkar [140], P. Sarma [41], V.M. Sarti [104], M.H.P. Sas [61], E. Scapparone [53], B. Schaefer [95], J. Schambach [118], H.S. Scheid [67], C. Schiaua [47], R. Schicker [103], A. Schmah [103], C. Schmidt [106], H.R. Schmidt [102], M.O. Schmidt [103], M. Schmidt [102], N.V. Schmidt [95,67], A.R. Schmier [129], J. Schukraft [88], Y. Schutz [135], K. Schwarz [106], K. Schweda [106], G. Scioli [26], E. Scomparin [58], M. Šefčík [37], J.E. Seger [15], Y. Sekiguchi [131], D. Sekihata [131], I. Selyuzhenkov [106,92], S. Senyukov [135], D. Serebryakov [62], E. Serradilla [70], A. Sevcenco [66], A. Shabanov [62], A. Shabetai [114], R. Shahoyan [33], W. Shaikh [109], A. Shangaraev [90], A. Sharma [99], A. Sharma [100], H. Sharma [117], M. Sharma [100], N. Sharma [99], S. Sharma [100], A.I. Sheikh [140], K. Shigaki [45], M. Shimomura [82], S. Shirinkin [91], Q. Shou [39], Y. Sibiriak [87], S. Siddhanta [54], T. Siemiarczuk [84], D. Silvermyr [80], G. Simatovic [89], G. Simonetti [33,104], R. Singh [85], R. Singh [100], R. Singh [49], V.K. Singh [140], V. Singhal [140], T. Sinha [109], B. Sitar [13], M. Sitta [31], T.B. Skaali [20], M. Slupecki [125], N. Smirnov [145], R.J.M. Snellings [61], T.W. Snellman [43,125], C. Soncco [111], J. Song [124,60], A. Songmoolnak [115], F. Soramel [28], S. Sorensen [129], I. Sputowska [117], J. Stachel [103], I. Stan [66], P. Stankus [95], P.J. Steffanic [129], E. Stenlund [80], D. Stocco [114], M.M. Storetvedt [35], L.D. Stritto [29], A.A.P. Suaide [120], T. Sugitate [45], C. Suire [77], M. Suleymanov [14], M. Suljic [33], R. Sultanov [91], M. Šumbera [94], V. Sumberia [100], S. Sumowidagdo [50], S. Swain [64], A. Szabo [13], I. Szarka [13], U. Tabassam [14], S.F. Taghavi [104], G. Taillepied [133], J. Takahashi [121], G.J. Tambave [21], S. Tang [133,6], M. Tarhini [114], M.G. Tarzila [47], A. Tauro [33], G. Tejeda Muñoz [44], A. Telesca [33], L. Terlizzi [25], C. Terrevoli [124], D. Thakur [49], S. Thakur [140], D. Thomas [118], F. Thoresen [88], R. Tieulent [134], A. Tikhonov [62], A.R. Timmins [124], A. Toia [67], N. Topilskaya [62], M. Toppi [51], F. Torales-Acosta [19], S.R. Torres [9,119], A. Trifiró [55], S. Tripathy [49], T. Tripathy [48], S. Trogolo [28], G. Trombetta [32], L. Tropp [37], V. Trubnikov [2], W.H. Trzaska [125], T.P. Trzcinski [141], B.A. Trzeciak [36,61], T. Tsuji [131], A. Tumkin [108], R. Turrisi [56], T.S. Tveter [20], K. Ullaland [21], E.N. Umaka [124], A. Uras [134], G.L. Usai [23], A. Utrobicic [98], M. Vala [37], N. Valle [138], S. Vallero [58], N. van der Kolk [61], L.V.R. van Doremalen [61],

M. van Leeuwen [89], P. Vande Vyvre [33], D. Varga [144], Z. Varga [144], M. Varga-Kofarago [144], A. Vargas [44], M. Vasileiou [83], A. Vasiliev [87], O. Vázquez Doce [104], V. Vechernin [112], A.M. Veen [61], E. Vercellin [25], S. Vergara Limón [44], L. Vermunt [61], R. Vernet [7], R. Vértesi [144], L. Vickovic [34], Z. Vilakazi [130], O. Villalobos Baillie [110], A. Villatoro Tello [44], G. Vino [52], A. Vinogradov [87], T. Virgili [29], V. Vislavicius [88], A. Vodopyanov [74], B. Volkel [33], M.A. Völkl [102], K. Voloshin [91], S.A. Voloshin [142], G. Volpe [32], B. von Haller [33], I. Vorobyev [104], D. Voscek [116], J. Vrláková [37], B. Wagner [21], M. Weber [113], A. Wegrzynek [33], D.F. Weiser [103], S.C. Wenzel [33], J.P. Wessels [143], J. Wiechula [67], J. Wikne [20], G. Wilk [84], J. Wilkinson [10,53], G.A. Willems [143], E. Willsher [110], B. Windelband [103], M. Winn [136], W.E. Witt [129], Y. Wu [127], R. Xu [6], S. Yalcin [76], K. Yamakawa [45], S. Yang [21], S. Yano [136], Z. Yin [6], H. Yokoyama [61], I.-K. Yoo [17], J.H. Yoon [60], S. Yuan [21], A. Yuncu [103], V. Yurchenko [2], V. Zaccolo [24], A. Zaman [14], C. Zampolli [33], H.J.C. Zanoli [61], N. Zardoshti [33], A. Zarochentsev [112], P. Závada [65], N. Zaviyalov [108], H. Zbroszczyk [141], M. Zhalov [97], S. Zhang [39], X. Zhang [6], Z. Zhang [6], V. Zherebchevskii [112], D. Zhou [6], Y. Zhou [88], Z. Zhou [21], J. Zhu [6,106], Y. Zhu [6], A. Zichichi [10,26], M.B. Zimmermann [33], G. Zinovjev [2], N. Zurlo [139]

