

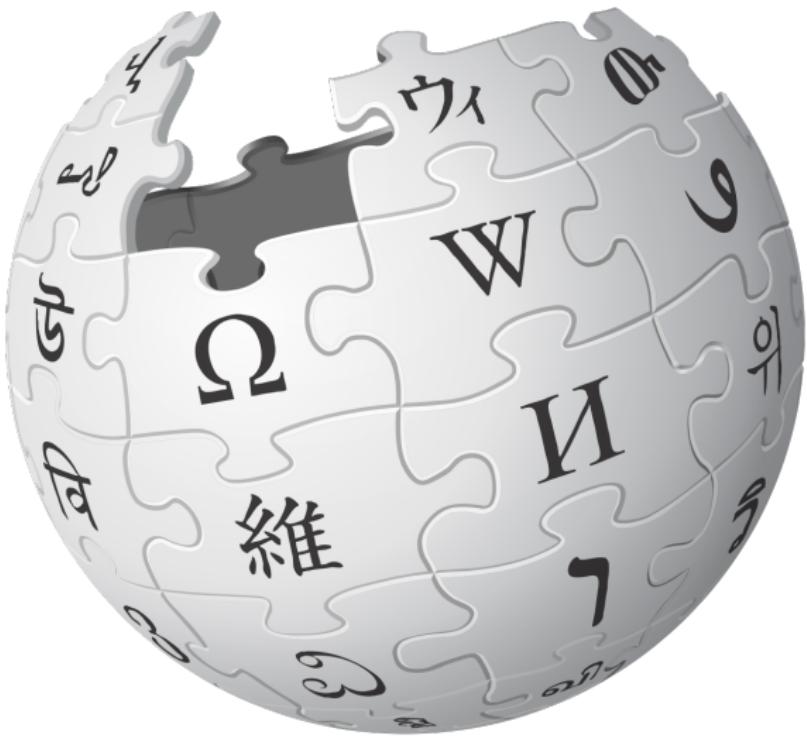
The Fragile Families Challenge

Matthew Salganik, Ian Lundberg, Alex Kindel, Sara McLanahan,
and people from around the world

Summer Institutes in Computational Social Science
June 21, 2019

Fragile Families Challenge is supported by the Russell Sage Foundation. Board of Advisors: Jeanne Brooks-Gunn, Kathryn Edin, Barbara Engelhardt, Irwin Garfinkel, Moritz Hardt, Dean Knox, Nicholas Lemann, Karen Levy, Sara McLanahan, Arvind Narayanan, Timothy Nelson, Matthew Salganik, Brandon Stewart & Duncan Watts.





Initial sequencing and analysis of the human genome

International Human Genome Sequencing Consortium*

** A partial list of authors appears on the opposite page. Affiliations are listed at the end of the paper.*

<http://dx.doi.org/10.1038/35057062>

Genome Sequencing Centres (Listed in order of total genomic sequence contributed, with a partial list of personnel. A full list of contributors at each centre is available as Supplementary Information.)

Whitehead Institute for Biomedical Research, Center for Genome Research: Eric S. Lander¹, Lauren M. Linton¹, Bruce Birren¹, Chad Nusbaum¹, Michael C. Zody¹, Jennifer Baldwin¹, Keri Devon¹, Ken Dewar¹, Michael Doyle¹, William FitzHugh¹, Roel Funke¹, Diane Gage¹, Katrina Harris¹, Andrew Heaford¹, John Howland¹, Lisa Kann¹, Jessica Lebocky¹, Rosie LeVine¹, Paul McEwan¹, Kevin McKernan¹, James Melkman¹, Jill P. Mesirov¹, Cher Miranda¹, William Morris¹, Jerome Naylor¹, Christine Raymond¹, Mark Roselli¹, Ralph Santos¹, Andrew Sheridan¹, Carrie Sougnez¹, Nicole Stange-Thomann¹, Nikola Stejanovic¹, Aravind Subramanian¹, & Dudley Wymant¹

The Sanger Centre: Jane Rogers², John Sulston², Rachael Ainscough², Stephen Beck², David Bentley², John Burton², Christopher Cleef², Nigel Carter², Alan Coulson², Rebecca Deadman², Panos Deloukas², Andrew Dunham², Ian Dunham², Richard Durbin², Lisa French², Darren Graffham², Simon Gregory², Tim Hubbard², Sean Humphray², Adrienne Hunt², Matthew Jones², Christine Lloyd², Amanda McMurray², Lucy Matthews², Simon Mercer², Sarah Milne², James C. Mullikin², Andrew Mungall², Robert Plumb², Mark Ross², Ratna Showker², & Sarah Sims²

Washington University Genome Sequencing Center: Robert H. Waterston³, Richard K. Wilson³, LaDeana W. Hillier³, John D. McPherson³, Marco A. Marra³, Elaine R. Mardis³, Lucinda A. Fulton³, Asil T. Chinwalla³, Kymberlie H. Pepin³, Warren R. Gish³, Stephanie L. Chissoe³, Michael C. Wendt³, Kim D. Delehaunty³, Tracie L. Miner³, Andrew Delehaunty³, Jason B. Kramer³, Lisa L. Cook³, Robert S. Fulton³, Douglas L. Johnson³, Patrick J. Minx³ & Sandra W. Clifton³

US DOE Joint Genome Institute: Trevor Hawkins⁴, Elbert Branscomb⁴, Paul Detrixie⁴, Paul Richardson⁴, Sarah Wenning⁴, Tom Slezk⁴, Norman Doggett⁴, Jan-Fang Cheng⁴, Anne Olsen⁴, Susan Lucas⁴, Christopher Ekin⁴, Edward Überbacher⁴ & Marvin Frazier⁴

Baylor College of Medicine Human Genome Sequencing Center: Richard A. Gibbs⁵, Donna M. Muzny⁵, Steven E. Scherer⁵, John B. Bouck⁵, Erica J. Sodergren⁵, Kim C. Worley⁵, Catherine M. Rives⁵, James H. Gorrell⁵, Michael L. Metzker⁵, Susan L. Nayor⁵, Raju S. Kucherlapati⁵, David L. Nelson⁵, & George M. Weinstock⁵

RIKEN Genomic Sciences Center: Yoshiyuki Sakai⁶, Asoo Fujiyama⁶, Masaharu Hattori⁶, Tetsushi Yada⁶, Atsushi Toyoda⁶, Takehiko Itoh⁶, Chiharu Kawabe⁶, Hiromi Watanebe⁶, Yasutomo Totoku⁶ & Todd Taylor⁶

Genoscope and CNRS UMR-8030: Jean Weissenbach⁷, Roland Hellin⁷, William Saurin⁷, Francois Arigonave⁷, Philippe Brotte⁷, Thomas Brule⁷, Eric Pelletier⁷, Catherine Robert⁷ & Patrick Wincker⁷

GTC Sequencing Center: Douglas R. Smith¹¹, Lynn Doucette-Stamm¹¹, Marc Rubenfield¹¹, Keith Weinstock¹¹, Hong Mei Lee¹¹ & JoAnne Dubois¹¹

Department of Genome Analysis, Institute of Molecular

Biotechnology: André Rosenthal¹², Matthias Platzer¹², Gerald Nyakatura¹², Stefan Taudien¹² & Andreas Rump¹²

Beijing Genomics Institute/Human Genome Center: Huanning Yang¹³, Jun Yu¹³, Jian Wang¹³, Guyang Huang¹⁴ & Jun Gu¹⁵

Multimegapbase Sequencing Center, The Institute for Systems Biology: Leroy Hood¹⁶, Lee Rowen¹⁶, Anup Madan¹⁶ & Shizhen Qin¹⁶

Stanford Genome Technology Center: Ronald W. Davis¹⁷, Nancy A. Federspil¹⁷, A. Pla Abols¹⁷ & Michael J. Proctor¹⁷

Stanford Human Genome Center: Richard M. Myers¹⁸, Jeremy Schmutz¹⁸, Mark Dickson¹⁸, Jane Grimwood¹⁸ & David R. Cox¹⁸

University of Washington Genome Center: Maynard V. Olson¹⁹, Rajinder Kaul¹⁹ & Christopher Raymond¹⁹

Department of Molecular Biology, Keio University School of Medicine: Nobuyoshi Shimizu²⁰, Kazuhiko Kawasaki²⁰ & Shinsei Minoshima²⁰

University of Texas Southwestern Medical Center at Dallas: Glen A. Evans²¹, Maria Athanasiou²¹ & Roger Schultz²¹

University of Oklahoma's Advanced Center for Genome Technology: Bruce A. Roe²², Feng Chen²² & Huaiqin Pan²²

Max Planck Institute for Molecular Genetics: Juliane Ramser²³, Hans Lehrach²³ & Richard Reinhardt²³

Cold Spring Harbor Laboratory, Lita Annenberg Hazen Genome Center: W. Richard McCombie²⁴, Melissa de la Bastide²⁴ & Neillay Dedhia²⁴

GBF—German Research Centre for Biotechnology: Helmut Blöcker²⁵, Klaus Hornischek²⁵ & Gabriele Nordiek²⁵

*** Genome Analysis Group (listed in alphabetical order, also includes individuals listed under other headings):**

Richa Agarwala²⁶, L. Aravind²⁶, Jeffrey A. Bailey²⁷, Alex Bateman²⁷, Serafin Batzoglou²⁸, Ewan Birney²⁹, Peer Bork²⁸, Daniel G. Brown²⁹, Christopher B. Burge²⁹, Lorenzo Cerutti²⁹, Hsiao-Chuan Chen²⁹, Deanna Church²⁸, Michele Clamp²⁹, Richard R. Coply²⁹, Tobias Doers²⁸, Sean R. Eddy²⁹, Evan E. Echler²⁹, Terrence S. Furey²⁹, James Galagan²⁹, James G. R. Gilbert²⁶, Cyrus Harootunian²⁹, Yoshihilde Hayashizaki²⁹, David Haussler²⁹, Henning Hermjakob²⁹, Karsten Hockamp²⁷, Wonhee Jeon²⁹, L. Steven Johnson²⁹, Thomas A. Jones²⁹, Simon Kasif²⁹, Arik Kasprzyk²⁹, Scott Kennedy²⁹, W. James Kent²⁹, Paul Kiths²⁹, Eugene V. Koonin²⁹, Ian Korf²⁹, David Kulp²⁹, Doron Lancet²⁹, Todd M. Lowy²⁹, Ailie Mclysaght²⁹, Tarjei Mikkelsen²⁹, John V. Moran²⁹, Nicola Mulder²⁹, Victor J. Pollara²⁹, Chris P. Ponting²⁹, Greg Schuler²⁹, Jörg Schütz²⁹, Guy Slater²⁹, Arfan A. Smit²⁹, Ella Stupka²⁹, Joseph Szustakowski²⁹, Danielle Thierry-Mieg²⁹, Jean Thierry-Mieg²⁹, Lukas Wagner²⁹, John Wallis²⁹, Raymond Wheeler²⁹, Alan Williams²⁹, Yuli I. Wolf²⁹, Kenneth H. Wolfe²⁹, Shiaw-Pyn Yang²⁹ & Ru-Fang Yeh²⁹

Scientific management: National Human Genome Research Institute, US National Institutes of Health: Francis Collins²⁹, Mark S. Guyer²⁹, Jane Peterson²⁹, Adam Fleischman²⁹, Kris A. Wetterstrand²⁹; Office of Science, US Department of Energy: Aristides Patrinos²⁹; The Wellcome Trust: Michael J. Morgan²⁹



Combined Measurement of the Higgs Boson Mass in pp Collisions at $\sqrt{s} = 7$ and 8 TeV with the ATLAS and CMS Experiments

G. Aad *et al.*^{*}

(ATLAS Collaboration)[†]

(CMS Collaboration)[‡]

(Received 25 March 2015; published 14 May 2015)

- Conference for Computing in High-Energy and Nuclear Physics (CHEP03), 2003, CHEP-2003-MOLT007, arXiv: physics/0306116.
- [28] L. Moneta, K. Belasco, K.S. Cranmer, A. Lazzaro, D. Piparo, G. Schott, W. Verkerke, and M. Wolf, The ROOSTAT Project, in Proceedings of the 13th International Workshop on Advanced Computing and Analysis Techniques in Physics Research (ACAT2010) (SISSA, 2010), Phys. Sci., ACAT2010 (2010) 057 [arXiv:1009.1003].
- [29] K. Cranmer, O. Lewis, L. Moneta, A. Shihab, and W. Verkerke (ROOT), "HISTFACTORY: A tool for creating statistical models for use with ROOFIT and ROOSTAT," Tech. Rep. CERN-OPEN-2012-016, 2012 (http://cds.cern.ch/record/1456844).
- [30] ATLAS Collaboration, Electron and photon energy calibration with the ATLAS detector using LHC Run 1 data, Eur. Phys. J. C **74**, 3071 (2014).
- [31] ATLAS Collaboration, Measurement of the muon reconstruction performance of the ATLAS detector using 2011 and 2012 LHC proton-proton collision data, Eur. Phys. J. C **74**, 3130 (2014).
- [32] CMS Collaboration, Performance of CMS muon reconstruction in pp collision events at $\sqrt{s} = 7$ TeV, J. Instrum. **7**, P10002 (2012).
- [33] CMS Collaboration, Performance of electron reconstruction and selection with the CMS detector in proton-proton collisions at $\sqrt{s} = 8$ TeV, arXiv:1502.02701 [J. Instrum. (to be published)].
- [34] CMS Collaboration, Performance of photon reconstruction and identification with the CMS detector in proton-proton collisions at $\sqrt{s} = 8$ TeV, arXiv:1502.02702.
- [35] P.D. Dauncey, M. McKenzie, N. Waddington, and G.J. Davies, Handling uncertainty in background shapes: The discrete profiling method, J. Instrum. **10**, P04015 (2015).
- [36] ALEPH, DELPHI, L3, OPAL, SLD Collaborations, LEP Electroweak Working Group, and SLD Electroweak and Heavy Flavour Groups, Precision electroweak measurements on the Z resonance, Phys. Rep. **427**, 257 (2006).
- [37] ATLAS Collaboration, Observation and measurement of Higgs boson decays to WW^* with the ATLAS detector, arXiv:1412.2641 [Phys. Rev. D (to be published)].
- [38] ATLAS Collaboration, Evidence for the Higgs-boson Yukawa coupling to tau leptons with the ATLAS detector, J. High Energy Phys. 04 (2015) 117.
- [39] CMS Collaboration, Measurement of Higgs boson production and properties in the WW decay channel with leptonic final states, J. High Energy Phys. 01 (2014) 096.
- [40] CMS Collaboration, Evidence for the 125 GeV Higgs boson decaying to a pair of τ leptons, J. High Energy Phys. 05 (2014) 104.

-
- G. Aad,^{85,†} B. Abbott,^{113,‡} J. Abdallah,^{151,†} O. Abdinov,^{11,†} R. Aben,^{107,†} M. Abolins,^{30,†} O. S. AbouZeid,^{158,†} H. Abramowicz,^{153,†} H. Abreu,^{152,†} R. Abreu,^{30,†} Y. Aloulabi,^{146a,146b,†} B. S. Acharya,^{164a,164b,†} L. Adamczyk,^{38a,†} D. L. Adams,^{25,†} J. Adelman,^{108,†} S. Adomeit,^{100,†} T. Adye,^{131,†} A. A. Afckler,^{34,†} T. Agathonovic-Jovin,^{13,†} J. A. Aguilar-Sauvage,^{125a,126a,†} S. P. Ahlen,^{22,†} F. Almehmed,^{65,†} G. Aielli,^{135a,135b,†} H. Akersdottir,^{146a,146b,†} T.P.A. Åkesson,^{41,†} G. Akimoto,^{155,†} A. V. Akimov,^{96,†} G. L. Alberghi,^{20a,20b,†} J. Albert,^{109,†} S. Albrand,^{25,†} M. J. Alconada Verzini,^{71,†} M. Aleksić,^{30,†} I.N. Aleksandrov,^{65,†} C. Alexa,^{26a,†} G. Alexander,^{153,†} T. Alexopoulos,^{10,†} M. Althroop,^{113,†} G. Altimonti,^{91,†} L. Alio,^{85,†} J. Alison,^{31,†} S. P. Alkire,^{35,†} B. M. M. Allbrooke,^{18,†} P. P. Allport,^{74,†} A. Aloisio,^{104a,106b,†} A. Alonso,^{36,†} F. Alonso,^{17,†} C. Alpigiani,^{76,†} A. Altheimer,^{35,†} B. Alvarez-Gonzalez,^{20,†} D. Álvarez Piqueras,^{36,†} M. G. Alvigi,^{104,104b,†} B. T. Amadio,^{15,†} K. Amako,^{66,†} Y. Amaral Coutinho,^{24a,†} C. Ameling,^{23,†} D. Amidei,^{90,†} S. P. Amor Dos Santos,^{126a,126c,†} A. Amorim,^{126a,126b,†} S. Amoroso,^{48,†} N. Amram,^{153,†} G. Amundsen,^{23,†} C. Anastopoulos,^{139,†} L. S. Anzu,^{49,†} N. Andari,^{30,†} T. Andeen,^{35,†} C. F. Anders,^{58b,†} G. Anders,^{30,†} J. K. Anders,^{74,†} K.J. Anderson,^{47,†} A. Andreazza,^{146a,146b,†} V. Andrei,^{58a,†} S. Angelidakis,^{9,†} I. Angelozzi,^{107,†} J. Anger,^{44,†} A. Angerami,^{35,†} F. Anghinolfi,^{30,†} A. V. Anisimov,^{109,†} N. Anjos,^{12,†} A. Annovi,^{124a,124b,†} M. Antonelli,^{47,†} A. Antonov,^{98,†} J. Antos,^{140b,†} F. Anulli,^{132a,†} M. Aoki,^{56,†} L. Aperio Bella,^{18,†} G. Arabidez,^{90,†} Y. Araújo,^{66,†} J. P. Araújo,^{126a,†} A. T. H. Arce,^{45,†} F. A. Ardhu,^{71,†} J.-F. Arguin,^{95,†} S. Argyropoulos,^{42,†} M. Arik,^{104,†} A. J. Ambroster,^{30,†} O. Arnael,^{30,†} V. Arnal,^{82,†} H. Arnold,^{146a,146b,†} M. Arratia,^{35,†} O. Arslan,^{21,†} A. Artamonov,^{49,†} G. Artoni,^{23,†} S. Asai,^{155,†} N. Asbah,^{42,†} A. Ashkenazi,^{153,†} B. Åsman,^{146a,146b,†} L. Asquith,^{149b,†} K. Assamagan,^{25,†} R. Astalos,^{144,†} M. Atkinson,^{163,†} N. B. Atlay,^{141,†} B. Auermann,^{6,†} K. Augsten,^{125,†} M. Auroousseau,^{145b,†} G. Avolio,^{30,†} B. Axen,^{15,†} M. K. Ayoub,^{117,†} G. Azuelos,^{30,†} M. A. Baak,^{26a,†} E.A. Baas,^{58a,†} C. Bacci,^{134a,134b,†} H. Bachacou,^{136,†} K. Bachas,^{154,†} M. Backes,^{30,†} M. Backhaus,^{30,†} E. Badescu,^{26a,†} P. Bagiacchi,^{148,†} P. Bagnaia,^{132a,132b,†} Y. Bai,^{23a,†} T. Bain,^{35,†} J. T. Barnes,^{131,†} O. K. Baker,^{176,†} L. Balek,^{129,†} T. Balest,^{148,†} F. Balli,^{84,†} E. Banza,^{29,†} S. Baranovska,^{175,†} A. E. Baranova,^{175,†} H. S. Bansil,^{18,†} L. Barak,^{30,†} S. P. Baranov,^{96,†} E.L. Barberio,^{88,†} D. Barberis,^{85,†} M. Barbero,^{101,†} T. Barillari,^{101,†} M. Barisonzi,^{134a,†} T. Barklow,^{143,†} N. Barklow,^{28,†} S.L. Barnes,^{84,†} B.M. Barnes,^{131,†} R.M. Barnett,^{15,†} Z. Barnovska,^{4,†} A. Baroncelli,^{143,†} G. Barone,^{49,†} A.J. Barr,^{120,†} F. Barreiro,^{82,†} J. Barreiro Guimaraes da Costa,^{37,†} R. Bartoldus,^{143,†} A.E. Barton,^{72,†}

