Particle Data Group

Authors of listings and reviews:

W.-M. Yao,[1] C. Amsler,[2] D. Asner,[3] R.M. Barnett,[1] J. Beringer,[1] P.R. Burchat,[4] C.D. Carone,[5] C. Caso,[6] O. Dahl,[1] G. D'Ambrosio,[7] A. De Gouvea,[8] M. Doser,[9] S. Eidelman,[10] J.L. Feng,[11] T. Gherghetta,[12] M. Goodman,[13] C. Grab,[14] D.E. Groom,[1] A. Gurtu,[15,9] K. Hagiwara,[16] K.G. Hayes,[17] J.J. Hernández-Rey,[18†] K. Hikasa,[19] H. Jawahery,[20] C. Kolda,[21] Y. Kwon,[22] M.L. Mangano,[9] A.V. Manohar,[23] A. Masoni,[24] R. Miquel,[1] K. Mönig,[25] H. Murayama,[1,26] K. Nakamura,[16] S. Navas,[27†] K.A. Olive,[12] L. Pape,[14] C. Patrignani,[6] A. Piepke,[28] G. Punzi,[29] G. Raffelt,[30] J.G. Smith,[31] M. Tanabashi,[19] J. Terning,[32] N.A. Törnqvist,[33] T.G. Trippe,[1] P. Vogel,[34] T. Watari,[1] C.G. Wohl,[1] R.L. Workman,[35] P.A. Zyla[1]

Technical Associates: B. Armstrong,[1] G. Harper,[1] V.S. Lugovsky,[36] P. Schaffner[1]

Authors of reviews:

M. Artuso,[37] K.S. Babu,[38] H.R. Band,[39] E. Barberio,[40] M. Battaglia,[26] H. Bichsel,[41] O. Biebel,[42] P. Bloch,[9] E. Blucher,[43] R.N. Cahn,[1] D. Casper,[11] A. Cattai,[9] A. Ceccucci,[9] D. Chakraborty,[44] R.S. Chivukula,[45] G. Cowan,[46] T. Damour,[47] T. DeGrand,[31] K. Desler,[48] M.A. Dobbs,[49] M. Drees,[50] A. Edwards,[4] D.A. Edwards,[48] V.D. Elvira,[51] J. Erler,[52] V.V. Ezhela,[36] W. Fetscher,[14] B.D. Fields,[53] B. Foster,[54] D. Froidevaux,[9] T.K. Gaisser,[55] L. Garren,[51] H.-J. Gerber,[14] G. Gerbier,[56] L. Gibbons,[57] F.J. Gilman,[58] G.F. Giudice,[9] A.V. Gritsan,[59] M. Grünewald,[60] H.E. Haber,[61] C. Hagmann,[62] I. Hinchliffe,[1] A. Höcker,[9] P. Igo-Kemenes,[63] J.D. Jackson,[1] K.F. Johnson,[64] D. Karlen,[65] B. Kayser,[51] D. Kirkby,[11] S.R. Klein,[66] K. Kleinknecht,[67] I.G. Knowles,[68] R.V. Kowalewski,[65] P. Kreitz,[69] B. Krusche,[70] Yu.V. Kuyanov,[36] O. Lahav,[71] P. Langacker,[72] A. Liddle,[73] Z. Ligeti,[1] T.M. Liss,[74] L. Littenberg,[75] J.C. Liu,[69] K.S. Lugovsky,[36] S.B. Lugovsky,[36] T. Mannel,[76] D.M. Manley,[77] W.J. Marciano,[75] A.D. Martin,[78] D. Milstead,[79] M. Narain,[80] P. Nason,[81] Y. Nir,[82] J.A. Peacock,[68] S.A. Prell,[83] A. Quadt,[50,84,30] S. Raby,[85] B.N. Ratcliff,[69] E.A. Razuvaev,[36] B. Renk,[67] P. Richardson,[78] S. Roesler,[9] G. Rolandi,[9] M.T. Ronan,[1] L.J. Rosenberg,[86] C.T. Sachrajda,[87] Y. Sakai,[16] S. Sarkar,[88] M. Schmitt,[8] O. Schneider,[89] D. Scott,[90] T. Sjöstrand,[91] G.F. Smoot,[1] P. Sokolsky,[92] S. Spanier,[69] H. Spieler,[1] A. Stahl,[93] T. Stanev,[55] R.E. Streitmatter,[94] T. Sumiyoshi,[95] N.P. Tkachenko,[36] G.H. Trilling,[1] G. Valencia,[83] K. van Bibber,[62] M.G. Vincter,[3] D.R. Ward,[96] B.R. Webber,[96] J.D. Wells, [97] M. Whalley,[78] L. Wolfenstein,[58] J. Womersley,[98] C.L. Woody,[75] A. Yamamoto,[16] O.V. Zenin,[36] J. Zhang,[99] R.-Y. Zhu[100]