[1] *A.I. Alikhanyan National Science Laboratory (Yerevan Physics Institute) Foundation, Yerevan, Armenia*
[2] *Bogolyubov Institute for Theoretical Physics, National Academy of Sciences of Ukraine, Kiev, Ukraine*
[3] *Bose Institute, Department of Physics and Centre for Astroparticle Physics and Space Science (CAPSS), Kolkata, India*
[4] *Budker Institute for Nuclear Physics, Novosibirsk, Russia*
[5] *California Polytechnic State University, San Luis Obispo, CA, United States*
[6] *Central China Normal University, Wuhan, China*
[7] *Centre de Calcul de l'IN2P3, Villeurbanne, Lyon, France*
[8] *Centro de Aplicaciones Tecnológicas y Desarrollo Nuclear (CEADEN), Havana, Cuba*
[9] *Centro de Investigación y de Estudios Avanzados (CINVESTAV), Mexico City and Mérida, Mexico*
[10] *Centro Fermi – Museo Storico della Fisica e Centro Studi e Ricerche "Enrico Fermi', Rome, Italy*
[11] *Chicago State University, Chicago, IL, United States*
[12] *China Institute of Atomic Energy, Beijing, China*
[13] *Comenius University Bratislava, Faculty of Mathematics, Physics and Informatics, Bratislava, Slovakia*
[14] *COMSATS University Islamabad, Islamabad, Pakistan*
[15] *Creighton University, Omaha, NE, United States*
[16] *Department of Physics, Aligarh Muslim University, Aligarh, India*
[17] *Department of Physics, Pusan National University, Pusan, Republic of Korea*
[18] *Department of Physics, Sejong University, Seoul, Republic of Korea*
[19] *Department of Physics, University of California, Berkeley, CA, United States*
[20] *Department of Physics, University of Oslo, Oslo, Norway*
[21] *Department of Physics and Technology, University of Bergen, Bergen, Norway*
[22] *Dipartimento di Fisica dell'Università 'La Sapienza' and Sezione INFN, Rome, Italy*
[23] *Dipartimento di Fisica dell'Università and Sezione INFN, Cagliari, Italy*
[24] *Dipartimento di Fisica dell'Università and Sezione INFN, Trieste, Italy*

[25] Dipartimento di Fisica dell'Università and Sezione INFN, Turin, Italy
[26] Dipartimento di Fisica e Astronomia dell'Università and Sezione INFN, Bologna, Italy
[27] Dipartimento di Fisica e Astronomia dell'Università and Sezione INFN, Catania, Italy
[28] Dipartimento di Fisica e Astronomia dell'Università and Sezione INFN, Padova, Italy
[29] Dipartimento di Fisica 'E.R. Caianiello' dell'Università and Gruppo Collegato INFN, Salerno, Italy
[30] Dipartimento DISAT del Politecnico and Sezione INFN, Turin, Italy
[31] Dipartimento di Scienze e Innovazione Tecnologica dell'Università del Piemonte Orientale and INFN Sezione di Torino, Alessandria, Italy
[32] Dipartimento Interateneo di Fisica 'M. Merlin' and Sezione INFN, Bari, Italy
[33] European Organization for Nuclear Research (CERN), Geneva, Switzerland
[34] Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, University of Split, Split, Croatia
[35] Faculty of Engineering and Science, Western Norway University of Applied Sciences, Bergen, Norway
[36] Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, Prague, Czech Republic
[37] Faculty of Science, P.J. Šafárik University, Košice, Slovakia
[38] Frankfurt Institute for Advanced Studies, Johann Wolfgang Goethe-Universität Frankfurt, Frankfurt, Germany
[39] Fudan University, Shanghai, China
[40] Gangneung-Wonju National University, Gangneung, Republic of Korea
[41] Gauhati University, Department of Physics, Guwahati, India
[42] Helmholtz-Institut für Strahlen- und Kernphysik, Rheinische Friedrich-Wilhelms-Universität Bonn, Bonn, Germany