- P. Bartos,^{144a,†} A. Bassalat,^{117,‡} A. Basye,^{165,‡} R. L. Bates,^{53,‡} S. J. Batista,^{158,‡} J. R. Batley,^{28,‡} M. Battaglia,^{137,‡}
 M. Baute,^{132a,132b,‡} F. Bauer,^{116,‡} H. S. Bawa,^{145,‡} J. B. Beacham,^{112,‡} M. D. Beattie,^{72,‡} T. Beau,^{104,‡} P. H. Beauchemin,^{161,‡}
 R. Beccerelle,^{126a,124b,‡} P. Bechtle,^{21,‡} H. P. Beck,^{17,‡} K. Becker,^{120,‡} M. Becker,^{83,‡} S. Becker,^{100,‡} M. Beckingham,^{270,‡}
 C. Becot,^{117,‡} A. J. Beddall,^{192,‡} A. Beddall,^{192,‡} V. A. Bednyakov,^{65,‡} C. P. Bee,^{148,‡} L. J. Beemster,^{107,‡} T. A. Beermann,^{175,‡}
 M. Begel,^{25,‡} J. K. Behr,^{120,‡} C. Belanger-Champagne,^{87,‡} W. H. Bell,^{49,‡} G. Bella,^{153,‡} L. Bellagamba,^{20a,‡} A. Bellerive,^{29,‡}
 M. Bellomo,^{118,‡} K. Belotsky,^{9,‡} O. Beltramello,^{30,‡} O. Benary,^{153,‡} D. Benchekroun,^{156a,‡} M. Bender,^{100,‡}
 K. Bendy,^{146a,146b,‡} N. Benekos,^{101,‡} Y. Benhammou,^{153,‡} E. Benhar Noccioli,^{49,‡} J. A. Benitez Garcia,^{159b,‡}
 D. P. Benjamin,^{45,‡} J. R. Bensinger,^{23,‡} S. Bentvelsen,^{107,‡} L. Beresford,^{120,‡} M. Beretta,^{47,‡} D. Berge,^{107,‡}
 E. Berghea Kuutmann,^{166,‡} N. Berger,^{5,‡} F. Berghaus,^{109,‡} J. Beringer,^{15,‡} C. Bernard,^{22,‡} N. R. Bernard,^{86,‡} C. Bernius,^{110,‡}
 F. U. Bernlochner,^{21,‡} T. Berry,^{7,‡} P. Beta,^{120,‡} C. Bertella,^{83,‡} G. Bertelli,^{146a,146b,‡} F. Bertolucci,^{125a,126b,‡} C. Berutsche,^{113,‡}
 D. Berutsche,^{113,‡} M. I. Besana,^{91,‡} G. J. Besjes,^{106,‡} O. Bessidokhai Bylund,^{146a,146b,‡} M. Bessner,^{42,‡} N. Besson,^{30,‡}
 C. Betancourt,^{48,‡} S. Bethke,^{101,‡} A. J. Bevan,^{76,‡} W. Bhimji,^{46,‡} R. M. Bianchi,^{125,‡} L. Bianchini,^{23,‡} M. Bianco,^{30,‡}
 O. Biebel,^{101,‡} S. P. Bienniek,^{143,‡} M. Biglietti,^{150,‡} J. Bibao De Mendoza,^{69,‡} H. Bilokon,^{67,‡} M. Bindl,^{54,‡} S. Binet,^{117,‡}
 A. Biebel,^{101,‡} C. Bini,^{132a,132b,‡} C. W. Black,^{150,‡} J. E. Black,^{143,‡} M. K. Black,^{22,‡} D. Blackburn,^{138,‡} R. E. Blair,^{6,‡}
 J.-B. Blanchard,^{136,‡} J. E. Blanco,^{77,‡} T. Blazek,^{144,‡} I. Bloch,^{42,‡} C. Blocker,^{23,‡} W. Blum,^{83,‡} U. Blumenschein,^{54,‡}
 G. J. Bobbink,^{107,‡} V. S. Bobrovnikov,^{109,‡} S. S. Bocchetta,^{81,‡} A. Bocci,^{145,‡} C. Bock,^{100,‡} M. Boehler,^{48,‡} J. A. Bogaerts,^{30,‡}
 A. G. Bogodanchikov,^{108,‡} C. Bohm,^{146a,‡} V. Botvits,^{77,‡} T. Böld,^{30,‡} W. Boldea,^{26a,‡} A. S. Boldyrev,^{99,‡} M. Bombe,^{80,‡}
 M. Bona,^{95,‡} M. Boonekamp,^{136,‡} A. Borisov,^{130b,‡} G. Borisov,^{72,‡} S. Borroni,^{42,‡} J. Borfeldt,^{105,‡} V. Bortolotto,^{66a-66c,‡}
 K. Bos,^{107,‡} D. Boscherini,^{20a,‡} M. Bosman,^{12,‡} J. Bourdaire,^{125,‡} J. Bouffard,^{2,‡} E. V. Bouhouva-Thacker,^{72,‡}
 D. Boumediene,^{34,‡} C. Bourdarios,^{117,‡} N. Boussoin,^{144,‡} A. Boveia,^{30,‡} J. Boyd,^{30,‡} I. R. Boyke,^{65,‡} I. Bozic,^{13,‡}
 J. Braciak,^{18,‡} A. Brandt,^{48,‡} G. Brandt,^{54,‡} O. Brandt,^{156,‡} U. Bratzler,^{156,‡} B. Brau,^{46,‡} J. E. Brau,^{116,‡} H. M. Braun,^{178a,‡}
 S. F. Brazzale,^{164a,164b,‡} K. Brendlinger,^{122,‡} A. J. Brennan,^{88,‡} I. Brenner,^{107,‡} R. Brenner,^{166,‡} S. Bressler,^{172,‡}
 K. Bristow,^{145,‡} T. M. Bristow,^{46,‡} D. Britton,^{53,‡} D. Britzger,^{42,‡} F. M. Brochu,^{26,‡} I. Brock,^{21,‡} R. Brock,^{90,‡} J. Bronner,^{101,‡}
 G. Brooijmans,^{35,‡} T. Brooks,^{77,‡} W. K. Brooks,^{10,‡} J. Brosamer,^{15,‡} E. Brost,^{106,‡} J. Brown,^{55,‡}
 P. A. Bruckman de Renstrom,^{39,‡} D. Bruncko,^{144b,‡} R. Bruniere,^{48,‡} A. Brunni,^{26a,‡} G. Bruni,^{26a,‡} M. Bruschi,^{20a,‡}
 L. Bryngemark,^{81,‡} T. Buanes,^{14,‡} Q. Buaat,^{142,‡} P. Bucholz,^{141,‡} A. G. Buckley,^{53,‡} S. L. Budka,^{26a,‡} I. A. Budagov,^{65,‡}
 F. Buehrer,^{48,‡} L. Buge,^{119,‡} M. K. Buge,^{119,‡} O. Bulekov,^{98,‡} D. Bullock,^{8,‡} H. Burckhardt,^{30,‡} S. Burdin,^{53,‡}
 B. Burghgraeve,^{108,‡} S. Burke,^{131,‡} I. Burmeister,^{43,‡} E. Busato,^{34,‡} D. Büscher,^{48,‡} V. Büscher,^{93,‡} P. Bussey,^{53,‡}
 P. C. Buszello,^{164,‡} J. M. Butler,^{22,‡} A. I. Butt,^{3,‡} C. M. Butt,^{33,‡} J. M. Butterworth,^{76,‡} P. Butt,^{107,‡} W. Buttlinger,^{28,‡}
 A. Butazu,^{53,‡} V. Buzkayko,^{109,‡} S. Cabrera Urbán,^{107,‡} D. Caforio,^{128,‡} V. M. Cairo,^{37a,37b,‡} O. Cakir,^{46,‡} P. Calafuria,^{15,‡}
 A. Calandri,^{136,‡} G. Calderini,^{30,‡} P. Calfayan,^{100,‡} L. P. Caloba,^{24‡} D. Calvet,^{34,‡} R. Camacho Toro,^{31,‡}
 S. Camarda,^{42,‡} P. Camarri,^{133a,133b,‡} D. Cameron,^{119,‡} L. M. Caminada,^{15,‡} R. Caminada Armadans,^{12,‡} S. Campana,^{30,‡}
 M. Campanelli,^{78,‡} A. Campanverde,^{148,‡} V. Canale,^{30a,30b,‡} A. Canepa,^{148,‡} M. Canete Beri,^{76,‡} J. Cantero,^{42,‡}
 R. Cantrell,^{126a,‡} T. Cao,^{40,‡} M. D. M. Capaenos Garrido,^{30,‡} I. Caprini,^{26a,‡} M. Caprini,^{26a,‡} M. Capua,^{37a,37b,‡} R. Caputo,^{83,‡}
 R. Cardarelli,^{133a,‡} T. Carli,^{30,‡} G. Carino,^{104,‡} L. Carminti,^{91a,91b,‡} S. Caron,^{106,‡} E. Carquin,^{32,‡} G. D. Carrillo-Montoya,^{8,‡}
 J. R. Carter,^{28,‡} J. Carvalho,^{126a,126b,‡} D. Casader,^{78,‡} M. P. Casado,^{12,‡} M. Casolino,^{12,‡} E. Castaneda-Miranda,^{149b,‡}
 A. Castelli,^{107,‡} V. Castillo Gimenez,^{107,‡} N. F. Castro,^{12,‡} P. Catastini,^{59,‡} A. Catimacco,^{30,‡} J. R. Catmore,^{119,‡}
 A. Cattai,^{30,‡} J. Cauldon,^{83,‡} V. Cavaliere,^{165,‡} J. Cavalli,^{76,‡} M. Cavalli-Sforza,^{12,‡} V. Cavasini,^{124a,124b,‡}
 F. Ceradini,^{134a,134b,‡} B. C. Cerio,^{45,‡} K. Cerny,^{129,‡} A. S. Cerqueira,^{24b,‡} A. Cerni,^{49,‡} L. Cerrito,^{76,‡} F. Cerutti,^{15,‡} M. Cervi,^{30,‡}
 A. Cervelli,^{27,‡} S. A. Cetin,^{136,‡} A. Chafaq,^{135a,‡} D. Chakraborty,^{108,‡} I. Chalupkova,^{128,‡} P. Chang,^{165,‡} B. Chapleau,^{87,‡}
 J. D. Chapman,^{28,‡} D. G. Charlton,^{18,‡} C. C. Chan,^{128,‡} C. A. Chavez Barajas,^{49,‡} S. Cheatham,^{132,‡} A. Chegwidden,^{90,‡}
 S. Chekanov,^{6,‡} S. V. Chekuliev,^{159a,‡} G. A. Chelkov,^{65,‡} M. A. Chelstowska,^{99,‡} C. Chen,^{64,‡} H. Chen,^{25,‡} K. Chen,^{148,‡}
 L. Chen,^{33a,‡} S. Chen,^{33c,‡} Y. Chen,^{67,‡} H. C. Cheng,^{90,‡} Y. Cheng,^{31,‡} A. Cheplakov,^{65,‡} E. Cheremushkina,^{130,‡}
 R. Cherkouai El Mousli,^{135c,‡} V. Chernyatyn,^{25,‡} E. Cheu,^{7,‡} L. Chevalier,^{136,‡} V. Chiarella,^{47,‡} J. T. Childers,^{8,‡}
 G. Chiodini,^{73,‡} A. S. Chisholm,^{18,‡} R. T. Chislett,^{78,‡} A. Chitan,^{26a,‡} M. V. Chizhov,^{65,‡} K. Choi,^{41,‡} S. Chouridou,^{9,‡}
 B. K. B. Chow,^{200,‡} V. Christodoulou,^{78,‡} D. Chromek-Burckhardt,^{30,‡} M. L. Chu,^{131,‡} J. Chudoba,^{127,‡} A. J. Chujnowski,^{87,‡}
 J. J. Chwastowski,^{39,‡} L. Chytka,^{115,‡} G. Ciapetti,^{132a,132b,‡} A. Ciftci,^{46,‡} D. Cinca,^{53,‡} V. Cindro,^{75,‡} I. A. Ciocara,^{21,‡}
 A. Ciocio,^{15,‡} Z. H. Citron,^{26a,‡} M. Ciubancan,^{8,‡} A. Clark,^{40,‡} B. L. Clark,^{37,‡} P. J. Clark,^{46,‡} R. N. Clarke,^{15,‡}
 W. Cleland,^{125,‡} C. Clement,^{146a,146b,‡} Y. Coadou,^{83,‡} M. Cobal,^{164a,164c,‡} A. Coccaro,^{138,‡} J. Cochran,^{64,‡} L. Coffey,^{23,‡}

- J. G. Cogan,^{143,t} B. Cole,^{35,t} S. Cole,^{108,t} A. P. Colijn,^{107,t} J. Collot,^{55,t} T. Colombo,^{58c,t} G. Compastella,^{101,t}
 P. Conde Muñoz,^{126a,126b,t} E. Conovatis,^{48,t} S. H. Connell,^{148b,t} L. A. Connolly,^{17,t} S. M. Consonni,^{92a,b,t} V. Consorti,^{48,t}
 S. Constantinescu,^{26a,t} C. Conta,^{123a,123b,t} G. Conti,^{30,t} F. Conventi,^{104a,t} M. Cooke,^{15,t} D. B. Cooper,^{78,t}
 A. M. Cooper-Sarkar,^{120,t} T. Cornelissen,^{175,t} M. Corradi,^{20,t} F. Corriveau,^{87,t} A. Corso-Radu,^{103,t} A. Cortes-Gonzalez,^{12,t}
 G. Cortiana,^{101,t} G. Costa,^{91a,t} M. J. Costa,^{107,t} D. Costanzo,^{139,t} D. Côte,^{8,t} G. Cottin,^{28,t} G. Cowan,^{77,t} B. E. Cox,^{84,t}
 K. Cranmer,^{110,t} G. Cree,^{29,t} S. Crépel-Renaudin,^{46,t} F. Crescioli,^{40,t} W. A. Cribbs,^{104a,146b,t} M. Crispin Ortuzar,^{120,t}
 M. Cristinziani,^{21,t} V. Croft,^{106,t} G. Crosetti,^{27a,27b,t} T. Cuhadar Donszelmann,^{139,t} J. Cummings,^{176,t} M. Curatolo,^{47,t}
 C. Cuthbert,^{150,t} H. Czaj,^{141,t} P. Czodrowski,^{3,t} S. D'Auria,^{53,t} M. D'Onofrio,^{74,t}
 M. J. Da Cunha Sargedas De Sousa,^{123a,123b,t} C. Da Via,^{84,t} W. Dabrowski,^{38a,t} A. Dafinac,^{120,t} T. Dai,^{99,t} O. Dale,^{14,t}
 F. Dallaire,^{6,t} C. Dellapiccola,^{26,t} M. Dam,^{36,t} J. R. Dandoy,^{31,t} N. P. Pang,^{48,t} A. C. Daniells,^{18,t} M. Danninger,^{166,t}
 M. Dano Hoffmann,^{16,t} V. Dav,^{48,t} G. Darbo,^{50a,t} S. Darmora,^{8,t} J. Dassoulas,^{3,t} A. Datta Gupta,^{61,t} W. Davy,^{21,t}
 C. David,^{109,t} T. Davidek,^{129,t} E. Davies,^{53,t} M. Davies,^{153,t} P. Davison,^{78,t} Y. Davygora,^{58,t} E. Dawe,^{88,t} I. Dawson,^{139,t}
 R. K. Daya-Ishmukhametova,^{86,t} K. De,^{8,t} R. De Asmundis,^{104a,t} D. De Castro,^{20a,20b,t} S. De Cecco,^{80,t} N. De Groot,^{106,t}
 P. de Jong,^{107,t} H. De la Torre,^{82,t} F. De Lorenzi,^{64,t} L. De Nooit,^{107,t} D. De Pepe,^{132a,t} A. De Salvo,^{122a,t} U. De Sanctis,^{149,t}
 A. De Santo,^{149,t} J. B. De Vivie De Regie,^{117,t} W. J. Deamey,^{149,t} R. Debbe,^{25,t} C. Debenedetti,^{137,t} D. V. Dedovich,^{65,t}
 I. Deigaard,^{107,t} J. Del Peso,^{82,t} T. Del Prete,^{124a,124b,t} D. Delgove,^{117,t} F. Delion,^{116,t} C. M. Delitzsch,^{49,t} M. Deliyergiyev,^{75,t}
 A. Dell'Acqua,^{30,t} L. Dell'asta,^{22,t} M. Dello Russo,^{124a,124b,t} M. Della Pietra,^{30,t} D. della Volpe,^{49,t} M. Delmastro,^{5,t}
 P. A. Delsart,^{55,t} C. Deluca,^{107,t} D. DeMarco,^{158,t} S. Demers,^{76,t} M. Demichev,^{85,t} A. Demilly,^{80,t} S. P. Denisov,^{130,t}
 D. Derendarz,^{39,t} J. E. Derkaoui,^{155,t} F. Derue,^{80,t} P. Derven,^{34,t} K. Desch,^{21,t} C. Deterre,^{42,t} P. O. Deviereiros,^{30,t}
 A. Dewhurst,^{131,t} S. Dhaliwal,^{107,t} A. Di Ciaccio,^{133a,133b,t} L. Di Ciazzo,^{5,t} A. Di Domenico,^{132a,132b,t} C. Di Donato,^{104a,104b,t}
 A. Di Girolamo,^{30,t} B. Di Girolamo,^{30,t} A. Di Mattia,^{152,t} B. Di Micco,^{152,t} R. Di Nardo,^{47,t} A. Di Simone,^{48,t}
 R. Di Sipio,^{158,t} D. Di Valentino,^{29,t} C. Diaconi,^{83,t} M. Diamond,^{138,t} F. A. Dias,^{46,t} M. A. Diaz,^{32a,t} E. B. Diehl,^{99,t}
 J. Dietrich,^{16,t} S. Diglio,^{85,t} A. Dimitrijevska,^{13,t} J. Dijngfelder,^{21,t} P. Dita,^{26a,t} S. Ditt,^{20a,t} F. Dittus,^{30,t} F. Djama,^{85,t}
 T. Djobava,^{51b,t} J. I. Djuvlandsk,^{58a,t} M. A. B. do Vale,^{24c,t} D. Dobos,^{30,t} M. Dobre,^{26a,t} C. Doglioni,^{49,t} T. Dolhmae,^{155,t}
 J. Dolejsi,^{129,t} Z. Dolezal,^{129b,t} B. A. Dolgoshein,^{98a,t} M. Donadelli,^{24d,t} S. Donati,^{124a,124b,t} P. Dondero,^{121a,121b,t}
 J. Donini,^{34,t} J. Dopke,^{131,t} A. Doris,^{104a,t} M. T. Dova,^{71,t} A. T. Doyle,^{33,t} E. Drechsler,^{34,t} M. Dris,^{10,t} E. Dubreuil,^{34,t}
 E. Duchovn,^{172,t} G. Duckeck,^{100,t} O. A. Duda,^{20a,20b,t} D. Duda,^{175,t} A. Dularayev,^{30,t} L. Duflo,^{117,t} L. Duguid,^{77,t}
 M. Dührssen,^{30,t} M. Dunford,^{58a,t} H. Duran Yildiz,^{46,t} M. Dürren,^{52,t} A. Durgishvili,^{51b,t} D. Duschinger,^{44,t} M. Dyndal,^{38a,t}
 C. Eckardt,^{42,t} K. M. Ecker,^{201,t} R. C. Edgar,^{98,t} W. Edson,^{93,t} N. E. Edwards,^{46,t} W. Ehrenfeld,^{21,t} T. Elifert,^{30,t} G. Eigen,^{14,t}
 K. Einsweiler,^{15,t} T. Ekelof,^{166,t} M. El Kacimi,^{135,t} M. Ellert,^{166,t} S. Elles,^{8,t} F. Ellinghaus,^{83,t} A. A. Elliott,^{169,t} N. Ellis,^{30,t}
 J. Elmsheuser,^{100,t} M. Eising,^{30,t} D. Emelyanov,^{13,t} Y. Enari,^{155,t} O. C. Endner,^{33,t} M. Endo,^{118,t} R. Engelmann,^{148,t}
 J. Erdmann,^{43,t} A. Ereditato,^{175,t} G. Ernis,^{175,t} J. Ernst,^{2,t} M. Ernst,^{195,t} S. Errede,^{165,t} E. Ertel,^{83,t} M. Escalier,^{117,t} H. Esch,^{43,t}
 P. Fernandez Martinez,^{167,t} S. Fernandez Perez,^{30,t} S. Ferrap,^{23,t} A. Ferretto Parodi,^{30a,30b,t} G. Facini,^{31,t}
 D. E. Ferreira de Lima,^{53,t} A. Ferreir,^{167,t} D. Ferreir,^{49,t} C. Ferretti,^{89,t} A. Ferretto Parodi,^{30a,30b,t} M. Fiascaris,^{31,t}
 E. Fiedler,^{83,t} A. Filipic,^{25,t} M. Filipuzzi,^{42,t} F. Filthaut,^{108,t} M. Fincke-Keler,^{160,t} K. D. Finelli,^{130,t}
 M. C. N. Fiolhais,^{126a,126b,t} L. Fiorini,^{167,t} A. Firan,^{49,t} A. Fischer,^{2,t} C. Fischer,^{12,t} J. Fischer,^{175,t} W. C. Fisher,^{90,t}
 E. A. Fitzgerald,^{23,t} M. Flechi,^{48,t} I. Fleck,^{141,t} F. Fleischmann,^{89,t} S. Fleischmann,^{173,t} G. T. Fletcher,^{139,t} G. Fletcher,^{76,t}
 T. Flick,^{175,t} A. Floderus,^{81,t} L. R. Flores Castillo,^{60a,t} M. J. Flowerdew,^{108,t} A. Formica,^{136,t} A. Forti,^{84,t} D. Fournier,^{117,t}
 H. Fox,^{72,t} S. Fracchia,^{12,t} P. Francavilla,^{20,t} M. Franchini,^{20a,20b,t} D. Francis,^{30,t} L. Franconi,^{118,t} M. Franklin,^{57,t}
 M. Fraternali,^{121a,121b,t} D. Freeborn,^{176,t} D. French,^{28,t} F. Friedrich,^{44,t} D. Froidevaux,^{30,t} J. A. Frost,^{120,t} C. Fukunaga,^{156,t}
 E. Fullana Torregrosa,^{83,t} B. G. Fulson,^{143,t} J. Fuller,^{167,t} C. Gabaldon,^{55,t} O. Gabizon,^{175,t} A. Gabrielli,^{20a,20b,t}
 A. Gabrielli,^{132a,132b,t} S. Gadatsch,^{107,t} S. Adamowski,^{49,t} G. Gagliardi,^{50a,50b,t} P. Gagnon,^{61,t} C. Galea,^{106,t}
 B. Galhardo,^{126a,126b,t} E. J. Gallas,^{131,t} B. J. Gallop,^{128,t} P. Gallus,^{36,t} G. Galster,^{36,t} K. K. Gan,^{111,t} J. Gao,^{31b,85,t} Y. Gao,^{46,t}
 Y. S. Gao,^{143,t} F. M. Gray Walls,^{46,t} F. Garberson,^{176,t} C. Garcia,^{167,t} J. E. Garcia Navarro,^{167,t} M. Garcia-Sciveres,^{15,t}