1. *Physics Division, Lawrence Berkeley National Laboratory, 1 Cyclotron Road, Berkeley, CA 94720, USA*
2. *Institute of Physics, University of Zürich, CH-8057 Zürich, Switzerland*
3. *Department of Physics, Carleton University, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada*
4. *Department of Physics, Stanford University, Stanford, CA 94305, USA*
5. *Nuclear and Particle Theory Group, Department of Physics, College of William and Mary, Williamsburg, VA 23187, USA*
6. *Dipartimento di Fisica e INFN, Università di Genova, I-16146 Genova, Italy*
7. *INFN - Sezione di Napoli (and Dipartimento di Scienze Fisiche, Univ. di Napoli "Federico II,") Complesso Universitario Monte Sant'Angelo, Via Cintia, 80126 Napoli, Italy*
8. *Department of Physics and Astronomy, Northwestern University, Evanston, IL 60208, USA*
9. *CERN, European Organization for Nuclear Research, CH-1211 Genève 23, Switzerland*
10. *Budker Institute of Nuclear Physics, RU-630090, Novosibirsk, Russia*
11. *Department of Physics and Astronomy, University of California, Irvine, CA 92697-4576, USA*
12. *School of Physics and Astronomy, University of Minnesota, Minneapolis, MN 55455, USA*
13. *Argonne National Laboratory, 9700 S. Cass Ave., Argonne, IL 60439-4815, USA*
14. *Institute for Particle Physics, ETH Zürich, CH-8093 Zürich, Switzerland*
15. *Tata Institute of Fundamental Research, Mumbai (Bombay) 400 005, India*
16. *KEK, High Energy Accelerator Research Organization, Oho, Tsukuba-shi, Ibaraki-ken 305-0801, Japan*
17. *Department of Physics, Hillsdale College, Hillsdale, MI 49242, USA*
18. *IFIC — Instituto de Física Corpuscular, Universitat de València — C.S.I.C., E-46071 Valencia, Spain*
19. *Department of Physics, Tohoku University, Aoba-ku, Sendai 980-8578, Japan*
20. *University of Maryland, Department of Physics and Astronomy, College Park, MD 20742-4111, USA*
21. *Department of Physics, University of Notre Dame, 225 Niewland Hall, Notre Dame, IN 46556 USA*
22. *Yonsei University, Department of Physics, 134 Sinchon-dong, Sudaemoon-gu, Seoul 120-749, South Korea*
23. *Department of Physics, University of California at San Diego, La Jolla, CA 92093, USA*
24. *INFN Sezione di Cagliari, Cittadella Universitaria de Monserrato, Casella postale 170, I-09042 Monserrato (CA), Italy*
25. *DESY-Zeuthen, D-15735 Zeuthen, Germany*
26. *Department of Physics, University of California, Berkeley, CA 94720, USA*
27. *Dpto. de Física Teórica y del Cosmos & C.A.F.P.E., Universidad de Granada, 18071 Granada, Spain*
28. *Department of Physics and Astronomy University of Alabama, 206 Gallalee Hall, Box 870324, Tuscaloosa, AL 35487-0324, USA*
29. *INFN and Dipartimento di Fisica, Universita' di Pisa, I-56127 Pisa, Italy*
30. *Max-Planck-Institut für Physik (Werner-Heisenberg-Institut), Föhringer Ring 6, D-80805 München, Germany*
31. *Department of Physics, University of Colorado at Boulder, Boulder, CO 80309 USA*
32. *Department of Physics, University of California, Davis, CA 95616, USA*
33. *Department of Physical Sciences, POB 64 FIN-00014 University of Helsinki, Finland*