[43] Helsinki Institute of Physics (HIP), Helsinki, Finland
[44] High Energy Physics Group, Universidad Autónoma de Puebla, Puebla, Mexico
[45] Hiroshima University, Hiroshima, Japan
[46] Hochschule Worms, Zentrum für Technologietransfer und Telekommunikation (ZTT), Worms, Germany
[47] Horia Hulubei National Institute of Physics and Nuclear Engineering, Bucharest, Romania
[48] Indian Institute of Technology Bombay (IIT), Mumbai, India
[49] Indian Institute of Technology Indore, Indore, India
[50] Indonesian Institute of Sciences, Jakarta, Indonesia
[51] INFN, Laboratori Nazionali di Frascati, Frascati, Italy
[52] INFN, Sezione di Bari, Bari, Italy
[53] INFN, Sezione di Bologna, Bologna, Italy
[54] INFN, Sezione di Cagliari, Cagliari, Italy
[55] INFN, Sezione di Catania, Catania, Italy
[56] INFN, Sezione di Padova, Padova, Italy
[57] INFN, Sezione di Roma, Rome, Italy
[58] INFN, Sezione di Torino, Turin, Italy
[59] INFN, Sezione di Trieste, Trieste, Italy
[60] Inha University, Incheon, Republic of Korea
[61] Institute for Gravitational and Subatomic Physics (GRASP), Utrecht University/Nikhef, Utrecht, Netherlands
[62] Institute for Nuclear Research, Academy of Sciences, Moscow, Russia
[63] Institute of Experimental Physics, Slovak Academy of Sciences, Košice, Slovakia
[64] Institute of Physics, Homi Bhabha National Institute, Bhubaneswar, India
[65] Institute of Physics of the Czech Academy of Sciences, Prague, Czech Republic
[66] Institute of Space Science (ISS), Bucharest, Romania
[67] Institut für Kernphysik, Johann Wolfgang Goethe-Universität Frankfurt, Frankfurt, Germany
[68] Instituto de Ciencias Nucleares, Universidad Nacional Autónoma de México, Mexico City, Mexico
[69] Instituto de Física, Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre, Brazil
[70] Instituto de Física, Universidad Nacional Autónoma de México, Mexico City, Mexico
[71] iThemba LABS, National Research Foundation, Somerset West, South Africa
[72] Jeonbuk National University, Jeonju, Republic of Korea
[73] Johann-Wolfgang-Goethe Universität Frankfurt Institut für Informatik, Fachbereich Informatik und Mathematik, Frankfurt, Germany
[74] Joint Institute for Nuclear Research (JINR), Dubna, Russia
[75] Korea Institute of Science and Technology Information, Daejeon, Republic of Korea
[76] KTO Karatay University, Konya, Turkey
[77] Laboratoire de Physique des 2 Infinis, Irène Joliot-Curie, Orsay, France

[78] Laboratoire de Physique Subatomique et de Cosmologie, Université Grenoble-Alpes, CNRS-IN2P3, Grenoble, France
[79] Lawrence Berkeley National Laboratory, Berkeley, CA, United States
[80] Lund University Department of Physics, Division of Particle Physics, Lund, Sweden
[81] Nagasaki Institute of Applied Science, Nagasaki, Japan
[82] Nara Women's University (NWU), Nara, Japan
[83] National and Kapodistrian University of Athens, School of Science, Department of Physics, Athens, Greece
[84] National Centre for Nuclear Research, Warsaw, Poland
[85] National Institute of Science Education and Research, Homi Bhabha National Institute, Jatni, India
[86] National Nuclear Research Center, Baku, Azerbaijan
[87] National Research Centre Kurchatov Institute, Moscow, Russia
[88] Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark
[89] Nikhef, National institute for subatomic physics, Amsterdam, Netherlands
[90] NRC Kurchatov Institute IHEP, Protvino, Russia
[91] NRC «Kurchatov»Institute – ITEP, Moscow, Russia
[92] NRNU Moscow Engineering Physics Institute, Moscow, Russia
[93] Nuclear Physics Group, STFC Daresbury Laboratory, Daresbury, United Kingdom
[94] Nuclear Physics Institute of the Czech Academy of Sciences, Řež u Prahy, Czech Republic
[95] Oak Ridge National Laboratory, Oak Ridge, TN, United States