- R. W. Gardner,^{31,t} N. Garelli,^{143,t} V. Garonne,^{119,t} C. Gatti,^{47,t} A. Gaudiello,^{50,50h,t} G. Gaudio,^{121a,t} B. Gaur,^{141,t}
 L. Gauthier,^{95,t} P. Gauzzi,^{132a,132b,t} I. L. Gavrilenko,^{96,t} C. Gay,^{168,t} G. Gaycken,^{21,t} E. N. Gazis,^{167,t} P. Ge,^{33d,t} Z. Gece,^{168,t}
 C. N. P. Gee,^{131,t} D. A. A. Geerts,^{107,t} Ch. Geich-Gimbel,^{21,t} M. P. Geisler,^{58a,t} C. Gemme,^{50,t} M. H. Genes,^{25,t}
 S. Gentile,^{132a,132b,t} M. George,^{54,t} S. George,^{77,t} D. Gerbaudo,^{163,t} A. Gershon,^{153,t} H. Ghazlane,^{135b,t} B. Giacobbe,^{20a,t}
 S. Giagu,^{132a,132b,t} V. Giangiobbe,^{12,t} P. Giannetti,^{124a,124b,t} B. Gibbard,^{25,t} S. M. Gibson,^{77,t} M. Gilchrist,^{15,t}
 T. P. S. Gillam,^{28,t} D. Gillberg,^{30,t} G. Gilles,^{34,t} D. M. Gingrich,^{93,t} N. Giokaris,^{41,t} M. Pi. Giordani,^{164a,164b,t} F. M. Giorgi,^{20a,t}
 F. M. Giorgi,^{76,t} P. F. Giraud,^{136,t} P. Giromini,^{47,t} D. Giugni,^{91,t} C. Giuliani,^{48,t} M. Giulini,^{58b,t} B. K. Gjelsten,^{119,t}
 S. Gkaitatzis,^{154,t} I. Gkikas,^{154,t} E. L. Gkougkousis,^{117,t} L. K. Gladin,^{99,t} C. Glasman,^{39,t} J. Glatzer,^{30,t}
 P. C. F. Glashyer,^{46,t} A. Glazov,^{12,t} M. Goblerski-Kolb,^{103,t} J. R. Goddard,^{76,t} J. Godlewski,^{39,t} S. Goldfarb,^{89,t}
 T. Golling,^{97,t} D. Golubkov,^{130,t} A. Gomes,^{128a,128b,128d,t} R. Gonçalo,^{126b,t} J. Goncalves Pinto Firmino Da Costa,^{136,t}
 L. Gonella,^{21,t} S. González de la Hoz,^{167,t} G. González Parra,^{12,t} S. Gonzalez-Sevilla,^{49,t} L. Goossens,^{30,t}
 P. A. Gorbounov,^{97,t} H. A. Gordon,^{25,t} I. Gorelov,^{105,t} B. Gorini,^{135c,t} E. Gorini,^{73a,73b,t} A. Gorisek,^{75,t} E. Gornicki,^{39,t}
 A. T. Goshaw,^{45,t} C. Gössling,^{45,t} M. I. Gostkin,^{65,t} D. Gougamli,^{135c,t} A. G. Goussiou,^{138,t} N. Govender,^{146b,t}
 H. M. X. Grabas,^{137,t} L. Graber,^{24,t} I. Grabowska-Bold,^{58a,t} P. Grafström,^{20a,20b,t} K. J. Grahn,^{42,t} J. Gramling,^{49,t}
 E. Gramstad,^{119,t} S. Grancagnolo,^{16,t} V. Grassi,^{148,t} V. Gratchev,^{123,t} H. M. Gray,^{30,t} E. Graziani,^{134a,t} Z. D. Greenwood,^{29a,t}
 K. Gregersen,^{78,t} I. M. Gregor,^{42,t} P. Grenier,^{143,t} J. Griffiths,^{8,t} A. M. Grillo,^{137,t} K. Grimm,^{72,t} S. Grinstein,^{12,t}
 Ph. Gris,^{34,t} J.-F. Grivaz,^{117,t} J. P. Grohs,^{64,t} A. Grohsjean,^{42,t} E. Gross,^{172,t} J. Gross-Kneitter,^{54,t} G. C. Grossi,^{79,t}
 Z. J. Grout,^{140,t} L. Guan,^{33b,t} J. Guenther,^{128,t} F. Guescini,^{40,t} D. Guest,^{176,t} O. Gueta,^{153,t} E. Guido,^{50a,50b,t} T. Guillemin,^{117,t}
 S. Guindon,^{12,t} U. Gul,^{53,t} C. Gumpert,^{44,t} J. Guo,^{33a,t} S. Gupta,^{120,t} P. Gutierrez,^{113,t} N. G. Gutierrez Ortiz,^{53,t}
 C. Gutschow,^{44,t} C. Guyot,^{136,t} C. Gwenlan,^{120,t} C. B. Guilliam,^{74,t} A. Haas,^{110,t} C. Habes,^{15,t} H. K. Hadavand,^{8,t}
 N. Haddad,^{135,t} P. Haeferl,^{21,t} S. Hageböck,^{21,t} Z. Hajduk,^{30,t} H. Habokyan,^{171,t} M. Haleem,^{42,t} J. Haley,^{114,t} D. Hall,^{120,t}
 G. Halladjian,^{90,t} G. D. Hellwell,^{85,t} K. Hamacher,^{175,t} P. Hamal,^{115,t} K. Hanama,^{169,t} M. Hamer,^{54,t} A. Hamilton,^{143a,t}
 G. N. Hamity,^{145,t} P. G. Hammett,^{42,t} L. Han,^{33b,t} K. Hanagaki,^{118,t} K. Hanawa,^{155,t} M. Hance,^{15,t} P. Hanke,^{58a,t}
 R. Hanna,^{136,t} J. B. Hansen,^{36,t} M. C. Hansen,^{36,t} P. H. Hansen,^{21,t} P. H. Hansen,^{36,t} K. Hara,^{168,t} A. S. Hard,^{173,t}
 T. Harenberg,^{175,t} F. Hariri,^{117,t} S. Harkschka,^{92,t} R. D. Harrington,^{46,t} P. F. Harrison,^{170,t} R. Hartjes,^{107,t} M. Hasegawa,^{67,t}
 S. Hasegawa,^{103,t} F. Hasegawa,^{140,t} R. J. Hassel,^{113,t} S. Hassani,^{136,t} S. Haug,^{17,t} R. Hauser,^{90,t} L. Hauswald,^{44,t}
 M. Havranek,^{127,t} C. M. Hawkes,^{18,t} R. J. Hawkings,^{30,t} A. D. Hawkins,^{81,t} T. Hayashi,^{165,t} D. Hayden,^{90,t} C. P. Hays,^{120,t}
 J. M. Hayes,^{76,t} H. S. Hayward,^{74,t} S. J. Haywood,^{151,t} J. Head,^{18,t} T. Heck,^{83,t} V. Hedberg,^{81,t} L. Heelan,^{8,t} S. Hein,^{122,t}
 T. Heim,^{178,t} B. Heinemann,^{145,t} L. Heinrich,^{108,t} J. Hejbal,^{121,t} L. Helary,^{22,t} J. Hellman,^{340a,340b,t} D. Hellmich,^{21,t}
 C. Helsens,^{30,t} J. Henderson,^{72,t} R. C. W. Henderksen,^{72,t} Y. Heng,^{173,t} C. Henglert,^{42,t} A. Henrichs,^{176,t}
 A. M. Henriques Correia,^{30,t} S. Hentrot-Versille,^{117,t} G. H. Herbst,^{16,t} Y. Hernández Jiménez,^{167,t} R. Herberg-Schubert,^{16,t}
 G. Herten,^{48,t} R. Hertenberger,^{100,t} L. Hervas,^{30,t} G. G. Hesketh,^{78,t} N. P. Hessey,^{107,t} J. W. Hetherly,^{40,t} R. Hickling,^{76,t}
 E. Higón-Rodríguez,^{167,t} E. Hill,^{160,t} J. C. Hill,^{26,t} K. H. Hiller,^{42,t} S. J. Hillier,^{178,t} I. Hincliffe,^{123,t} E. Hines,^{122,t}
 R. R. Hinman,^{15,t} M. Hirose,^{157,t} D. Hirschbuehl,^{175,t} J. Hobbs,^{148,t} N. Hod,^{107,t} M. C. Hodgkinson,^{130,t} P. Hodgson,^{139,t}
 A. Hoecker,^{30,t} M. R. Hoefkerkamp,^{105,t} F. Hoenig,^{100,t} M. Hofhield,^{83,t} D. Hohn,^{21,t} T. R. Holmes,^{15,t} T. M. Hong,^{122,t}
 L. Hoof van Huysduyven,^{110,t} W. H. Hopkins,^{116,t} Y. Horai,^{30,t} A. J. Horton,^{142,t} J.-Y. Hostachy,^{58,t} S. Hou,^{151,t}
 A. Hounmoud,^{135,t} J. Howard,^{128,t} J. Howarth,^{42,t} M. M. Hrabovsky,^{115,t} I. Hristova,^{86,t} J. Hrivnac,^{117,t} T. Hrynowa,^{5,t}
 A. Hrynevych,^{93,t} C. Hsu,^{146c,t} P. J. Hsu,^{151,t} S.-C. Hsu,^{138,t} D. Hu,^{25,t} Q. Hu,^{33b,t} X. Hu,^{90,t} Y. Huang,^{42,t} Z. Hubacek,^{30,t}
 F. Hubaut,^{85,t} F. Huegging,^{21,t} T. B. Huffman,^{120,t} E. W. Hughes,^{35,t} G. Hughes,^{72,t} M. Huhtinen,^{30,t} T. A. Hülsing,^{33,t}
 N. Huseynov,^{65,t} J. Huston,^{90,t} J. J. Huht,^{27,t} G. Iacobucci,^{40,t} G. Iakovovidis,^{23,t} I. Ibragimov,^{141,t} L. Iconomou-Fayard,^{112,t}
 E. Ideal,^{178,t} Z. Idrissi,^{135,t} P. Iengo,^{30,t} O. Igonkina,^{107,t} T. Izawa,^{171,t} Y. Ikegami,^{96,t} K. Ikematsu,^{141,t} M. Ikeno,^{96,t}
 Y. Ilchenko,^{116,t} D. Iliadis,^{154,t} N. Ilie,^{143,t} Y. Inamaru,^{67,t} T. Ince,^{101,t} P. Ioannou,^{9,t} M. Iodice,^{134,t} K. Iordanou,^{35,t}
 V. Ippolito,^{37,t} A. Irles Isaksson,^{167,t} C. Isaksson,^{166,t} M. Ishino,^{68,t} M. Ishitsuka,^{157,t} R. Ishumukhametov,^{111,t} C. Isiever,^{120,t}
 S. Istin,^{104,t} J. M. Iturbe Ponce,^{84,t} R. Juppa,^{133a,133b,t} J. Ivansson,^{81,t} W. Iwanski,^{39,t} H. Iwasaki,^{66,t} J. M. Izen,^{41,t}
 V. Izzo,^{104,t} S. Jabbar,^{5,t} B. Jackson,^{22,t} D. O. Jamín,^{151,t} D. K. Jana,^{79,t} V. Jain,^{21,t} K. Jakobs,^{28,t}
 J. Jakobson,^{30,t} T. Jakoubek,^{127,t} J. Jakubek,^{128,t} D. O. Jamín,^{151,t} D. K. Jana,^{79,t} E. Jansen,^{78,t} R. W. Jansky,^{62,t}
 J. Janssen,^{21,t} M. Janus,^{170,t} G. Jarlskog,^{81,t} N. Javadov,^{65,t} T. Javurek,^{48,t} L. Jeanty,^{15,t} J. Jejelava,^{51a,t} G.-Y. Jeng,^{150,t}
 D. Jennens,^{88,t} P. Jenni,^{48,t} J. Jentsch,^{43,t} C. Jeske,^{130,t} S. Jézquel,^{8,t} H. Ji,^{173,t} J. Jia,^{148,t} Y. Jiang,^{33b,t} S. Jiggins,^{78,t}
 J. Jimenez Pena,^{167,t} S. Jin,^{33a,t} A. Jinaru,^{26a,t} O. Jinnouchi,^{157,t} M. D. Joergensen,^{36,t} P. Johansson,^{139,t} K. A. Johns,^{7,t}