† J.J. Hernández-Rey and S. Navas acknowledge support from MCYT, Spain (FPA2002-12065-E).

34. *California Institute of Technology, Kellogg Radiation Laboratory 106-38, Pasadena, CA 91125, USA*
35. *Department of Physics, George Washington University Virginia Campus, Ashburn, VA 20147-2604, USA*
36. *COMPAS Group, Institute for High Energy Physics, RU-142284, Protvino, Russia*
37. *Department of Physics, Syracuse University, Syracuse, NY, 13244-1130, USA*
38. *Department of Physics, Oklahoma State University, Stillwater, OK 74078, USA*
39. *Department of Physics, University of Wisconsin, Madison, WI 53706*
40. *University of Melbourne, School of Physics, Parkville, Victoria 3052, Australia*
41. *Department of Astronomy, University of Washington, Physics/Astronomy Bldg., Stevens Way, POB 351580, Seattle, WA 98195-1580, USA*
42. *Ludwig-Maximilians-Universität, Department für Physik, Schellingstr. 4, D-80799 München, Germany*
43. *The University of Chicago, Chicago, IL 60637-1433, USA*
44. *Department of Physics, Northern Illinois University, DeKalb, IL 60115*
45. *Michigan State University, Dept. of Physics and Astronomy, East Lansing, MI 48824-2320, USA*
46. *Department of Physics, Royal Holloway, University of London, Egham, Surrey TW20 0EX, UK*
47. *Institut des Hautes Etudes Scientifiques, F-91440 Bures-sur-Yvette, France*
48. *Deutsches Elektronen-Synchrotron DESY, 85 Notkestraße, D-22603 Hamburg, Germany*
49. *Dept. of Physics, McGill University, 3600 Rue Université, Montréal, Canada H3A 2T8*
50. *Universität Bonn, Physikalisches Institut, Nussallee 12, DE-53115 Bonn, Germany*
51. *Fermilab, P.O. Box 500, Batavia, IL 60510, USA*
52. *Instituto de Física, Universidad Nacional Autónoma de México, Apartado Postal 20-364, 01000 México D.F., México*
53. *Department of Astronomy, University of Illinois, 1002 W. Green St., Urbana, IL 61801, USA*
54. *Denys Wilkinson Building, Department of Physics, University of Oxford, Oxford, OX1 3RH, UK*
55. *Bartol Research Institute, University of Delaware, Newark, DE 19716, USA*
56. *CEA/Saclay, B.P.2, Orme des Merisiers, F-91191 Gif-sur-Yvette Cedex, France*
57. *Newman Laboratory for Elementary Particle Physics, Cornell University, Ithaca, NY 14853-5001, USA*
58. *Department of Physics, Carnegie Mellon University, Pittsburgh, PA 15213, USA*
59. *Johns Hopkins University, Baltimore, Maryland 21218, USA*
60. *UCD School of Physics, University College Dublin, Belfield, Dublin 4, Ireland*
61. *Santa Cruz Institute for Particle Physics, University of California, Santa Cruz, CA 95064, USA*
62. *Lawrence Livermore National Laboratory, 7000 East Ave., Livermore, CA 94550, USA*
63. *Physikalisches Institut, Universität Heidelberg, Philosophenweg 12, D-69120 Heidelberg, Germany*
64. *Department of Physics, Florida State University, Tallahassee, FL 32306, USA*
65. *University of Victoria, Victoria, BC V8W 3P6, Canada*
66. *Nuclear Science Division, Lawrence Berkeley National Laboratory, 1 Cyclotron Road, Berkeley, CA 94720, USA*