[96] Ohio State University, Columbus, OH, United States
[97] Petersburg Nuclear Physics Institute, Gatchina, Russia
[98] Physics department, Faculty of science, University of Zagreb, Zagreb, Croatia
[99] Physics Department, Panjab University, Chandigarh, India
[100] Physics Department, University of Jammu, Jammu, India
[101] Physics Department, University of Rajasthan, Jaipur, India
[102] Physikalisches Institut, Eberhard-Karls-Universität Tübingen, Tübingen, Germany
[103] Physikalisches Institut, Ruprecht-Karls-Universität Heidelberg, Heidelberg, Germany
[104] Physik Department, Technische Universität München, Munich, Germany
[105] Politecnico di Bari and Sezione INFN, Bari, Italy
[106] Research Division and ExtreMe Matter Institute EMMI, GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany
[107] Rudjer Bošković Institute, Zagreb, Croatia
[108] Russian Federal Nuclear Center (VNIIEF), Sarov, Russia
[109] Saha Institute of Nuclear Physics, Homi Bhabha National Institute, Kolkata, India
[110] School of Physics and Astronomy, University of Birmingham, Birmingham, United Kingdom
[111] Sección Física, Departamento de Ciencias, Pontificia Universidad Católica del Perú, Lima, Peru
[112] St. Petersburg State University, St. Petersburg, Russia
[113] Stefan Meyer Institut für Subatomare Physik (SMI), Vienna, Austria
[114] SUBATECH, IMT Atlantique, Université de Nantes, CNRS-IN2P3, Nantes, France
[115] Suranaree University of Technology, Nakhon Ratchasima, Thailand
[116] Technical University of Košice, Košice, Slovakia
[117] The Henryk Niewodniczanski Institute of Nuclear Physics, Polish Academy of Sciences, Cracow, Poland
[118] The University of Texas at Austin, Austin, TX, United States
[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] Universidade Federal do ABC, Santo Andre, Brazil
[123] University of Cape Town, Cape Town, South Africa
[124] University of Houston, Houston, TX, United States
[125] University of Jyväskylä, Jyväskylä, Finland
[126] University of Liverpool, Liverpool, United Kingdom
[127] University of Science and Technology of China, Hefei, China
[128] University of South-Eastern Norway, Tonsberg, Norway
[129] University of Tennessee, Knoxville, TN, United States
[130] University of the Witwatersrand, Johannesburg, South Africa
[131] University of Tokyo, Tokyo, Japan

[132] University of Tsukuba, Tsukuba, Japan
[133] Université Clermont Auvergne, CNRS/IN2P3, LPC, Clermont-Ferrand, France
[134] Université de Lyon, Université Lyon 1, CNRS/IN2P3, IPN-Lyon, Villeurbanne, Lyon, France
[135] Université de Strasbourg, CNRS, IPHC UMR 7178, F-67000 Strasbourg, France
[136] Université Paris-Saclay Centre d'Etudes de Saclay (CEA), IRFU, Département de Physique Nucléaire (DPhN), Saclay, France
[137] Università degli Studi di Foggia, Foggia, Italy
[138] Università degli Studi di Pavia and Sezione INFN, Pavia, Italy
[139] Università di Brescia and Sezione INFN, Brescia, Italy
[140] Variable Energy Cyclotron Centre, Homi Bhabha National Institute, Kolkata, India
[141] Warsaw University of Technology, Warsaw, Poland
[142] Wayne State University, Detroit, MI, United States
[143] Westfälische Wilhelms-Universität Münster, Institut für Kernphysik, Münster, Germany
[144] Wigner Research Centre for Physics, Budapest, Hungary
[145] Yale University, New Haven, CT, United States
[146] Yonsei University, Seoul, Republic of Korea

[I] Deceased.
[II] Also at: Dipartimento DET del Politecnico di Torino, Turin, Italy.
[III] Also at: M.V. Lomonosov Moscow State University, D.V. Skobeltsyn Institute of Nuclear, Physics, Moscow, Russia.
[IV] Also at: Department of Applied Physics, Aligarh Muslim University, Aligarh, India.
[V] Also at: Institute of Theoretical Physics, University of Wroclaw, Poland.