- K. Jon-And^{146a,146b,†}, G. Jones^{170,†}, R. W. L. Jones^{72,†}, T. J. Jones^{74,†}, Johnnemann^{58a,†}, P. M. Jorge^{126a,126b,†}, K. D. Joshi^{84,†}, J. Jovicic^{139a,†}, X. Ju^{173,†}, C. A. Jung^{167,†}, P. Jussel^{62,†}, A. Juste Rozas^{12,†}, M. Kaci^{26,†}, A. Kaczmarcka^{36,†}, M. Kado^{117,†}, H. Kagan^{171,†}, M. Kagan^{143,†}, S. J. Kahn^{83,†}, E. Kajomovitz^{65,†}, C. W. Kalderon^{120,†}, S. Kama^{103,†}, A. Kamenshchikov^{130,†}, N. Kanaya^{155,†}, M. Kaneda^{30,†}, S. Kaneti^{28,†}, V. A. Kantsarov^{98,†}, J. Kanzaki^{66,†}, B. Kaplan^{110,†}, A. Kaply^{31,†}, D. Kar^{53,†}, K. Karakostas^{10,†}, A. Karamouzi^{3,†}, N. Karastathis^{10,107,†}, M. J. Karem^{54,†}, M. Karnevsky^{83,†}, S. N. Karpov^{65,†}, Z. M. Karpova^{40,†}, K. Kartik^{19,†}, V. Kartvelishvili^{72,†}, A. N. Karyukhin^{130,†}, L. Kashif^{173,†}, R. D. Kass^{21,†}, A. Kastanas^{14,†}, Y. Kataoka^{155,†}, A. Katre^{49,†}, J. Katzy^{42,†}, K. Kawago^{70,†}, T. Kawamoto^{25,†}, G. Kawamura^{54,†}, S. Kazama^{155,†}, V. F. Kazanin^{109,†,§}, M. Y. Kazaninov^{55,†}, R. Keefer^{169,†}, R. Kehoe^{40,†}, J. S. Keller^{42,†}, J. J. Kempster^{77,†}, H. Keoshkerian^{84,†}, O. Kepka^{127,†}, B. P. Kersevan^{31,†}, S. Kersten^{178,†}, R. A. Keyes^{87,†}, F. Khalil-zada^{11,†}, H. Khandamyan^{146a,146b,†}, A. Khanov^{114,†}, G. A. Kharlamov^{209,†}, T. J. Kho^{28,†}, V. Khovansky^{97,†}, E. Khramov^{65,†}, J. Khubua^{51a,†}, H. Y. Kim^{8,†}, H. Kim^{146a,146b,†}, S. H. Kim^{100,†}, Y. Kim^{31,†}, N. Kimura^{154,†}, O. M. Kind^{16,†}, B. T. King^{74,†}, M. King^{167,†}, R. S. B. King^{120,†}, S. B. King^{108,†}, J. Kirk^{131,†}, A. E. Kiryunin^{101,†}, T. Kishimoto^{67,†}, D. Kisielewska^{18a,†}, F. Kiss^{46,†}, K. Kiuchi^{165,†}, O. Kivemyk^{136,†}, E. Kladiva^{144,†}, M. H. Klein^{58,†}, M. Klein^{74,†}, U. Klein^{74,†}, K. Kleinknecht^{83,†}, P. Klimek^{146a,146b,†}, A. Klimentov^{25,†}, E. Klingenberg^{43,†}, J. A. Klinger^{80,†}, T. Kluhutchnikova^{30,†}, E.-E. Kluge^{50a,†}, P. Kluit^{107,†}, S. Kluth^{101,†}, E. Knerner^{92,†}, E. B. F. G. Knoops^{35,†}, A. Knu^{53,†}, A. Kobayashi^{153,†}, D. Kobayashi^{157,†}, T. Kobayashi^{155,†}, M. Kobel^{44,†}, M. Kocian^{143,†}, P. Kodys^{129,†}, T. Koffas^{9,†}, E. Koffman^{107,†}, L. A. Kogan^{96,†}, S. Kohlmann^{175,†}, Z. Kohout^{128,†}, T. Kohrik^{66,†}, T. Koi^{143,†}, H. Kolanski^{16,†}, I. Koletsou^{5,†}, A. A. Komar^{96,†}, Y. Komori^{155,†}, T. Kondo^{66,†}, N. Kondrashova^{42,†}, K. Koneke^{48,†}, A. C. König^{106,†}, S. König^{83,†}, T. Kono^{66,†}, R. Konopnicki^{170,†}, N. Konstantinidis^{78,†}, R. Kopelianakis^{152,†}, S. Koperny^{36a,†}, L. Köpke^{83,†}, A. Kopp^{48,†}, K. Korycyl^{39,†}, K. Kordas^{154,†}, A. Korn^{78,†}, A. A. Korol^{109,†}, I. Korolov^{12,†}, E. V. Korolkova^{139,†}, O. Koterm^{100,†}, S. Kortner^{101,†}, T. Kosel^{129,†}, V. V. Kostyukhin^{21,†}, V. M. Kotov^{63,†}, A. Kotwal^{45,†}, A. Kourkoumelis-Charalampidi^{154,†}, C. Kourkoumelis^{9,†}, V. Kouskoura^{24,†}, A. Koutsou^{159,†}, R. Kowalewski^{30,†}, T. Z. Kowalski^{26a,†}, W. Kozanecki^{156,†}, A. S. Kozhin^{130,†}, V. A. Kramarenko^{99,†}, G. Kramberger^{73,†}, D. Krasnopalov^{98,†}, A. Krasznahorkay^{30,†}, J. K. Kraus^{21,†}, A. Kravchenko^{25,†}, S. Kreiss^{110,†}, M. Kretz^{96,†}, J. Kretzschneider^{74,†}, K. Kreutzfeldt^{52,†}, P. Krieger^{158,†}, K. Krizka^{31,†}, K. Kroemer^{43,†}, H. Kroha^{101,†}, J. Kroll^{122,†}, J. Kroseberg^{71,†}, J. Krstic^{13,†}, U. Kruchonak^{65,†}, H. Krüger^{41,†}, N. Krummack^{64,†}, Z. V. Krumshteyn^{65,†}, A. Kruse^{173,†}, M. C. Kruse^{45,†}, M. Kruskal^{22,†}, T. Kubota^{78,†}, H. Kucuk^{87,†}, S. Kuday^{46,†}, S. Kuehn^{48,†}, A. Kugel^{58c,†}, F. Kuger^{174,†}, A. Kuhl^{137,†}, T. Kuhl^{42,†}, V. Kukhlin^{65,†}, Y. Kulchitsky^{92,†}, S. Kuleshov^{32b,†}, M. Kunz^{132a,132b,†}, T. Kunigo^{68,†}, A. Kupco^{127,†}, H. Kurashige^{47,†}, Y. A. Kurochkin^{92,†}, R. Kurumida^{67,†}, V. Kus^{127,†}, E. S. Kuwertz^{160,†}, M. Kuze^{157,†}, J. Kvita^{115,†}, T. Kwan^{168,†}, D. Kyriazopoulos^{138,†}, A. La Rosa^{98,†}, J. L. La Rosa Navarro^{24a,†}, L. La Rotonda^{97a,97b,†}, C. Lacasta^{167,†}, F. Lacava^{132a,132b,†}, S. Lai^{48,†}, H. Lacke^{16,†}, D. Lacour^{16,†}, V. R. Lacuesta^{167,†}, E. Ladypin^{65,†}, R. Lafaye^{5,†}, B. Laforge^{80,†}, T. Lagouri^{176,†}, S. Lai^{48,†}, L. Lamboume^{78,†}, S. Lammers^{61,†}, C. L. Lampen^{7,†}, W. Lampl^{7,†}, E. Lançon^{136,†}, U. Landgraf^{48,†}, M. P. J. Landon^{76,†}, V. S. Lang^{58a,†}, J. C. Lange^{12,†}, A. J. Lankford^{163,†}, F. Lanni^{25,†}, K. Lantzsch^{28,†}, S. Laplace^{46,†}, C. Lapoire^{136,†}, J. F. Laporte^{136,†}, T. Lari^{12,†}, F. Lasagab Manghi^{20a,20b,†}, M. Lassnig^{30,†}, P. Laurelli^{47,†}, W. Lavrijsen^{15,†}, A. T. Law^{137,†}, P. Laycock^{74,†}, O. Le Dortz^{81,†}, E. Le Guirice^{45,†}, E. Le Meneude^{12,†}, M. LeBlanc^{169,†}, T. LeCompte^{6,†}, L. Ledroit-Guilhon^{55,†}, S. C. Lee^{144b,†}, S. C. Lee^{151,†}, L. Lee^{1,†}, G. Lefebvre^{30,†}, M. Lefebvre^{109,†}, F. Legger^{100,†}, C. Leggett^{15,†}, A. Lehau^{74,†}, G. Lehmann Miotti^{30,†}, X. Lei^{7,†}, W. A. Leigh^{29,†}, A. Leisos^{154,†}, A. G. Leister^{176,†}, M. A. L. Leite^{24d,†}, R. Leitner^{120,†}, D. Lellouch^{172,†}, B. Lemmer^{54,†}, K. J. C. Leney^{76,†}, T. Lenz^{21,†}, B. Lenzi^{30,†}, R. Leone^{7,†}, S. Leone^{12,†}, C. Leonidopoulos^{46,†}, S. Leontsinis^{10,†}, C. Leroy^{95,†}, C. G. Lester^{28,†}, M. Levchenko^{123,†}, J. Leveque^{5,†}, D. Levin^{80,†}, L. J. Levinson^{172,†}, M. Levy^{18,†}, A. Lewis^{120,†}, A. M. Leyko^{21,†}, M. Leyton^{41,†}, B. Li^{133a,†}, H. Li^{148,†}, H. L. Li^{31,†}, L. Li^{45,†}, L. Li^{33c,†}, S. Li^{45,†}, Y. Li^{1,†}, Z. Liang^{17,†}, H. Liao^{34,†}, B. Liberti^{133a,†}, A. Liblong^{158,†}, P. Lichard^{30,†}, K. Lie^{165,†}, J. Liebal^{21,†}, W. Liebig^{14,†}, C. Limbach^{21,†}, A. Limosani^{150,†}, S. C. Lin^{151,†}, T. H. Lin^{131,†}, F. Linde^{107,†}, B. E. Lindquist^{148,†}, J. T. Linnemann^{90,†}, E. Lipelis^{122,†}, A. Lipniacka^{14,†}, M. Lisoviy^{26b,†}, T. M. Liss^{165,†}, D. Lissauer^{25,†}, A. Lister^{158,†}, M. A. Litke^{157,†}, B. Liu^{151,†}, D. Liu^{151,†}, J. Liu^{35,†}, J. B. Liu^{133b,†}, K. Liu^{165,†}, L. Liu^{165,†}, M. Liu^{45,†}, M. Liu^{33b,†}, Y. Liu^{33b,†}, M. Livian^{121a,121b,†}, A. Lleres^{137,†}, J. Llorente Merino^{84,†}, E. Loevschall-Jensen^{36,†}, A. Loginov^{176,†}, T. Lohse^{16,†}, K. Lohwasser^{42,†}, M. Lokajicek^{127,†}, B. A. Long^{22,†}, J. D. Long^{89,†}, R. E. Long^{72,†}, C. A. Looper^{111,†}, L. Lopez^{126a,†}, D. Lopez Mateos^{57,†}, B. Lopez Paredes^{139,†}, I. Lopez Paz^{12,†}, J. Lorenz^{100,†}, N. Lorenzo Martinez^{61,†}, M. Losada^{162,†}, P. Loscutoff^{15,†}, P. J. Lösel^{100,†}, X. Lou^{33a,†}, A. Louinis^{117,†}, J. Love^{8,†}, P. A. Love^{72,†}, N. Lu^{98,†}, H. J. Lubat^{138,†}, C. Luci^{132a,132b,†}, A. Lucotte^{55,†}, F. Luehring¹⁹¹⁸⁰³⁻¹³

- W. Lukas,^{62,†} L. Luminari,^{132a,b} O. Lundberg,^{146a,146b,†} B. Lund-Jensen,^{147,†} D. Lynn,^{25,†} R. Lysak,^{127,†} E. Lytken,^{81,†} H. Ma,^{25,†} L. L. Ma,^{20,†} G. Maccarone,^{47,†} A. Macchione,^{106,†} C. M. Macdonald,^{139,†} J. Machado-Migues,^{122,123b,†} D. Macina,^{30,†} D. Madaffari,^{85,†} R. Madar,^{34,†} H. J. Maddocks,^{72,†} W. F. Mader,^{44,†} A. Madsen,^{106,†} S. Maeland,^{14,†} T. Maeno,^{25,†} A. Maevskiy,^{99,†} E. Magradze,^{54,†} K. Mahboubi,^{48,†} J. Mahstedt,^{107,†} C. Maiani,^{136,†} C. Maidantchik,^{24a,†} A. A. Maier,^{101,†} T. Maier,^{100,†} A. Maior,^{128a,128b,128d,†} S. Majewski,^{116,†} Y. Makide,^{66,†} N. Makovec,^{80,†} B. Malaiescu,^{80,†} P. Malecki,^{39,†} V. Maleev,^{20,†} F. Malek,^{55,†} U. Mallik,^{63,†} D. Malon,^{6,†} C. Malone,^{143,†} S. Maltezos,^{10,†} V. M. Malyshev,^{109,†} S. Malyukov,^{20,†} J. Mamuzic,^{42,†} G. Mancini,^{47,†} B. Mandelli,^{30,†} L. Mandelli,^{91a,†} I. Mandic,^{75,†} R. Mandrysch,^{61,†} J. Mancera,^{126a,126b,†} A. Manfredini,^{101,†} L. Manhaes de Andrade Filho,^{20b,†} J. Manjares Ramos,^{150b,†} A. Mann,^{108,†} P. M. Manning,^{137,†} A. Manousakis-Katsikakis,^{9,†} B. Mansouli,^{136,†} R. Mantel,^{83,†} M. Mantoani,^{54,†} L. Mapelli,^{30,†} L. March,^{145,†} G. Marchiori,^{103,†} M. Marcusi,^{127,†} C. Marta,^{109,†} M. Marjanovic,^{13,†} F. Marroquin,^{24a,†} S. P. Marsden,^{44,†} Z. Marshall,^{15,†} F. L. Marti,^{17,†} S. Marti-Garcia,^{106,†} B. Martin,^{90,†} T. A. Martin,^{170,†} V. J. Martin,^{46,†} B. Martin dit Latour,^{14,†} M. Martinez,^{12,†} S. Martin-Haque,^{131,†} V. S. Martoit,^{26a,†} A. C. Martyniuk,^{78,†} M. Marx,^{138,†} F. Marzano,^{132a,†} A. Marzin,^{96,†} L. Masetti,^{83,†} T. Mashimo,^{155,†} R. Mashinistov,^{96,†} J. Masis,^{84,†} A. L. Maslenkov,^{109,†} I. Massa,^{20a,20b,†} L. Massa,^{20,†} N. Massol,^{5,†} P. Mastandrea,^{148,†} A. Mastroberardino,^{37a,37b,†} T. Matsubashi,^{155,†} P. Mättig,^{175,†} J. Mattmann,^{83,†} J. Maure,^{20a,†} M. Maxfield,^{74,†} D. A. Maximov,^{109,†} R. Mazini,^{151,†} S. M. Mazza,^{91a,91b,†} L. Mazzafaro,^{132a,132b,†} G. Mc Goldrick,^{158,†} S. P. Mc Kee,^{49,†} A. Mc Cann,^{89,†} R. L. McCarthy,^{148,†} T. G. McCarthy,^{29,†} N. A. McCubbin,^{131,†} K. W. McFarlane,^{56,†} J. A. McFayden,^{78,†} G. McHedlidze,^{54,†} S. J. McMahon,^{131,†} R. A. McPherson,^{208,†} M. Medimis,^{42,†} S. Meehan,^{145,†} S. Melihase,^{200,†} A. Mehta,^{74,†} K. Meier,^{58a,†} C. Meineck,^{100,†} B. Meirois,^{41,†} B. R. Mellado Garcia,^{145,†} F. Meloni,^{17,†} A. Mengarelli,^{21a,21b,†} S. Menke,^{101,†} E. Meoni,^{161,†} K. M. Mercurio,^{57,†} S. Mergelman,^{21,†} P. Memrod,^{49,†} L. Merolla,^{104a,104b,†} C. Meromi,^{91a,†} F. S. Merritt,^{31,†} A. Messina,^{132a,132b,†} J. Metcalfe,^{25,†} A. S. Mete,^{163,†} C. Meyer,^{83,†} J. Meyer,^{122,†} J.-P. Meyer,^{156,†} J. Meyer,^{107,†} R. P. Middleton,^{131,†} S. Miglioranzi,^{164,164c,†} L. Mijović,^{21,†} G. Mikenberg,^{172,†} N. Miketstikova,^{127,†} M. Mikusz,^{75,†} M. Milesi,^{88,†} A. Milic,^{30,†} D. W. Miller,^{31,†} C. Mills,^{46,†} A. Milov,^{172,†} D. A. Milstead,^{146a,146b,†} A. A. Minenko,^{130,†} Y. Minami,^{155,†} I. A. Minashvili,^{85,†} A. I. Mincer,^{110,†} B. Mindur,^{38a,†} M. Mineev,^{65,†} Y. Ming,^{173,†} L. M. Mir,^{12,†} T. Mitani,^{171,†} J. Mitrevski,^{100,†} V. A. Mitsou,^{167,†} A. Miucci,^{95,†} P. S. Miyagawa,^{139,†} J. U. Mjörmark,^{84,†} T. Moa,^{146a,146b,†} K. Mochizuki,^{85,†} S. Mohapatra,^{25,†} W. Mohr,^{48,†} S. Molander,^{146a,146b,†} R. Moles-Valls,^{107,†} K. Möng,^{42,†} C. Monini,^{55,†} J. Monk,^{36,†} E. Monnier,^{83,†} J. Montejo Berlingen,^{12,†} F. Monticelli,^{71,†} S. Monzani,^{132a,132b,†} R. W. Moore,^{3,†} N. Morano,^{117,†} D. Moreno,^{162,†} M. Moreno Llacer,^{54,†} P. Morettini,^{50a,†} M. Morgenstern,^{44,†} M. Mori,^{57,†} M. Morinaga,^{155,†} V. Moritsub,^{119,†} S. Moritz,^{83,†} A. K. Moritz,^{44,†} G. Mornacchi,^{36,†} J. D. Morris,^{76,†} S. S. Mortensen,^{36,†} A. Morton,^{51,†} L. Moravj,^{103,†} M. Mosidze,^{31b,†} J. Moss,^{111,†} K. Motohashi,^{157,†} R. Mount,^{143,†} E. Mountricha,^{25,†} S. V. Mouravie,^{96,†} E. J. W. Moyse,^{86,†} S. Muanza,^{85,†} R. D. Mudd,^{18,†} F. Mueller,^{101,†} J. Mueller,^{123,†} K. Mueller,^{21,†} R. S. P. Mueller,^{108,†} T. Mueller,^{28,†} D. Muenstermann,^{40,†} P. Mullen,^{53,†} Y. Munwes,^{153,†} J. A. Murillo Quijada,^{54,†} W. J. Murray,^{170,171,†} H. Musheghyan,^{83,†} E. Musto,^{162,†} A. G. Myagkov,^{130a,130b,†} M. Myska,^{128,†} O. Nackenhorst,^{54,†} J. Nadal,^{54,†} K. Nagai,^{120,†} R. Nagai,^{157,†} Y. Nagai,^{45,†} K. Nagano,^{66,†} A. Nagarkar,^{111,†} Y. Nagasaki,^{99,†} K. Nagata,^{160,†} M. Nagel,^{101,†} E. Nagy,^{85,†} A. M. Nairz,^{30,†} Y. Nakahama,^{30,†} K. Nakamura,^{66,†} T. Nakamura,^{155,†} I. Nakano,^{112,†} H. Namasyanayam,^{41,†} R. F. Narango Garcia,^{31,†} R. Narayan,^{31,†} T. Naumann,^{42,†} G. Navarro,^{162,†} R. Nayyar,^{7,†} H. A. Neal,^{89,†} P. Yu. Nechaeva,^{96,†} T. J. Neep,^{64,†} P. D. Neff,^{145,†} A. Negri,^{121a,121b,†} M. Negriini,^{20a,†} S. Nektarjevic,^{106,†} C. Nellist,^{117,†} A. Nelson,^{163,†} J. Nemecic,^{177,†} P. Nemethy,^{110,†} A. M. Neponuceno,^{24a,†} M. Nessi,^{30a,c,†} M. S. Neubauer,^{165,†} M. Neumann,^{175,†} R. M. Neves,^{110,†} P. Newski,^{25,†} P. R. Newman,^{18,†} D. H. Nguyen,^{61,†} R. B. Nickerson,^{120,†} R. Nicolaïdou,^{136,†} B. Nicquevert,^{101,†} J. Nielsen,^{137,†} N. Nikiforou,^{153,†} A. Nikiforou,^{16,†} V. Nikolaenko,^{130ab,†} I. Nikolic-Audit,^{80,†} K. Niklopoulos,^{18,†} J. Nilsen,^{119,†} P. Nilsson,^{25,†} Y. Ninomiya,^{155,†} A. Nisati,^{132a,†} R. Nisius,^{101,†} T. Nobe,^{157,†} M. Nomachi,^{118,†} I. Nomidis,^{20,†} T. Nooney,^{76,†} S. Norberg,^{113,†} M. Nordberg,^{30,†} O. Novgorodova,^{44,†} S. Nowak,^{101,†} M. Nowak,^{66,†} L. Nozka,^{115,†} K. Nitecas,^{10,†} G. Nunes Haminger,^{88,†} T. Nunnemann,^{100,†} E. Nurse,^{78,†} F. Nutt,^{88,†} B. J. O'Brien,^{46,†} F. O'Grady,^{7,†} D. C. O'Neill,^{142,†} V. O'Shea,^{53,†} F. G. Oakham,^{20a,20b,†} H. Oberlack,^{108,†} T. Obermann,^{21,†} J. Ocariz,^{10,†} A. Ochi,^{157,†} L. Ochoa,^{76,†} P. J. Ochoa-Ricou,^{32a,†} S. Oda,^{70,†} S. Oda,^{66,†} H. Ogren,^{61,†} A. Oh,^{84,†} S. H. Oh,^{157,†} C. C. Ohm,^{166,†} H. Oide,^{30,†} W. Okamura,^{218,†} H. Okawa,^{200,†} Y. Okumura,^{31,†} T. Okuyama,^{155,†} A. Olarin,^{26a,†} S. A. Olivares Pino,^{46,†} D. Oliveira Damazio,^{25,†} E. Oliver Garcia,^{167,†} A. Olszewski,^{153,†} J. Olszowska,^{134a,134b,†} A. Onofre,^{154,†} P. U. E. Onyisi,^{31,†} C. J. Oram,^{159a,†} M. J. Oreglia,^{31,†} Y. Oren,^{153,†} D. Orestano,^{134a,134b,†} N. Orlando,^{154,†} C. Oropeza Barrera,^{33,†} R. S. Orr,^{158,†} B. Osculati,^{30a,50b,†} R. Ospanov,