67. *Institut für Physik, Johannes-Gutenberg Universität Mainz, D-55099 Mainz, Germany*
68. *Institute for Astronomy, University of Edinburgh, Royal Observatory, Blackford Hill, Edinburgh, EH9 3JZ, Scotland, UK*
69. *Stanford Linear Accelerator Center, P.O. box 4349, Stanford, CA 94309, USA*
70. *Institute of Physics, University of Basel, CH-4056 Basel, Switzerland*
71. *University of Cambridge, Institute of Astronomy, Madingley Road, Cambridge, CB3 0HA, UK*
72. *Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, PA 19104, USA*
73. *University of Sussex, Astronomy Centre, Falmer Brighton BN1 9RH, UK*
74. *Department of Physics, University of Illinois, 1110 W. Green Street, Urbana, IL 61801, USA*
75. *Physics Department, Brookhaven National Laboratory, Upton, NY 11973, USA*
76. *University Siegen, Fachbereich fur Physik, Siegen, Germany*
77. *Department of Physics, Kent State University, Kent, OH 44242, USA*
78. *Institute for Particle Physics Phenomenology, Department of Physics, University of Durham, Durham DH1 3LE, UK*
79. *Fysikum, Stockholms Universitet, AlbaNova University Centre, SE-106 91 Stockholm, Sweden*
80. *Boston University, Department of Physics, 590 Commonwealth Ave., Boston, MA 02215, USA*
81. *INFN Sezione di Milano, via Celoria 16, I-20133 Milano, Italy*
82. *Weizmann Institue of Science, Department of Particle Physics, P.O. Box 26 Rehovot 76100, Israel*
83. *Department of Physics, Iowa State University, Ames, IA 50011, USA*
84. *University of Rochester / NY, River Campus/Physics & Astronomy, Bausch & Lomb Bldg., Rochester, NY 14627*
85. *Department of Physics, The Ohio State University, 191 W. Woodruff Ave., Columbus, OH 43210, USA*
86. *Department of Physics and Laboratory for Nuclear Science, MIT, 77 Massachusetts Avenue, Cambridge, MA 02139, USA*
87. *School of Physics and Astronomy, University of Southampton, Highfield, Southampton S017 1BJ, UK*
88. *Rudolf Peierls Centre for Theoretical Physics, University of Oxford, 1 Keble Road, Oxford OX1 3NP, UK*
89. *Ecole Polytechnique Fédérale de Lausanne (EPFL), CH-1015 Lausanne, Switzerland*
90. *Department of Physics and Astronomy, University of British Columbia, Vancouver, BC V6T 1Z1 Canada*

91. *Department of Theoretical Physics, Lund University, S-223 62 Lund, Sweden*
92. *Department of Physics, University of Utah, Salt Lake City, UT 84112*
93. *III. Physikalisches Institut, Physikzentrum, RWTH Aachen, 52056 Aachen, Germany*
94. *Code 661, NASA/GSFC, Greenbelt, MD 20771*
95. *High Energy Accel. Res. Organization, 1-1 Oho, Tsukuba-shi, Ibaraki-ken 305-0801, JAPAN*
96. *Cavendish Laboratory, J.J. Thomson Avenue, Cambridge CB3 0HE, UK*
97. *Michigan Center for Theoretical Physics, Physics Dept., 2477 Randall Laboratory, University of Michigan, Ann Arbor, MI 48109-1120, USA*
98. *CCLRC Rutherford Appleton Laboratory, Chilton, Didcot, OX11 0QX, UK*
99. *IHEP, Chinese Academy of Sciences,Beijing 100049, P.R. CHINA*
100. *California Institute of Technology, Physics Department, 256-48, Pasadena, CA 91125, USA*