- G. Otero y Garzon,^{27,†} H. Otomo,^{70,†} M. Ouchrif,^{135,‡} E. A. Ouellette,^{169,†} F. Ould-Saada,^{119,‡} A. Ouraou,^{136,‡} K. P. Ouusoren,^{107,‡} Q. Ouyang,^{33a,‡} A. Ovcharov,^{14,§} M. Owen,^{18,‡} R. E. Owen,^{18,‡} V. E. Ozcan,^{167,‡} N. Ozturk,^{8,§} K. Pachai,^{142,‡} A. Pacheco Pages,^{12,‡} C. Padilla Aranda,^{12,‡} M. Palagiova,^{48,‡} S. Pagan Griso,^{15,‡} E. Paganis,^{130,‡} C. Pahl,^{101,‡} F. Paige,^{25,‡} P. Pais,^{86,‡} K. Pajchel,^{119,‡} G. Palacino,^{150,§} S. Palestini,^{30,‡} M. Palka,^{38b,‡} D. Pallin,^{24,‡} A. Palma,^{126a,126b,‡} Y. B. Pan,^{173,‡} E. Panagiopoulou,^{10,‡} C. E. Pandini,^{80,‡} J. G. Panduro Vazquez,^{77,‡} P. Pani,^{146a,146b,‡} S. Panitkin,^{25,‡} D. Pantea,^{26a,‡} L. Paolozzi,^{49,‡} Th.D. Papadopoulos,^{101,‡} K. Papageorgiou,^{184,‡} A. Paramonov,^{6,‡} D. Paredes Hernandez,^{154,‡} M. A. Parker,^{28,‡} K. A. Parker,^{130,‡} F. Parodi,^{50a,50b,‡} J. A. Parsons,^{35,‡} U. Parzefall,^{46,‡} E. Pasqualucci,^{132a,‡} S. Passaggio,^{20a,‡} F. Pastore,^{134a,134b,‡} Fr. Pastore,^{77,‡} G. Pásztor,^{29,‡} S. Pataraia,^{175,‡} N. D. Patel,^{150,‡} J. R. Pater,^{94,‡} T. Pauri,^{30,‡} J. Pearce,^{169,‡} B. Pearson,^{113,‡} L. E. Pedersen,^{36,‡} M. Pedersen,^{189,‡} S. Pedraza Lopez,^{167,‡} R. Pedro,^{126a,126b,‡} S. V. Peleganchuk,^{108,‡} D. Pelikan,^{166,‡} H. Peng,^{108,‡} B. Penning,^{31,‡} J. Penwell,^{26,‡} P. Perellesta,^{25,‡} E. Perez Codina,^{159n,‡} M. T. Pérez García-Estate,^{167,‡} L. Perini,^{91a,91b,‡} H. Permegger,^{30,‡} S. Perrella,^{104a,104b,‡} R. Peschke,^{42,‡} V. D. Peschekhonov,^{65,‡} K. Peters,^{30,‡} R. F. Y. Peters,^{84,‡} B. A. Petersen,^{134a,134b,‡} T. C. Petersen,^{36,‡} E. Petit,^{42,‡} A. Petridis,^{146a,146b,‡} C. Petridou,^{154,‡} E. Petrolo,^{132a,‡} F. Petrucci,^{18,‡} R. Pezera,^{32b,‡} P. W. Phillips,^{131,‡} G. Picciadio,^{143,‡} E. Pianori,^{170,‡} A. Picazio,^{40,‡} E. Piccaro,^{167,‡} M. Piccinini,^{175,‡} M. A. Pickett,^{120,‡} R. Piegaia,^{27,‡} D. T. Pignotti,^{111,‡} J. E. Pilcher,^{31,‡} A. D. Pilkington,^{84,‡} J. Pina,^{126a,126b,126d,‡} M. Pinamonti,^{164a,164c,164f,‡} J. L. Pinfol,^{3,‡} A. Pingel,^{36,‡} B. Pinto,^{126a,‡} S. Pires,^{80,‡} M. Pitt,^{172,‡} C. Pizio,^{91a,91b,‡} L. Plazak,^{144a,‡} M.-A. Pleier,^{28,‡} V. Plesko,^{120,‡} D. Plotnikova,^{65,‡} P. Plucinski,^{146a,146b,‡} D. Pluth,^{64,‡} R. Poettgen,^{83,‡} L. Poglioni,^{117,‡} D. Poli,^{21,‡} G. Pollesello,^{121,‡} A. Pollicicchio,^{18,‡} R. Polifka,^{158,‡} A. Polini,^{26b,‡} C. S. Pollard,^{53,‡} V. Polychronakos,^{25,‡} K. Pommeis,^{30,‡} I. Pontecorvo,^{132a,‡} B. G. Pope,^{90,‡} G. A. Popenciu,^{210,‡} D. S. Popovic,^{13,‡} A. Popleton,^{30,‡} S. Pospisil,^{128,‡} K. Potamianos,^{15,‡} N. I. Potrat,^{65,‡} C. J. Potter,^{149,‡} C. T. Potter,^{116,‡} G. Poulard,^{51,‡} J. J. Poveda,^{74a,‡} V. Pozdnjakov,^{65,‡} P. Pralavorio,^{85,‡} A. Pranko,^{15,‡} S. Prasad,^{30,‡} S. Prell,^{64,‡} D. Price,^{94,‡} L. Price,^{6,‡} M. Primavera,^{74a,‡} S. Prince,^{40,‡} M. Proissl,^{60,‡} K. Prokofiev,^{16,‡} F. Prokoshin,^{37b,‡} E. Protopapadaki,^{130,‡} S. Protopopescu,^{25,‡} J. Proudfoot,^{6,‡} M. Przybycien,^{36a,‡} J. Ptacek,^{116,‡} D. Puddu,^{134a,134b,‡} E. Pueschl,^{60,‡} D. Puldton,^{148,‡} M. Purnohi,^{25,‡} P. Puzzo,^{117,‡} J. Qian,^{90,‡} G. Qin,^{53,‡} Y. Qin,^{94,‡} A. Quadt,^{34,‡} D. R. Quarrie,^{15,‡} W. B. Quayle,^{164a,164b,‡} M. Queitsch-Maitland,^{62,‡} D. Quilty,^{53,‡} S. Radduin,^{119,‡} V. Radeka,^{25,‡} V. Radescu,^{42,‡} S. K. Radhakrishnan,^{148,‡} P. Radloff,^{116,‡} P. Rados,^{83,‡} F. Ragusa,^{91a,91b,‡} G. Rahal,^{178,‡} S. Rajagopalan,^{25,‡} M. Rammenhoffer,^{30,‡} C. Rangel-Smith,^{166,‡} F. Rauscher,^{100,‡} S. R. Rave,^{83,‡} T. Ravencroft,^{53,‡} M. Raymond,^{30,‡} A. L. Read,^{119,‡} N. P. Readoff,^{24,‡} D. M. Rebuzzi,^{121a,121b,‡} A. Redelbach,^{174,‡} G. Redlinger,^{25,‡} R. Reece,^{137,‡} K. Reeves,^{41,‡} L. Rehmsch,^{16,‡} H. Reisin,^{27,‡} M. Relich,^{163,‡} C. Rembser,^{30,‡} H. Ren,^{35a,‡} A. Renaud,^{117,‡} M. Rescigno,^{132a,‡} S. Resconi,^{91a,‡} O. L. Rezanova,^{109,‡} P. Reznicek,^{128,‡} R. Rezvani,^{95,‡} R. Richter,^{88,‡} S. Richter,^{78,‡} E. Richter-Was,^{88b,‡} O. Ricken,^{21,‡} M. Ridel,^{80,‡} P. Rieck,^{16,‡} C. J. Riegel,^{175,‡} J. Rieger,^{54,‡} M. Rijssenbeek,^{148,‡} A. Rimoldi,^{121a,121b,‡} L. Rinaldi,^{175,‡} B. Ristic,^{40,‡} E. Ritsch,^{62,‡} I. Riu,^{12,‡} F. Rizatdinova,^{114,‡} E. Rizvi,^{76,‡} S. H. Robertson,^{87,‡} A. Robichaud-Veronneau,^{87,‡} D. Robinson,^{28,‡} J. E. M. Robinson,^{84,‡} A. Robson,^{53,‡} C. Roda,^{124a,124b,‡} S. Roe,^{30,‡} O. Rohne,^{119,‡} S. Rolli,^{161,‡} A. Romanikau,^{96,‡} M. Romano,^{20a,20b,‡} S. M. Romano Saez,^{34,‡} E. Romere Adam,^{167,‡} N. Rompotis,^{136,‡} M. Ronzani,^{48,‡} L. Roos,^{20,‡} E. Ros,^{167,‡} S. Rosati,^{112,‡} K. Rosbach,^{46,‡} P. Rose,^{137,‡} P. L. Rosendahl,^{147,‡} O. Rosenthal,^{141,‡} V. Rossetti,^{146a,146b,‡} E. Rossi,^{104a,104b,‡} L. P. Rossi,^{50a,‡} R. Rosten,^{138,‡} M. Rotaru,^{26a,‡} I. Roth,^{172,‡} J. Rothberg,^{138,‡} D. Rousseau,^{117,‡} C. R. Royon,^{136,‡} A. Rozanov,^{85,‡} Y. Rozen,^{152,‡} X. Ruan,^{145c,‡} F. Rubbo,^{143,‡} I. Rubinsky,^{42,‡} V. I. Rud,^{99,‡} C. Rudolph,^{44,‡} M. S. Rudolph,^{158,‡} F. Rühr,^{48,‡} A. Ruiz-Martinez,^{30,‡} Z. Runikova,^{48,‡} N. A. Rusakovitch,^{65,‡} A. Ruschke,^{100,‡} H. L. Russell,^{138,‡} J. P. Ruthford,^{7,‡} N. Ruthmann,^{48,‡} F. Y. Ryabov,^{123,‡} M. Rybar,^{129,‡} G. Rybkina,^{117,‡} N. C. Ryder,^{120,‡} A. F. Saavedra,^{150,‡} G. Sabato,^{107,‡} S. Sacerdoti,^{27,‡} A. Sadidze,^{3,‡} H. F.-W. Sadrozinski,^{137,‡} R. Sadykov,^{65,‡} F. Safai Tehrani,^{132a,‡} M. Samipert,^{136,‡} H. Sakamoto,^{155,‡} Y. Sakurai,^{171,‡} G. Salamanna,^{134a,134b,‡} A. Salamon,^{133a,‡} M. Saleem,^{113,‡} D. Salek,^{107,‡} P. H. Sales De Bruin,^{158,‡} D. Salihagic,^{101,‡} A. Salnikov,^{143,‡} J. Salt,^{167,‡} D. Salvatore,^{17a,17b,‡} F. Salvatore,^{140,‡} A. Salucci,^{106,‡} A. Salzburger,^{154,‡} D. Sampsonidis,^{154,‡} A. Sanchez,^{104a,104b,‡} J. Sánchez,^{167,‡} V. Sanchez Martinez,^{167,‡} H. Sandaker,^{4,‡} R. L. Sandbach,^{76,‡} H. G. Sander,^{83,‡} M. P. Sanders,^{100,‡} M. Sandhoff,^{175,‡} C. Sandoval,^{162,‡} R. Sandstrom,^{101,‡} D. P. C. Sankey,^{131,‡} M. Sammizo,^{56a,56b,‡} A. Sansoni,^{47,‡} C. Santoni,^{34,‡} R. Santonicio,^{133a,133b,‡} H. Santos,^{126a,‡} L. Santoyo Castillo,^{149,‡} K. Sapp,^{125,‡} A. Sapromov,^{65,‡} J. G. Saravia,^{126a,126b,‡} B. Sarrazinot,^{21,‡} O. Sasaki,^{66,‡} Y. Sasaki,^{155,‡} K. Satoh,^{160,‡} G. Sauvage,^{5,‡} E. Sauvan,^{5,‡} G. Savage,^{77,‡} P. Savard,^{128,‡} C. Sawyer,^{120,‡} L. Sawyer,^{70,‡} J. Saxon,^{31,‡} C. Sharra,^{20a,‡} A. Shazzi,^{172,‡} T. Scanlon,^{78,‡} D. A. Scannicchio,^{83,‡} M. Scarcella,^{150,‡} V. Scarfone,^{37a,37b,‡} J. Schaarshmidt,^{172,‡} P. Schacht,^{101,‡} D. Schaefer,^{30,‡} R. Schaefer,^{42,‡} J. Schaeffer,^{83,‡} S. Schaepke,^{21,‡} S. Schaetzl,^{56b,‡} U. Schäfer,^{83,‡} A. C. Schaffer,^{117,‡} D. Schaele,^{100,‡} R. D. Schamberger,^{148,‡} V. Scharf,^{70a,‡}

- V. A. Schegelsky,^{128,†} D. Scheirich,^{129,†} M. Schernau,^{163,‡} C. Schiavi,^{50a,50b,‡} C. Schillo,^{48,†} M. Schioppa,^{37a,37b,†}
 S. Schlenker,^{30,‡} E. Schmidt,^{48,†} K. Schmieden,^{30,‡} C. Schmidt,^{48,†} S. Schmitt,^{48,†} B. Schneider,^{189a,†}
 Y. J. Schnellbach,^{74,†} U. Schoonroock,^{44,†} L. Schoopf,^{136,†} A. Schoening,^{20b,†} B. D. Schoenrock,^{90,†} E. Schopf,^{21,†}
 A. L. S. Schorlemmer,^{54,†} M. Schott,^{83,†} D. Schouten,^{159a,†} J. Schovancova,^{8,†} S. Schramm,^{158,†} M. Schreyer,^{174,†}
 C. Schroeder,^{83,†} N. Schuh,^{83,†} M. J. Schulmes,^{21,†} H.-C. Schultz-Coulon,^{98,†} H. Schulz,^{16,†} M. Schumacher,^{48,†}
 B. A. Schumann,^{137,†} Ph. Schune,^{136,†} C. Schwanenberger,^{48,†} A. Schwartzman,^{143,†} T. A. Schwarz,^{98,†} Ph. Schwegler,^{101,†}
 Ph. Schwemling,^{136,†} R. Schwienerhorst,^{90,†} J. Schwindig,^{136,†} T. Schwindt,^{21,†} M. Schwoerer,^{5,†} F. G. Sciacca,^{47,†}
 E. Seifo,^{117,†} G. Sciolta,^{23,†} F. Scuri,^{21,†} E. Seuti,^{21,†} J. Seucy,^{89,†} G. Sedov,^{42,†} E. Sedykh,^{99,†} P. Seema,^{21,†}
 S. C. Seidel,^{105,†} A. Seiden,^{137,†} F. Seifert,^{128,†} J. M. Sexias,^{24a,†} G. Sekhniaidze,^{83,†} K. Sekhon,^{89,†} S. J. Sekula,^{40,†}
 K. E. Selbach,^{46,†} D. M. Silverman,^{123,8,†} N. Semprini-Cesari,^{20a,20b,†} C. Serfon,^{30,†} L. Serin,^{117,†} L. Serkin,^{164,164b,†}
 T. Serre,^{85,†} M. Sessa,^{134,134b,†} R. Seuster,^{159a,†} H. Severini,^{113,†} T. Stijlgoij,^{75,†} F. Sforza,^{101,†} A. Sfyrla,^{20,†} E. Shabalina,^{54,†}
 M. Shamini,^{116,†} L. Y. Shan,^{33a,†} R. Shang,^{165,†} J. T. Shank,^{22,†} M. Shapiro,^{15,†} P. B. Shatalov,^{16,†} K. Shaw,^{164,164b,†}
 S. M. Shaw,^{84,†} A. Scherbakov,^{140a,140b,†} C. Y. Shehu,^{140,†} P. Sherwood,^{78,†} L. Shi,^{151,151b,†} S. Shimizu,^{83,†} C. O. Shimmin,^{163,†}
 M. Shimojima,^{102,†} M. Shiyakova,^{65,†} A. Shmeleva,^{96,†} D. Shoalaad Saadi,^{73,†} M. J. Shochet,^{71,†} S. Shojaii,^{91,91b,†}
 S. Shrestha,^{111,†} E. Shulgina,^{98,†} S. M. Shupe,^{7,†} S. Shushkevich,^{42,†} P. Sicho,^{127,†} O. Sidiropoulou,^{174,†} D. Sidorov,^{134,†}
 A. Sidoti,^{20a,20b,†} F. Siegert,^{44,†} D. Sijacki,^{13,†} J. Silva,^{15,†} Y. Silver,^{153,†} S. B. Silverstein,^{146a,†} V. Simak,^{128,†}
 O. Simard,^{83,†} Lj. Simic,^{13,†} S. Simon,^{117,†} E. Simioni,^{83,†} B. Simmonis,^{86,†} D. Simon,^{34,†} R. Simonello,^{91a,91b,†} P. Sinervo,^{158,†}
 N. B. Sinev,^{118,†} G. Siragusa,^{174,†} A. Sisakyan,^{86,†} S. Y. Sivoklokov,^{99,†} J. Sjolin,^{146a,146b,†} T. B. Bjursen,^{14,†}
 M. B. Skinner,^{72,†} H. P. Skottowe,^{37,†} P. Skubic,^{118,†} M. Slater,^{18,†} T. Slavicek,^{128,†} M. Slawinska,^{107,†} K. Sliwa,^{161,†}
 V. Smakhtin,^{172,†} B. H. Smart,^{46,†} L. Smestad,^{14,†} S. Yu. Smirnov,^{98,†} Y. Smirnov,^{83,†} N. Smirnova,^{99,99b,†} O. Smirnova,^{81,†}
 M. N. K. Smith,^{35,†} R. W. Smith,^{35,†} M. Smizanska,^{72,†} K. Smolek,^{126,†} A. A. Smesarev,^{93,†} G. Smidero,^{26,†} S. Snyder,^{98,†}
 R. Sobie,^{109,109,†} F. Socher,^{44,†} A. Soffer,^{133,†} D. A. Soh,^{151,151c,†} C. A. Solans,^{93,†} M. Solar,^{128,†} J. Solc,^{128,†} E. Yu. Soldatov,^{98,†}
 U. Soldevila,^{167,†} A. A. Solodkov,^{130,†} A. Soloshenko,^{65,†} O. V. Solovyanov,^{130,†} V. Solov'yev,^{123,†} P. Sommer,^{48,†}
 H. Y. Song,^{33,†} N. Soni,^{1,†} A. Sood,^{15,†} A. Sopeck,^{128,†} B. Sopko,^{128,†} V. Sorin,^{12,†} D. Sosa,^{42,†}
 M. Sosheebe,^{23,†} C. L. Sotiriopoulou,^{126a,126b,†} P. Soualah,^{164,164c,†} P. Souseid,^{83,†} A. M. Soukharev,^{109,109,†} D. South,^{21,†}
 B. C. Sowden,^{77,†} S. Spagnolo,^{77a,77b,†} M. Spalla,^{124a,124b,†} F. Spanò,^{77,†} W. R. Spearman,^{77,†} F. Spettel,^{101,†} R. Spighi,^{20a,†}
 G. Spiga,^{30,†} L. A. Spiller,^{88,†} M. Spousa,^{129,†} T. Spritzer,^{158,†} R. D. St. Denz,^{51,51c,†} S. Staerz,^{44,†} J. Stahlin,^{119,†}
 R. Stamen,^{58,†} S. Stamm,^{16,†} E. Staneecka,^{49,†} C. Stanescu,^{134,8,†} M. Stanescu-Bellu,^{42,†} M. M. Stanizki,^{42,†} S. Stappnes,^{58,†}
 E. A. Starchenko,^{130,†} J. Stark,^{54,†} P. Staroba,^{127,†} P. Starovoytov,^{42,†} R. Staszewski,^{98,†} P. Stavina,^{146a,146b,†} P. Steinberg,^{25,†}
 B. Stelzer,^{142,†} H. J. Stelzer,^{103,†} O. Stielzer-Chilton,^{159a,†} S. Soualah,^{32,†} S. Stern,^{201,†} G. A. Stewart,^{53,†} J. A. Stillings,^{21,†}
 M. C. Stockton,^{87,†} M. Stoebe,^{47,†} G. Stoica,^{26a,†} P. Stoltz,^{54,†} S. Stonjek,^{201,†} A. R. Stradling,^{8,†} A. Straessner,^{34,†}
 M. E. Stramaglia,^{17,†} J. Strandberg,^{147,†} S. Strandberg,^{147,†} A. Strandlie,^{119,†} E. Strauss,^{113,†} M. Strauss,^{113,†}
 P. Strizenec,^{144,6,†} R. Strömler,^{143,†} D. M. Strom,^{116,†} J. Stroyowski,^{40,†} A. Strubig,^{108,†} S. A. Stucci,^{13,†} B. Stugu,^{14,†}
 N. A. Styles,^{42,†} D. Su,^{143,†} J. Sun,^{125,†} R. Subramanian,^{10,†} A. Succurro,^{12,†} Y. Sugaya,^{118,†} C. Suhr,^{108,†} M. Suk,^{128,†}
 V. V. Sulim,^{96,†} S. T. Suman,^{4c,†} T. Sumida,^{68,†} S. Sun,^{57,†} X. Sun,^{33a,†} J. E. Sundermann,^{48,†} K. Suruliz,^{149,†}
 G. Susimmo,^{37a,37b,†} M. R. Sutton,^{149,†} S. Suzuki,^{66,†} Y. Suzuki,^{66,†} M. Svatos,^{127,†} S. Swedish,^{168,†} M. Swiatlowski,^{144,3,†}
 I. Sykora,^{144a,†} J. Sykora,^{129,7,†} D. Ta,^{90,†} C. Tacconi,^{134a,134b,†} K. Tackmann,^{42,†} J. Taenzer,^{158,†} A. Taffard,^{165,3,†} R. Tarifour,^{159a,†}
 N. Taihiumi,^{153,†} H. Takai,^{25,†} J. Takashima,^{69,†} H. Takeda,^{87,†} T. Takeishi,^{140,†} Y. Takubo,^{66,†} M. Talby,^{83,†}
 A. A. Talyshev,^{109,6,†} J. Y. C. Tan,^{174,†} K. G. Tan,^{38,†} J. Tanaka,^{158,†} R. Tanaka,^{117,†} S. Tanaka,^{66,†} B. B. Tannenwald,^{111,†}
 N. Tamoury,^{23,†} S. Tapprogue,^{83,†} S. Tarem,^{152,†} F. Tarrade,^{29,†} G. F. Tartarelli,^{21a,†} P. Tas,^{128,†} M. Tasevsky,^{127,†}
 T. Tashiro,^{16,†} E. Tassi,^{37a,37b,†} A. Tavares Delgado,^{126a,126b,†} Y. Tayalati,^{135d,†} F. E. Taylor,^{94,†} G. N. Taylor,^{88,†} W. Taylor,^{159b,†}
 F. A. Teischinger,^{30,†} M. Teixeira Dias Castanheira,^{76,†} P. Teixeira-Dias,^{77,†} K. K. Temming,^{48,†} H. Ten Kate,^{30,†}
 P. K. Teng,^{151,†} J. J. Teoh,^{118,†} F. Tepel,^{178,†} S. Terada,^{66,†} K. Terashi,^{155,†} J. Terren,^{82,†} S. Terzo,^{101,†} M. Testa,^{47,†}
 R. J. Teuscher,^{158,1,†} J. Therhaag,^{21,†} T. Theveneau-Pelzer,^{34,†} J. Thomas,^{18,†} J. J. Thomas-Wilsker,^{77,†} E. N. Thompson,^{35,†}
 P. D. Thompson,^{18,†} R. J. Thompson,^{84,†} A. S. Thompson,^{53,1,†} A. S. Thomasen,^{122,†} E. Thomson,^{122,†} M. Thomson,^{26,†}
 R. P. Thun,^{30a,7,†} M. J. Tibbets,^{15,†} E. Tiece Torres,^{85,†} S. Tiece Torres,^{85,†} G. O. Tikhomirov,^{96,1b,†} Yu. A. Tikhonov,^{109,6,†} S. Timoshenko,^{98,†}
 E. Tiouchichine,^{85,†} P. Tipton,^{176,†} S. Tisserant,^{85,†} T. Todorov,^{5,3,†} S. Todorova-Nova,^{120,†} J. Tojo,^{70,†} S. Tokář,^{144a,†}
 K. Tokushuku,^{66,†} K. Tolleson,^{90,†} E. Tolley,^{57,†} L. Tomlinson,^{84,†} M. Tomoto,^{103,†} L. Tompkins,^{143,11,†} K. Toms,^{105,†}
 E. Torrence,^{116,†} H. Torres,^{142,†} E. Torrò Pastor,^{167,†} J. Toth,^{85,10,†} F. Touchard,^{85,†} D. R. Tovey,^{139,†} T. Trefzger,^{174,†}

- L. Tremblet,^{30,†} A. Tricoli,^{30,‡} I. M. Trigger,^{159a,§} S. Trincaz-Duvord,^{30,||} M. F. Tripiana,^{12,†} W. Trischuk,^{158,¶} B. Trocmé,^{55,‡} C. Troncon,^{94,‡} M. Trottier-McDonald,^{12,§} M. Trouvaille,^{12a,13a,b,¶} P. True,^{90,‡} L. Truong,^{164,164c,||} M. Trzebinski,^{99,‡} A. Trzupek,^{30,‡} C. Tsarouchas,^{30,‡} J.-C.-L. Tseng,^{120,‡} P. V. Tsiareska,^{92,‡} D. Tsionis,^{154,‡} G. Tsipoliti,^{10,§} N. Tsiririanitis,^{9,‡} S. Tsikaridze,^{12,†} V. Tsikaridze,^{48,‡} E. G. Tskhadadze,^{51,‡} I. I. Tsukerman,^{97,‡} V. Tsulai,^{15,‡} S. Tsuno,^{66,‡} D. Tyshychev,^{148,‡} A. Tudorache,^{26a,†} V. Tudorache,^{26a,†} A. N. Tuna,^{20a,20b,†} S. A. Tuppur,^{20a,20b,†} S. Turchikhin,^{99,§} D. Turecek,^{128,‡} R. Turra,^{91a,91b,†} A. J. Turvey,^{40,‡} P. M. Tuts,^{14,‡} A. Tykhonov,^{20,†} M. Tymiad,^{148a,148b,†} M. Tyndel,^{131,‡} I. Ueda,^{155,‡} R. Ueno,^{20,‡} M. Ughetto,^{140a,140b,†} M. Uglan,^{14,‡} M. Uhlenbrock,^{21,‡} F. Ukegawa,^{160,‡} G. Unal,^{30,‡} A. Undrus,^{25,‡} G. Unel,^{48,‡} F. C. Ungaro,^{48,‡} Y. Unno,^{66,‡} C. Unverdorben,^{100,‡} J. Urban,^{140b,†} P. Usquijo,^{88,‡} P. Uriegola,^{83,‡} G. Usaï,^{83,‡} A. Usanova,^{62,‡} L. Vacavant,^{48,‡} V. Vacek,^{120,‡} B. Vachon,^{87,‡} C. Valkeronis,^{9,‡} N. Valencic,^{9,‡} S. Valentim,^{20a,20b,†} A. Valero,^{167,‡} L. Valery,^{12,‡} S. Valkar,^{129,‡} E. Valladolid Gallego,^{167,‡} S. Vallecera,^{49,‡} J. A. Valls Ferre,^{197,‡} W. Van Den Wollenberg,^{107,‡} P. C. Van Der Deijl,^{107,‡} R. van der Geer,^{107,‡} H. van der Graaf,^{107,‡} R. Van Der Leeuw,^{107,‡} N. van Eldik,^{152,‡} P. van Gemmeren,^{6,‡} J. Van Nieuwkoop,^{142,‡} I. van Vulpen,^{107,‡} M. C. van Woerden,^{38,‡} M. Vanadia,^{132a,132b,†} W. Vandelli,^{30,‡} R. Vanguri,^{122,‡} A. Vaniacchine,^{6,‡} F. Vannucci,^{80,‡} G. Vardanyan,^{347,‡} R. Vari,^{132,‡} E. W. Varner,^{7,‡} T. Varol,^{40,‡} R. Varcouhas,^{80,‡} K. E. Varvelle,^{8,‡} K. E. Varvelle,^{150,‡} F. Vazeille,^{347,‡} T. Vazquez Schroeder,^{87,‡} J. Veatch,^{7,‡} L. M. Veloci,^{26a,†} F. Veloso,^{126a,126c,†} T. Velz,^{21,‡} S. Veneziano,^{132a,‡} A. Ventura,^{73a,73b,‡} D. Ventura,^{86,‡} M. Ventura,^{109,‡} N. Ventura,^{158,‡} A. Venturini,^{23,‡} V. Vercesi,^{121a,‡} M. Verducci,^{132a,132b,‡} W. Verkerke,^{107,‡} J. C. Vermeulen,^{107,‡} A. Vest,^{44,‡} M. C. Vetterli,^{142,‡} O. Viazlo,^{81,‡} I. Ichou,^{165,‡} T. Vickey,^{139,‡} O. E. Vickey Boeriu,^{139,‡} G. H. A. Viehhauser,^{120,‡} S. Viel,^{15,‡} R. Vigne,^{30,‡} M. Villa,^{20a,20b,†} M. Villalpiana Perez,^{91a,91b,‡} E. Vilucchi,^{47,‡} M. G. Vinctor,^{29,‡} V. B. Vinogradov,^{65,‡} I. Vivarelli,^{140,‡} F. Vives Vaque,^{3,‡} S. Vlachos,^{10,‡} D. Vladou,^{100,‡} M. Vlasak,^{128,‡} M. Vogel,^{32a,‡} P. Vokac,^{128,‡} M. Volpi,^{88,‡} H. von der Schmitz,^{101,‡} H. von Radziewski,^{48,‡} E. von Terme,^{27,‡} K. Vorobel,^{28,‡} M. Vos,^{30,‡} R. Voss,^{74,‡} N. Vranjes,^{13,‡} M. Vossebeld,^{74,‡} N. Vranjes,^{13,‡} M. Vranjes Milosavljevic,^{13,‡} V. Vrba,^{127,‡} M. Vreeswijk,^{107,‡} R. Vuillermet,^{30,‡} L. Vukotic,^{31,‡} Z. Vykydal,^{128,‡} P. Wagner,^{21,‡} W. Wagner,^{175,‡} H. Wahlberg,^{71,‡} S. Wahrund,^{44,‡} J. Wakabayashi,^{103,‡} J. Walker,^{72,‡} R. Walker,^{108,‡} W. Walkowiak,^{141,‡} C. Wang,^{33c,‡} F. Wang,^{173,‡} H. Wang,^{15,‡} L. Wang,^{40,‡} J. Wang,^{42,‡} J. Wang,^{33a,‡} K. Wang,^{37,‡} R. Wang,^{6,‡} S. M. Wang,^{151,‡} T. Wang,^{21,‡} X. Wang,^{27b,‡} C. Wanotayaroj,^{116,‡} A. Warburton,^{87,‡} C. P. Ward,^{26,‡} D. R. Wardrobe,^{76,‡} M. Warsinsky,^{48,‡} A. Washbrook,^{46,‡} C. Wasicki,^{42,‡} P. M. Watson,^{18,‡} A. T. Watson,^{150,‡} L. J. Watson,^{150,‡} M. F. Watson,^{18,‡} G. Watts,^{128,‡} S. Watts,^{84,‡} B. M. Waugh,^{87,‡} S. Webb,^{84,‡} M. S. Weber,^{73,‡} S. W. Webster,^{174,‡} J. S. Webster,^{31,‡} A. R. Weidberg,^{120,‡} B. Weinert,^{61,‡} J. Weingarten,^{54,‡} C. Weiser,^{48,‡} H. Weiss,^{107,‡} P. S. Wells,^{30,‡} T. Wenaus,^{28,‡} T. Wengler,^{30,‡} S. Wenzl,^{30,‡} N. Wermes,^{21,‡} M. Werner,^{40,‡} P. Werner,^{30,‡} M. Wessels,^{28a,‡} J. Wetter,^{86,‡} K. Whalen,^{29,‡} A. M. Wharton,^{72,‡} A. White,^{8,‡} M. J. White,^{12,‡} R. White,^{32b,‡} S. White,^{22a,124b,†} D. Whiteson,^{165,‡} F. J. Wickens,^{131,‡} W. Wiedemann,^{173,‡} M. Wieler,^{131,‡} P. Wienemann,^{21,‡} C. Wiglesworth,^{36,‡} L. A. M. Wiik-Fuchs,^{21,‡} A. Wildauer,^{101,‡} H. G. Wilkens,^{30,‡} H. H. Williams,^{122,‡} S. Williams,^{107,‡} C. Willis,^{90,‡} S. Willcoq,^{88,‡} A. Wilson,^{89,‡} J. A. Wilson,^{18,‡} I. Wingerter-Seetz,^{5,‡} F. Winklmeier,^{116,‡} B. T. Winter,^{21,‡} M. Wittgen,^{144,‡} J. Wittkowski,^{100,‡} S. J. Wolffstadt,^{83,‡} M. W. Wolter,^{98,‡} H. Wolters,^{120a,120c,‡} B. K. Wosiak,^{39,‡} J. Wotschack,^{30,‡} M. J. Woudstra,^{84,‡} K. W. Woziński,^{98,‡} M. Wu,^{55,‡} M. Wu,^{21,‡} S. L. Wu,^{273,‡} X. Wu,^{49,‡} Y. Wu,^{89,‡} T. R. Wyatt,^{84,‡} B. M. Wynne,^{46,‡} S. S. Yella,^{36,‡} D. Xu,^{33a,‡} L. Xu,^{33b,‡} B. Yabsley,^{150,‡} S. Yacoob,^{148,‡} L. Yakabe,^{67,‡} M. Yamada,^{66,‡} Y. Yamaguchi,^{118,‡} A. Yamamoto,^{66,‡} S. Yamamoto,^{155,‡} T. Yamashita,^{155,‡} K. Yamanchi,^{103,‡} Y. Yamazaki,^{67,‡} Z. Yang,^{22,‡} H. Yang,^{3,‡} H. Yang,^{173,‡} Y. Yang,^{151,‡} L. Yao,^{36a,‡} W.-M. Yao,^{15,‡} Y. Yasu,^{66,‡} E. Yatsenko,^{5,‡} K. Hay,^{14,‡} J. Ye,^{40,‡} S. Ye,^{23,‡} I. Yetkiseltier,^{65,‡} A. L. Yen,^{37,‡} E. Yıldırım,^{42,‡} K. Yorita,^{171,‡} R. Yoshida,^{6,‡} K. Yoshihara,^{122,‡} C. Young,^{143,‡} C. J. S. Young,^{30,‡} S. Yousell,^{22,‡} D. R. Yu,^{15,‡} J. Yu,^{8,‡} J. M. Yu,^{89,‡} J. Yu,^{114,‡} L. Yuan,^{67,‡} A. Yurkewicz,^{108,‡} I. Yusoff,^{28a,m,‡} B. Zubinski,^{30,‡} R. Zaidan,^{63,‡} A. M. Zaitsev,^{130,3b,‡} J. Zalewickas,^{84,‡} A. Zaman,^{148,‡} S. Zamitbo,^{57,‡} L. Zanello,^{132a,132b,‡} D. Zanzi,^{98,‡} C. Zeititz,^{125,‡} M. Zeman,^{128,‡} A. Zemla,^{38a,‡} K. Zengel,^{23,‡} O. Zenin,^{130,‡} T. Ženčík,^{144,‡} D. Žerwas,^{177,‡} D. Zhang,^{103,‡} F. Zhang,^{173,‡} L. Zhang,^{6,‡} L. Zhang,^{48,‡} R. Zhang,^{30,‡} X. Zhang,^{33d,‡} Z. Zhang,^{117,‡} X. Zhao,^{40,‡} Y. Zhao,^{33a,17,‡} Z. Zhao,^{33b,‡} A. Zhemcovoglu,^{65,‡} J. Zhou,^{120,‡} B. Zhou,^{89,‡} C. Zhou,^{45,‡} L. Zhou,^{35,‡} L. Zhou,^{40,‡} N. Zhou,^{163,‡} C. G. Zhu,^{33d,‡} H. Zhu,^{33a,‡} J. Zhu,^{89,‡} Y. Zhu,^{33b,‡} X. Zhuang,^{33a,‡} K. Zhukov,^{96,‡} A. Zibell,^{174,‡} D. Ziemińska,^{61,‡} N. I. Zimine,^{65,‡} C. Zimmermann,^{83,‡} S. Zimmermann,^{54,‡} M. Zinszer,^{83,‡} M. Ziolkowski,^{141,‡} L. Živković,^{13,‡} G. Zobemig,^{179,‡} A. Zuccoli,^{20,20b,†} M. zur Nedden,^{16,‡} G. Zarzolo,^{104a,104b,†} L. Zwaliński,^{30,‡} V. Khachatryan,^{173,‡} A. M. Sirunyan,^{170,‡} A. Tumasyan,^{170,‡} W. Adam,^{180,‡} E. Asilar,^{180,‡} T. Bergauer,^{180,‡} J. Brandstetter,^{180,‡} E. Brondolin,^{180,‡} M. Dragicevic,^{180,‡} J. Erő,^{180,‡} M. Flechi,^{180,‡} M. Friedl,^{180,‡} R. Fröhlicher,^{180,‡} V. M. Ghete,^{180,‡} C. Hartl,^{180,‡} N. Hörmann,^{180,‡} J. Hrubec,^{180,‡} M. Jeitler,^{180,‡} V. Knünz,^{180,‡} A. König,^{180,‡}

- M. Krammer,^{180,n3} L. Krätschmer,^{180,1} D. Liko,^{180,1} T. Matsushita,^{180,1} I. Mikulec,^{180,1} D. Rabady,^{180,1n3} B. Rahbaran,^{180,1} H. Rohringer,^{180,1} J. Schieck,^{180,1} R. Schönbeck,^{180,1} J. Strauss,^{180,1} W. Treberer-Treberspurg,^{180,1} W. Waltenberger,^{180,1} C.-E. Wulz,^{180,1} V. Mossolov,^{181,1} N. Shumeiko,^{181,1} J. Suarez Gonzalez,^{181,1} S. Alderweireldt,^{182,1} T. Cornelis,^{182,1} E. A. De Wolf,^{182,1} X. Janssen,^{182,1} A. Knutsson,^{182,1} J. Lauwers,^{182,1} S. Luyckx,^{182,1} S. Ochesanu,^{182,1} R. Rougny,^{182,1} M. Van Klundert,^{182,1} H. Van Haevermaet,^{182,1} P. Van Mechelen,^{182,1} N. Van Remortel,^{182,1} A. Van Spilbeeck,^{182,1} S. Abu Zeid,^{183,1} F. Bleekman,^{183,1} D. Hondt,^{183,1} N. Daci,^{183,1} I. De Bruyn,^{183,1} K. Deroover,^{183,1} N. Heracleous,^{183,1} J. Keaveney,^{183,1} S. Lowette,^{183,1} L. Moreels,^{183,1} A. Olbrechts,^{183,1} Q. Python,^{183,1} D. Strom,^{183,1} S. Tavernier,^{183,1} W. Van Doninck,^{183,1} P. Van Mulders,^{183,1} G. P. Van Onsem,^{183,1} J. Van Parjs,^{183,1} P. Barria,^{184,1} C. Caillol,^{184,1} B. Clerbaux,^{184,1} G. De Lentdecker,^{184,1} H. Delannoy,^{184,1} D. Dobur,^{184,1} G. Fasnacht,^{184,1} L. Favart,^{184,1} A. P. R. Gay,^{184,1} A. Grebenyuk,^{184,1} T. Lenzi,^{184,1} A. Léonard,^{184,1} T. Maerschalk,^{184,1} M. Mohammadi,^{184,1} L. Perni,^{184,1} A. Randle-conde,^{184,1} T. Reis,^{184,1} T. Seva,^{184,1} L. Thomas,^{184,1} C. Vander Velde,^{184,1} P. Vanhae,^{184,1} J. Wang,^{184,1} R. Yonamine,^{184,1} F. Zenoni,^{184,1} F. Zhang,^{184,1} K. Beernaert,^{185,1} L. Benucci,^{185,1} A. Cimmino,^{185,1} S. Crucy,^{185,1} A. Fagot,^{185,1} G. Garcia,^{185,1} M. Gui,^{185,1} J. Mccartin,^{185,1} A. Ocampo Rios,^{185,1} D. Poyraz,^{185,1} D. Ryckbosch,^{185,1} S. Salva Giblana,^{185,1} M. Sigamani,^{185,1} N. Strobbe,^{185,1} M. Tytgat,^{185,1} W. Van Diressche,^{185,1} E. Yagzan,^{185,1} N. Zaganidis,^{185,1} S. Basegemez,^{186,1} C. Beluffi,^{186,1} O. Bondu,^{186,1} G. Bruno,^{186,1} R. Castello,^{186,1} A. Caudron,^{186,1} L. Ceard,^{186,1} G. G. Da Silveira,^{186,1} C. Delaere,^{186,1} D. Favart,^{186,1} L. Forthomme,^{186,1} A. Giannamico,^{186,1} J. Hollar,^{186,1} A. Jafari,^{186,1} P. Jez,^{186,1} M. Komm,^{186,1} V. Lemaitre,^{186,1} A. Mertens,^{186,1} C. Nuttens,^{186,1} L. Perni,^{186,1} A. Pin,^{186,1} K. Piotrkowski,^{186,1} A. Popov,^{186,1} L. Quertenmont,^{186,1} M. Selvaggi,^{186,1} M. Vidal Marono,^{186,1} N. Bely,^{187,1} T. Caeberg,^{187,1} G. H. Hammad,^{187,1} W. L. Aldá Junior,^{187,1} G. A. Alves,^{187,1} L. Brito,^{187,1} M. Corre Martins Junior,^{188,1} T. Dos Reis Martins,^{188,1} C. Hensel,^{188,1} C. Mora Herrera,^{188,1} A. Morais,^{188,1} M. E. Pot,^{188,1} P. Rebello Teles,^{188,1} E. Belchior Batista Das Chagas,^{189,1} W. Carvalho,^{189,1} J. Chinellato,^{189,1} A. Custódio,^{189,1} E. M. Da Costa,^{189,1} D. De Jesus Damiao,^{189,1} C. D. Oliveira Martins,^{189,1} S. Fonseca De Souza,^{189,1} L. M. Huertas Guativa,^{189,1} H. Malbouisson,^{189,1} D. Matos Figueiredo,^{189,1} L. Mundini,^{189,1} H. Nogima,^{189,1} W. L. Prado Da Silva,^{189,1} A. Santoro,^{189,1} A. Sznaider,^{189,1} E. J. Tonelli Mangano,^{189,1} A. Vilela Pereira,^{189,1} S. Ahuja,^{189,1} C. A. Bernardes,^{189,1} A. De Souza Santos,^{189,1} S. Dogra,^{189,1} T. R. Fernandez Perez Tomei,^{189,1} E. M. Gregores,^{189,1} P. G. Mercadante,^{189,1} C. S. Moon,^{190,1} S. F. Novais,^{190,1} Sandra S. Padula,^{190,1} D. Romero Abad,^{190,1} J. C. Ruiz Vargas,^{190,1} A. Aleksandrov,^{191,1} V. Genchev,^{191,1} R. Hadjipistis,^{191,1} P. Laydjev,^{191,1} A. Marinov,^{191,1} S. Piperov,^{191,1} M. Rodozov,^{191,1} S. Stoykova,^{191,1} G. Sultanov,^{191,1} M. Utovata,^{191,1} A. Dimitrov,^{192,1} I. Glushkov,^{192,1} L. Litov,^{192,1} B. Pavlov,^{192,1} P. Petkov,^{192,1} M. Ahmad,^{193,1} J. G. Bian,^{193,1} G. M. Chen,^{193,1} H. S. Chen,^{193,1} M. Chen,^{193,1} T. Cheng,^{193,1} R. Du,^{193,1} C. H. Jiang,^{193,1} R. Pestina,^{193,1} F. Romeo,^{193,1} S. M. Shahseen,^{193,1} J. Tao,^{193,1} C. Wang,^{193,1} Z. Wang,^{193,1} H. Zhang,^{193,1} C. Asawatangtrakuldej,^{194,1} Y. Ban,^{194,1} G. Chen,^{194,1} Q. Li,^{194,1} Y. Liu,^{194,1} Y. Mao,^{194,1} S. J. Qian,^{194,1} D. Wang,^{194,1} M. Wang,^{194,1} Q. Wang,^{194,1} Z. Xu,^{194,1} D. Yang,^{194,1} Z. Zhang,^{194,1} W. Zou,^{194,1} C. Avila,^{195,1} A. Cabrera,^{195,1} L. F. Chaparro Sierra,^{195,1} C. Florez,^{195,1} J. Gomez,^{195,1} B. Gomez Moreno,^{195,1} J. C. Sanabria,^{195,1} N. Godinovic,^{196,1} D. Lelas,^{196,1} D. Polic,^{196,1} I. Puljak,^{196,1} Z. Antonovic,^{197,1} M. Kovac,^{197,1} V. Briglievic,^{197,1} K. Kadija,^{197,1} J. Luetic,^{198,1} L. Sudic,^{198,1} A. Attikis,^{199,1} G. Mavromanolakis,^{199,1} J. Mousa,^{199,1} C. Nicolaou,^{199,1} F. Ptochos,^{199,1} P. A. Razis,^{199,1} H. Rykaczewski,^{199,1} M. Bodlak,^{200,1} M. Finger,^{200,1} M. Finger Jr.,^{200,1} A. Ali,^{201,1} R. Aly,^{201,1} S. Aly,^{201,1} Y. Assran,^{201,1} A. Ellithi Kamel,^{202,1} A. Lotfy,^{202,1} M. A. Mahmoud,^{202,1} R. Masod,^{201,1} A. Radj,^{201,1} J. Y. Calpus,^{203,1} M. Kadastik,^{203,1} M. Murumura,^{203,1} M. Raidal,^{203,1} A. Tiko,^{203,1} C. Veelken,^{202,1} P. Eerola,^{203,1} J. Pekkanen,^{203,1} M. Voutilainen,^{203,1} J. Härkönen,^{204,1} K. Karimäki,^{204,1} R. Kimminen,^{204,1} T. Lampén,^{204,1} K. Lassila-Perrin,^{204,1} S. Lehto,^{204,1} T. Lindén,^{204,1} P. Luukka,^{204,1} T. Mäenpää,^{204,1} T. Peltola,^{204,1} E. Tuominen,^{204,1} J. Tuominen,^{204,1} E. Tuominen,^{204,1} E. Tuominen,^{204,1} T. Wendland,^{204,1} J. Talvitie,^{205,1} T. Tuuva,^{205,1} M. Besancon,^{205,1} F. Couderc,^{206,1} M. Dejardin,^{206,1} D. Denegri,^{206,1} B. Fabre,^{206,1} J. L. Faure,^{206,1} C. Favaro,^{206,1} F. Ferri,^{206,1} S. Ganjour,^{206,1} A. Givernau,^{206,1} P. Gras,^{206,1} G. Hamel de Monchenault,^{206,1} P. Jarry,^{206,1} E. Locci,^{206,1} M. Machet,^{206,1} J. Malcles,^{206,1} J. Rander,^{206,1} A. Rosowsky,^{207,1} M. Titov,^{207,1} A. Zghiche,^{207,1} S. Baffioni,^{207,1} F. Beaudelet,^{207,1} P. Bussion,^{207,1} L. Cadamuro,^{207,1} E. Chapon,^{207,1} T. Charlöt,^{207,1} T. Dahmenz,^{207,1} P. Davignon,^{207,1} N. Filipovic,^{207,1} A. Florent,^{207,1} R. Granier de Cassagnac,^{207,1} S. Lisiak,^{207,1} L. Mastrolenzmo,^{207,1} P. Miné,^{207,1} I. N. Narango,^{207,1} M. Nguyen,^{207,1} C. Ochando,^{207,1} G. Ortona,^{207,1} P. Paganini,^{207,1} R. Regnard,^{207,1} R. Salerno,^{207,1} J. B. Sauvan,^{207,1} Y. Sirois,^{207,1} T. Streblér,^{207,1} Y. Yilmaz,^{207,1} A. Zabi,^{207,1} J.-L. Agram,^{208,1} J. Andrea,^{208,1} A. Aubin,^{208,1} D. Bloch,^{208,1} J.-M. Brom,^{208,1} M. Buttignol,^{208,1} E. C. Chabert,^{208,1} N. Chanon,^{208,1} C. Collard,^{208,1} E. Conte,^{208,1} J.-C. Fontaine,^{208,1} D. Gelé,^{208,1}

- U. Goerlach,^{208,1} C. Goetzmann,^{208,1} A.-C. Le Bihan,^{208,1} J. A. Merlin,^{208,1} K. Skovpen,^{208,1} P. Van Hove,^{208,1} S. Gadrat,^{209,1} S. Beauregard,^{209,1} C. Bermet,^{210,1} G. Bouroud,^{210,1} E. Bouvier,^{210,1} S. Brochet,^{210,1} C. A. Carrillo Montoya,^{210,1} J. Chassera,^{210,1} R. Chierici,^{210,1} D. Contardo,^{210,1} B. Courbon,^{210,1} P. Depasse,^{210,1} H. El Mamouni,^{210,1} J. Fan,^{210,1} J. Fay,^{210,1} S. Gascon,^{210,1} M. Gouzevitch,^{210,1} B. Ille,^{210,1} L. B. Laktine,^{210,1} M. Lethuillier,^{210,1} L. Mirabito,^{210,1} A. L. Pequegnat,^{210,1} S. Perries,^{210,1} J. D. Ruiz Alvarez,^{210,1} D. Sabes,^{210,1} L. Sgandurra,^{210,1} V. Sordini,^{210,1} M. Vander Donckt,^{210,1} P. Verdin,^{210,1} S. Viret,^{210,1} X. Xiao,^{210,1} Z. Tsamalaidze,^{211,1} C. Autermann,^{212,1} S. Beranek,^{212,1} M. Bontenackels,^{212,1} M. Edelhoff,^{212,1} L. Feld,^{212,1} M. K. Kiesel,^{212,1} K. Klein,^{212,1} M. Lipinski,^{212,1} A. Ostapchuk,^{212,1} M. Preuter,^{212,1} F. Raupach,^{212,1} J. Sammet,^{212,1} S. Schael,^{212,1} J. F. Schultz,^{212,1} T. Verlage,^{212,1} H. Weber,^{212,1} B. Wittmer,^{212,1} V. Zhukov,^{212,1} M. Ata,^{213,1} M. Brodski,^{213,1} E. Dietz-Laursonn,^{213,1} D. Duchardt,^{213,1} M. Endres,^{213,1} A. Erdmann,^{213,1} S. Erdweg,^{213,1} T. Esch,^{213,1} R. Fischer,^{213,1} A. Güth,^{213,1} T. Hebbeker,^{213,1} C. Heidemann,^{213,1} K. Hoepfner,^{213,1} D. Klingenberg,^{213,1} S. Knutzen,^{213,1} P. Kreuzer,^{213,1} M. Merschmeyer,^{213,1} A. Meyer,^{213,1} P. Millet,^{213,1} M. Olschewski,^{213,1} K. Padeken,^{213,1} P. Papacz,^{213,1} T. Pook,^{213,1} M. Radziej,^{213,1} H. Reithler,^{213,1} M. Rieger,^{213,1} F. Scheuch,^{213,1} L. Sonnenschein,^{213,1} D. Tessyier,^{213,1} S. Thüer,^{213,1} V. Cherepanov,^{214,1} Y. Erdogan,^{214,1} G. Flügge,^{214,1} H. Geenen,^{214,1} M. Geisler,^{214,1} W. Ha Ahmad,^{214,1} F. Hoehle,^{214,1} B. Kargoll,^{214,1} T. Kress,^{214,1} Y. Kuessel,^{214,1} A. Künsken,^{214,1} J. Lingemann,^{214,1} A. Nehrkorn,^{214,1} A. Nowack,^{214,1} I. M. Nugent,^{214,1} C. Pistone,^{214,1} P. Katsas,^{215,1} J. Kieseler,^{215,1} C. Kleinwort,^{215,1} I. Korol,^{215,1} W. Lange,^{215,1} J. Leonard,^{215,1} K. Lipka,^{215,1} A. Lobanova,^{215,1} W. Lohmann,^{215,1} R. Mankel,^{215,1} I. Marfin,^{215,1} I.-A. Melzer-Pellmann,^{215,1} A. B. Meyer,^{215,1} G. Mittag,^{215,1} J. Mnich,^{215,1} A. Mussigller,^{215,1} S. Naumann-Emme,^{215,1} A. Nayak,^{215,1} E. Ntomari,^{215,1} H. Perrey,^{215,1} D. Pitzl,^{215,1} R. Placakyte,^{215,1} A. Raspereza,^{215,1} P. M. Ribeiro Cipriano,^{215,1} B. Roland,^{215,1} M. O. Sahin,^{215,1} J. Salfeld-Nebgen,^{215,1} P. Saxena,^{215,1} T. Schoerner-Sadenius,^{215,1} M. Schröder,^{215,1} C. Seitz,^{215,1} S. Spannagel,^{215,1} K. D. Trippkewitz,^{215,1} C. Wissing,^{215,1} V. Blobel,^{216,1} Centis Vignali,^{216,1} A. Draeger,^{216,1} J. Erflé,^{216,1} E. Garutti,^{216,1} K. Goebel,^{216,1} D. Gonzalez,^{216,1} M. Görner,^{216,1} J. Haller,^{216,1} M. Hoffmann,^{216,1} R. Höing,^{216,1} A. Junkes,^{216,1} R. Klanner,^{216,1} R. Kogler,^{216,1} T. Lapsien,^{216,1} T. Lenz,^{216,1} I. Marchesini,^{216,1} D. Marconi,^{216,1} D. Nowatschin,^{216,1} J. Ott,^{216,1} F. Pantaleo,^{216,1} T. Peiffer,^{216,1} A. Periesam,^{216,1} N. Pletsch,^{216,1} J. Poehlsen,^{216,1} D. Rathjens,^{216,1} C. Sander,^{216,1} H. Schettler,^{216,1} P. Schleper,^{216,1} E. Schlieckau,^{216,1} A. Schmidt,^{216,1} J. Schwandt,^{216,1} M. Seidel,^{216,1} V. Sola,^{216,1} H. Stadie,^{216,1} G. Steinbrück,^{216,1} H. Tholen,^{216,1} D. Treondel,^{216,1} E. Usai,^{216,1} L. Vanelderken,^{216,1} A. Vanhofer,^{216,1} M. Akbyiyik,^{217,1} C. Amstutz,^{217,1} C. Barth,^{217,1} C. Baus,^{217,1} J. Berger,^{217,1} C. Beskidt,^{217,1} C. Böser,^{217,1} E. Butz,^{217,1} R. Casprt,^{217,1} T. Chwalek,^{217,1} F. Colombo,^{217,1} W. D. Boer,^{217,1} A. Desroclos,^{217,1} A. Dierlamm,^{217,1} R. Eber,^{217,1} M. Feindt,^{217,1} S. Fink,^{217,1} M. Fischer,^{217,1} F. French,^{217,1} B. Freund,^{217,1} R. Friese,^{217,1} D. Funka,^{217,1} M. Giffels,^{217,1} A. Gilbert,^{217,1} D. Haitz,^{217,1} T. Harbaum,^{217,1} M. A. Harrendorf,^{217,1} F. Hartmann,^{217,1} U. Husemann,^{217,1} F. Kassel,^{217,1} I. Katkov,^{217,1} A. Kormayer,^{217,1} S. Kudella,^{217,1} P. Lobelle Pardo,^{217,1} B. Maier,^{217,1} H. Mildner,^{217,1} M. U. Mozer,^{217,1} T. Müller,^{217,1} Th. Müller,^{217,1} M. Plagge,^{217,1} M. Printz,^{217,1} G. Quast,^{217,1} K. Rabbertz,^{217,1} S. Röcker,^{217,1} F. Roscher,^{217,1} I. Shvetsov,^{217,1} G. Sieber,^{217,1} H. J. Simonis,^{217,1} F. M. Stober,^{217,1} R. Ulrich,^{217,1} J. Wagner-Kuhr,^{217,1} S. Wayand,^{217,1} T. Weiler,^{217,1} S. Williamson,^{217,1} C. Wöhrmann,^{217,1} R. Wolf,^{217,1} G. Aganostou,^{218,1} G. Daskalakis,^{218,1} T. Gerald,^{218,1} V. A. Giakoumopoulou,^{218,1} A. Kyriakis,^{218,1} D. Loukas,^{218,1} A. Markou,^{218,1} A. Psallidas,^{218,1} I. Topsis-Giotis,^{218,1} A. Agapitos,^{219,1} S. Kesisoglou,^{219,1} A. Panagioutou,^{219,1} N. Saoulidou,^{219,1} E. Tzafiri,^{219,1} I. Evangelou,^{219,1} G. Flouris,^{219,1} C. Fouad,^{220,1} P. Kokkas,^{220,1} N. Loukas,^{220,1} N. Manthos,^{220,1} I. Papadopoulos,^{220,1} E. Paradas,^{220,1} J. Strologas,^{220,1} G. Bencze,^{221,1} C. Hajdu,^{221,1} A. Hazi,^{221,1} P. Hidas,^{221,1} D. Horvath,^{221,1} F. Sikler,^{221,1} V. Veszpremi,^{221,1} G. Vesztrombi,^{221,1} A. J. Zsigmond,^{221,1} N. Beni,^{222,1} S. Czelar,^{222,1} J. Karancsi,^{222,1} K. Molnar,^{222,1} Z. Szillas,^{222,1} M. Bartok,^{223,1} A. Makovec,^{223,1} P. Raics,^{223,1} Z. L. Trocsanyi,^{223,1} B. Ujvari,^{223,1} P. Mal,^{224,1} K. Mandal,^{224,1} N. Sahoo,^{224,1} S. K. Swain,^{224,1} S. Bansal,^{224,1} S. B. Beri,^{224,1} A. Bhattacharya,^{224,1} Chawla,^{224,1} R. Gupta,^{224,1} U. Bhawandeep,^{224,1} A. K. Kalsi,^{225,1} A. Kaur,^{225,1} M. Kaur,^{225,1} R. Kumar,^{225,1} A. Mehta,^{225,1} M. Mittal,^{225,1} N. Nishu,^{225,1} J. B. Singh,^{225,1} G. Walia,^{226,1} Ashok Kumar,^{226,1} Arun Kumar,^{226,1} A. Bhardwaj,^{226,1} B. C. Choudhary,^{226,1} R. B. Garg,^{226,1} A. Kumar,^{226,1} S. Malhotra,^{226,1} M. Naimuddin,^{226,1} K. Ranjan,^{226,1} R. Sharma,^{226,1} S. Banerjee,^{227,1} S. Bhattacharya,^{227,1}

- K. Chatterjee,^{227,†} S. Dey,^{227,‡} S. Dutta,^{227,§} Sa. Jain,^{227,§} Sh. Jain,^{227,§} R. Khurana,^{227,§} N. Majumdar,^{227,§} A. Modak,^{227,§} K. Mondal,^{227,§} S. Mukherjee,^{227,§} S. Mukhopadhyay,^{227,§} A. Roy,^{227,§} D. Roy,^{227,§} S. Roy,^{227,§} S. Sarkar,^{227,§} M. Sharan,^{227,§} A. Abdulsalam,^{228,§} R. Chudasma,^{228,§} E. Datta,^{228,§} V. Jha,^{228,§} V. Kumar,^{228,§} A. K. Mohanty,^{228,§} L. M. Pant,^{228,§} P. Shukla,^{228,§} A. Topkar,^{228,§} T. Aziz,^{229,§} S. Banerjee,^{229,§} S. Bhownik,^{229,§} R. M. Chatterjee,^{229,§} R. K. Dewanjee,^{229,§} S. Dugad,^{229,§} S. Ganguly,^{229,§} S. Ghosh,^{229,§} M. Guchait,^{229,§} A. Guru,^{229,§} G. Kole,^{229,§} S. Kumar,^{229,§} E. Mahakud,^{229,§} M. Maiti,^{229,§} G. Majumder,^{229,§} K. Mazumdar,^{229,§} S. Mitra,^{229,§} G. B. Mohanty,^{229,§} B. Parida,^{229,§} T. Sarkar,^{229,§} K. Sudhakar,^{229,§} N. Sutar,^{229,§} B. Sutar,^{229,§} N. Wickramage,^{229,§} S. Sharma,^{230,§} H. Bakshiansohi,^{231,§} B. Behnamian,^{231,§} S. M. Etesami,^{231,§} A. Fahim,^{231,§} R. Goldouzian,^{231,§} M. Khakzaei,^{231,§} M. Mohammadi Najafabadi,^{231,§} M. Naseri,^{231,§} S. Pakiniaj Mehdibadi,^{231,§} F. Rezaei Hosseiniabadi,^{231,§} B. Safarzadeh,^{231,§} M. Zeinali,^{231,§} M. Felicini,^{232,§} Grunewald,^{232,§} M. Abbrescia,^{233,§} C. Calabria,^{233,§} Zimbler,^{233,§} C. Caputo,^{233,§} Chhibra,^{233,§} S. S. Chhibra,^{233,§} A. Colaleo,^{233,§} D. Creanza,^{233,§} L. Cristella,^{233,§} De Filippis,^{233,§} M. De Palma,^{233,§} L. Fione,^{233,§} G. Iaselli,^{233,§} G. Maggi,^{233,§} M. Maggi,^{233,§} G. Minnello,^{233,§} S. Melville,^{233,§} S. Nuzzo,^{233,§} A. Pompli,^{233,§} G. Pugliese,^{233,§} R. Radogna,^{233,§} A. Ranieri,^{233,§} G. Salvaggi,^{233,§} L. Silvestris,^{233,§} R. Venditti,^{233,§} P. Verwilligen,^{233,§} G. Abbiendi,^{234,§} C. Battilana,^{234,§} A. Cenvenuti,^{234,§} D. Bonacorsi,^{234,§} Braibant-Giacomelli,^{234,§} L. Brigliadori,^{234,§} R. Campanini,^{234,§} P. Capiluppi,^{234,§} A. Castro,^{234,§} C. Cacciari,^{234,§} F. R. Cavallo,^{234,§} G. Codispoti,^{234,§} M. Cuffiani,^{234,§} G. M. Dallavalle,^{234,§} F. Fabbri,^{234,§} A. Fanfani,^{234,§} D. Fasanella,^{234,§} P. Giacomelli,^{234,§} C. Grandi,^{234,§} L. Guiducci,^{234,§} P. Masetti,^{234,§} A. Montanari,^{234,§} F. L. Navaria,^{234,§} Marcellini,^{234,§} P. Moretti,^{234,§} P. Rovelli,^{234,§} G. P. Siroli,^{234,§} N. Tosi,^{234,§} R. Travaglini,^{234,§} A. Perrotta,^{234,§} A. M. Rossi,^{234,§} G. S. Rosso,^{234,§} G. S. Salvi,^{234,§} G. S. Tosi,^{234,§} R. Potenza,^{235,§} G. Cappello,^{235,§} M. Chiorboli,^{235,§} S. Costa,^{235,§} F. Giordano,^{235,§} R. Potenza,^{236,§} A. Tricomi,^{236,§} C. Tuve,^{236,§} G. Barbagli,^{236,§} V. Ciulli,^{236,§} C. Civinini,^{236,§} R. D'Alessandro,^{236,§} S. Focardi,^{236,§} S. Gonzi,^{236,§} V. Giovannini,^{236,§} P. Lenzi,^{236,§} M. Meschini,^{236,§} S. Paoletti,^{236,§} G. Sguazzoni,^{236,§} A. Tropiano,^{236,§} L. Viliani,^{236,§} L. Benussi,^{237,§} S. Bianco,^{237,§} F. Fabri,^{237,§} D. Piccolo,^{237,§} V. Calvelli,^{238,§} F. Ferro,^{238,§} M. Lo Vetere,^{238,§} E. Robutti,^{238,§} S. Tosi,^{238,§} M. E. Di Marzo,^{238,§} S. Fiorendi,^{238,§} S. Gennari,^{238,§} R. Gerosa,^{238,§} A. Ghezzi,^{238,§} P. Govoni,^{238,§} S. Malvezzi,^{238,§} R. A. Manzoni,^{238,§} B. Marzocchi,^{239,§} S. Menassei,^{239,§} D. Menassei,^{239,§} L. Moroni,^{239,§} M. Pagani,^{239,§} D. Pedrini,^{239,§} S. Ragazzi,^{239,§} N. Redaelli,^{239,§} T. Tabarelli de Fatis,^{239,§} S. Buontempo,^{239,§} N. Cavallo,^{240,§} S. Di Guida,^{240,§} M. Esposito,^{240,§} F. Fabozzi,^{240,§} A. O. M. Iorio,^{240,§} G. Lanza,^{240,§} L. Lista,^{240,§} S. Meola,^{240,§} M. Merola,^{240,§} P. Paolucci,^{240,§} C. Sciacca,^{240,§} F. Thyssen,^{240,§} P. Azzi,^{241,§} N. Bacchetta,^{241,§} D. Bisello,^{241,§} Branca,^{241,§} R. Carlisi,^{241,§} A. Carvalho Antunes De Oliveira,^{241,§} P. Checchia,^{241,§} M. Dall'Osso,^{241,§} T. Dorigo,^{241,§} U. Dosselli,^{241,§} F. Gasparini,^{241,§} U. Gasparini,^{241,§} A. Gozzelino,^{241,§} K. Kanishchev,^{241,§} S. Lacaprara,^{241,§} M. Margoni,^{241,§} A. T. Meneguzzo,^{241,§} J. Pazzini,^{241,§} N. Pozzobon,^{241,§} P. Ronchese,^{241,§} F. Simonetto,^{241,§} E. Torassa,^{241,§} M. Tosi,^{241,§} M. Zanetti,^{241,§} P. Zotto,^{241,§} A. Zucchetta,^{241,§} G. Zumerle,^{241,§} A. Braghieri,^{242,§} M. Gabusi,^{242,§} A. Magnani,^{242,§} S. P. Ratti,^{242,§} V. Re,^{242,§} C. Riccardi,^{242,§} P. Salvini,^{242,§} I. Vai,^{242,§} P. Vitali,^{242,§} L. Aluna Solestis,^{243,§} M. Biasini,^{243,§} G. M. Bilen,^{243,§} D. Ciangottini,^{243,§} L. Fanò,^{243,§} P. Lericcia,^{243,§} G. Mantovani,^{243,§} M. Menichelli,^{243,§} A. Saha,^{243,§} A. Santoccia,^{243,§} A. Spiezia,^{243,§} K. Androssov,^{244,§} P. Azzurri,^{244,§} G. Baglioni,^{244,§} J. Bernardi,^{244,§} T. Boccali,^{244,§} G. Broccolo,^{244,§} R. Castaldi,^{244,§} M. A. Ciocci,^{244,§} R. Dell'Orso,^{244,§} S. Donato,^{244,§} G. Fedi,^{244,§} L. Fou,^{244,§} A. Giassi,^{244,§} M. T. Grippo,^{244,§} F. Ligabue,^{244,§} T. Lomtadze,^{244,§} L. Martin,^{244,§} A. Messineo,^{244,§} F. Palla,^{244,§} A. Rizzi,^{244,§} A. Tonelli,^{244,§} A. Savoy-Navarro,^{244,§} A. T. Serban,^{244,§} P. Spagnolo,^{244,§} P. Squillacioti,^{244,§} R. Tenchin,^{244,§} A. Ventrutino,^{244,§} P. G. Verdini,^{244,§} L. Barone,^{245,§} F. Cavallari,^{245,§} G. D'imperio,^{245,§} D. Re,^{245,§} M. Diemoz,^{245,§} S. Gelli,^{245,§} C. Jorda,^{245,§} E. Longo,^{245,§} F. Margaroli,^{245,§} P. Meridiani,^{245,§} F. Michelini,^{245,§} G. Organini,^{245,§} R. Paramatti,^{245,§} F. Pretiato,^{245,§} S. Rahatlou,^{245,§} C. Rovelli,^{245,§} F. Santanastasio,^{245,§} R. Traczynski,^{245,§} N. Amapane,^{246,§} R. Arcidiacono,^{246,§} M. Arneodo,^{246,§} R. Bellan,^{246,§} C. Biino,^{246,§} N. Cartiglia,^{246,§} M. Costa,^{246,§} R. Covarelli,^{246,§} A. Degana,^{246,§} N. Demaria,^{246,§} L. Finco,^{246,§} B. Kiani,^{246,§} C. Mariotti,^{246,§} S. Maselli,^{246,§} E. Migliore,^{246,§} V. Monaco,^{246,§} E. Montel,^{246,§} M. Musich,^{246,§} M. Obertino,^{246,§} L. Pacher,^{246,§} N. Pastore,^{246,§} M. Pelliccioni,^{246,§} G. L. Pinna Angioni,^{246,§}

- F. Ravera,^{246a,246b,1} A. Romero,^{246a,246b,1} M. Ruspa,^{246a,246c,1} R. Sacchi,^{246a,246b,1} A. Solano,^{246a,246b,1} A. Staiano,^{246a,1} U. Tamponi,^{246a,2,1} S. Belforte,^{246a,2} V. Candeline,^{246a,2} S. Casarosa,^{246a,2} F. Cossutti,^{247a,2,3} G. Della Ricca,^{247a,247b,3} B. Gibbo,^{247a,2} C. La Licata,^{247a,247b,3} M. Marone,^{247a,247b,3} A. Schizzi,^{247a,247b,3} T. Umer,^{247a,247b,3} A. Zanetti,^{247a,3} S. Chang,^{248,1} A. Kropivnitskaya,^{248,1} S.K. Nam,^{248,1} D. H. Kim,^{249,1} G. N. Kim,^{249,1} M.S. Kim,^{249,1} D.J. Kong,^{249,1} S. Lee,^{249,1} Y. D. Oh,^{249,1} A. Sakharov,^{249,1} D. C. Son,^{249,1} J. A. Brochero Cifuentes,^{250,1} H. Kim,^{250,1} T.J. Kim,^{250,1} M.S. Ryu,^{250,1} S. Song,^{251,1} S. Choi,^{252,1} Y. Go,^{252,1} D. Gyun,^{252,1} B. Hong,^{252,1} M. Jo,^{252,1} H. Kim,^{252,1} Y. Kim,^{252,1} B. Lee,^{252,1} K. Lee,^{252,1} K. S. Lee,^{252,1} S. Lee,^{252,1} S. K. Park,^{252,1} Y. Roh,^{252,1} H. D. Yoo,^{253,1} M. Choi,^{254,1} J. H. Kim,^{254,1} J. S. H. Lee,^{254,1} I. C. Park,^{254,1} G. Ryu,^{254,1} Y. Choi,^{255,1} Y. K. Choi,^{255,1} J. Goh,^{255,1} D. Kim,^{255,1} E. Kwon,^{255,1} J. Lee,^{255,1} I. Yu,^{255,1} A. Juodagalvis,^{256,1} J. Vaikus,^{256,1} Z. A. Ibrahim,^{257,1} J. R. Komaragiri,^{257,1} M. A. B. Md Ali,^{257,1} F. Mohamad Idris,^{257,1} W.A.T. Wan Abdullah,^{257,1} E. Casimiro Linares,^{258,1} H. Castilla-Valdez,^{258,1} E. De La Cruz-Burelo,^{258,1} I. Heredia-de La Cruz,^{258,1} A. Hernandez-Almada,^{258,1} R. Lopez-Fernandez,^{258,1} A. Sanchez-Hernandez,^{258,1} S. Carrillo Moreno,^{259,1} F. Vazquez Valencia,^{259,1} S. Carpintero,^{260,1} I. Pedraza,^{260,1} H. A. Salazar Ibarague,^{260,1} A. Morelos Pineda,^{261,1} D. Krofcheck,^{262,1} P.H. Butler,^{263,1} S. Reucroft,^{263,1} A. Ahmad,^{264,1} M. Ahmad,^{264,1} Q. Hassan,^{264,1} H.R. Hooranji,^{264,1} W. A. Khan,^{264,1} T. Khurshid,^{264,1} M. Shoab,^{264,1} H. Bialkowska,^{265,1} M. Blin,^{265,1} B. Boimska-Rybinska,^{265,1} T. Fruehoebs,^{265,1} M. Gorski,^{265,1} M. Kazana,^{265,1} K. Nawrocki,^{265,1} K. Romanowska-Rybinska,^{265,1} M. Szleper,^{265,1} P. Zalewski,^{265,1} G. Brona,^{266,1} K. Bunkowski,^{266,1} K. Dobrota,^{266,1} A. Kalinowski,^{266,1} M. Konecki,^{266,1} J. Krolikowski,^{266,1} M. Misura,^{266,1} M. Olszewski,^{266,1} M. Walczak,^{266,1} P. Bargassa,^{267,1} C. Beirão da Cruz e Silva,^{267,1} A. Di Francesco,^{267,1} P. Faccioli,^{267,1} P.G. Ferreira Parracho,^{267,1} M. Gallinaro,^{267,1} L. Lloret Iglesias,^{267,1} F. Nguyen,^{267,1} J. Rodriguez Antunes,^{267,1} J. Seixas,^{267,1} O. Toldaiay,^{267,1} D. Vadruccio,^{267,1} J. Varela,^{267,1} P. Vischia,^{267,1} S. Afamiasiev,^{268,1} P. Buning,^{268,1} M. Gavrilenko,^{268,1} I. Golutvin,^{268,1} I. Gorbovich,^{268,1} A. Kamenev,^{268,1} V. Karjavin,^{268,1} V. Komoplyanikov,^{268,1} A. Lanev,^{268,1} A. Malakhov,^{268,1} V. Matveev,^{268,1,2} P. Moisenko,^{268,1} V. Palichik,^{268,1} V. Perelygin,^{268,1} S. Shmatov,^{268,1} S. Shulha,^{268,1} N. Skatchkov,^{268,1} V. Smirnov,^{268,1} T. Torishiashvili,^{268,1,2} A. Zarubin,^{268,1} V. Golovtsov,^{269,1} Y. Ivanov,^{269,1} V. Kim,^{269,1,2} E. Kuznetsova,^{269,1} P. Levchenko,^{269,1} V. Murzin,^{269,1} V. Oreshkin,^{269,1} I. Smirnov,^{269,1} V. Sulimov,^{269,1} L. Uvarov,^{269,1} S. Savilov,^{269,1} A. Vorobьев,^{270,1} Yu. Andreev,^{270,1} A. Dermenev,^{270,1} S. Gminienko,^{270,1} N. Golubev,^{270,1} A. Kameyev,^{270,1} M. Kirsanov,^{270,1} N. Krashnikov,^{270,1} A. Pashenkov,^{270,1} D. Tilov,^{270,1} A. Toropin,^{270,1} V. Epishyn,^{271,1} V. Gavrilov,^{271,1} N. Lychkovskaya,^{271,1} V. Popov,^{271,1} I. Pozdnyakov,^{271,1} G. Safronov,^{271,1} A. Spiridonov,^{271,1} E. Vlason,^{271,1} A. Zhokin,^{271,1} V. Andreev,^{272,1} M. Azarkin,^{272,1,2} I. Dremin,^{272,1,2} M. Kirakosyan,^{272,1} A. Leonidov,^{272,1,2} G. Mesyats,^{272,1,2} S.V. Rusakov,^{272,1} A. Vinogradov,^{272,1} A. Baskakov,^{273,1} A. Belyaev,^{273,1} E. Boos,^{273,1} V. Bunichev,^{273,1} M. Dubinin,^{273,1,2} L. Dudko,^{273,1} A. Ershov,^{273,1} A. Grishubin,^{273,1} V. Klyukhin,^{273,1} O. Kodolova,^{273,1} I. Likholtin,^{273,1} I. Myagkov,^{273,1} S. Obraztsov,^{273,1} S. Petrushanko,^{273,1} V. Savrin,^{273,1} I. Azhgirey,^{274,1} I. Bayshev,^{274,1} S. Bitoukov,^{274,1} V. Kachanov,^{274,1} A. Kalinin,^{274,1} D. Konstantinov,^{274,1} V. Krychkine,^{274,1} V. Petrov,^{274,1} R. Rytutin,^{274,1} A. Sobol,^{274,1} L. Touarchanovich,^{274,1} S. Troshin,^{274,1} N. Tyurin,^{274,1} A. Uzunian,^{274,1} A. Volkov,^{274,1} P. Adzie,^{274,1,2} M. Ekmekci,^{274,1,2} J. Milosevic,^{274,1,2} V. Rekovic,^{274,1} J. Alcaraz Maestre,^{276,1} E. Calvo,^{276,1} M. Cerrada,^{276,1} M. Chamizo Llatas,^{276,1} N. Colino,^{276,1} B. De La Cruz,^{276,1} A. Delgado Peris,^{276,1} D. Dominguez Vázquez,^{276,1} A. Escalante Del Valle,^{276,1} C. Fernandez Bedoya,^{276,1} J.P. Fernández Ramos,^{276,1} J. Fliz,^{276,1} M. C. Fouz,^{276,1} P. García-Abia,^{276,1} O. González Lopez,^{276,1} S. Goy Lopez,^{276,1} J.M. Hernández,^{276,1} M. I. Josa,^{276,1} E. Navarro De Martino,^{276,1} P. Pérez-Calero Yzquierdo,^{276,1} J. Puerta Pelayo,^{276,1} A. Quintario Olmeda,^{276,1} I. Redondo,^{276,1} L. Romero,^{276,1} M. S. Soares,^{276,1} C. Albjar,^{277,1} J.F. de Trocóniz,^{277,1} M. Missiroli,^{277,1} D. Moran,^{277,1} H. Brun,^{278,1} J. Cuevas,^{278,1} J. Fernández Menéndez,^{278,1} S. Folgueras,^{278,1} I. González Caballero,^{278,1} E. Palencia Cortezon,^{278,1} J. M. Vizán García,^{278,1} I.J. Cabrillo,^{278,1} A. Calderon,^{278,1} J.R. Castilleiras De Saa,^{279,1} J. Duarte Campderros,^{279,1} M. Fernandez,^{279,1} G. Gomez,^{279,1} A. Graziano,^{279,1} A. Lopez Virtu,^{279,1} J. Marco,^{279,1} R. Marco,^{279,1} C. Martínez Rivero,^{279,1} F.J. Munoz Sanchez,^{279,1} J. Piedra Gomez,^{279,1} T. Rodrigo,^{279,1} A.Y. Rodriguez-Marrero,^{279,1} A. Ruiz-Jimeno,^{279,1} L. Scodellaro,^{279,1} I. Vilà,^{279,1} R. Vilar Cortabarri,^{279,1} D. Abbaneo,^{280,1} E. Auffray,^{280,1} G. Auzinger,^{280,1} M. Bachtis,^{280,1} P. Baillon,^{280,1} A.H. Ball,^{280,1} D. Barney,^{280,1} A. Benaglia,^{280,1} J. Bensdorff,^{280,1} J. Benvenuti,^{280,1} F. J. Benitez,^{280,1} G. M. Berruti,^{280,1} P. Bloch,^{280,1} A. Bocci,^{280,1} A. Bonato,^{280,1} C. Botti,^{280,1} H. Breuiler,^{280,1} T. Camporesi,^{280,1} G. Cerninaria,^{280,1} S. Colafranceschi,^{280,1} M. D'Alfonso,^{280,1} D. d'Enterria,^{280,1} A. Dabrowski,^{280,1} V. Duponte,^{280,1} A. David,^{280,1} M. De Gruttola,^{280,1} F. De Gui,^{280,1} A. De Roeck,^{280,1} S. De Visscher,^{280,1} E. Di Marco,^{280,1} M. Dobson,^{280,1} M. Dordevic,^{280,1} T. du Pree,^{280,1} N. Dupont-Sagorin,^{280,1} A. Elliott-Peisert,^{280,1} G. Franzoni,^{280,1} W. Funk,^{280,1} D. Gigi,^{280,1} K. Gill,^{280,1} D. Giordano,^{280,1}

- M. Girone,^{280,1} F. Glege,^{280,1} R. Guida,^{280,1} S. Gundacker,^{280,1} M. Guthoff,^{280,1} J. Hammer,^{280,1} M. Hansen,^{280,1} P. Harris,^{280,1} J. Hegeman,^{280,1} V. Innocente,^{280,1} P. Janot,^{280,1} H. Kirschbaum,^{280,1} M. J. Kortelainen,^{280,1} K. Kousours,^{280,1} K. Krajcarz,^{280,1} P. Lecoq,^{280,1} C. Lourenço,^{280,1} M. T. Lucchini,^{280,1} N. Magni,^{280,1} L. Malgeri,^{280,1} M. Mannelli,^{280,1} J. Marrouche,^{280,1} A. Martelli,^{280,1} L. Masetti,^{280,1} F. Meijers,^{280,1} S. Mersi,^{280,1} E. Meschi,^{280,1} F. Moortgat,^{280,1} S. Morovic,^{280,1} M. Mulders,^{280,1} M. V. Nemallapudi,^{280,1} H. Neugebauer,^{280,1} S. Orfanelli,^{280,1} L. Orsini,^{280,1} L. Pape,^{280,1} E. Perez,^{280,1} A. Petrelli,^{280,1} G. Petruccianni,^{280,1} A. Pfeiffer,^{280,1} D. Piparo,^{280,1} A. Racz,^{280,1} G. Rolandi,^{280,1} M. Rovere,^{280,1} M. Ruan,^{280,1} H. Sakulin,^{280,1} C. Schäfer,^{280,1} C. Schwick,^{280,1} A. Sharma,^{280,1} P. Silva,^{280,1} M. Simon,^{280,1} P. Spiehs,^{280,1} D. Spiga,^{280,1} J. Stegemann,^{280,1} B. Stieger,^{280,1} M. Stoye,^{280,1} Y. Takahashi,^{280,1} D. Treille,^{280,1} A. Tsirou,^{280,1} G. I. Veres,^{280,1} N. Wardle,^{280,1} H. K. Wöhri,^{280,1} A. Zagozdzinska,^{280,1} W. D. Zeuner,^{280,1} W. Bertl,^{280,1} K. Deiters,^{280,1} W. Erdmann,^{280,1} Horisberger,^{280,1} H. C. Kaestli,^{280,1} D. Kotlinski,^{280,1} U. Langenegg,^{280,1} T. Rohr,^{280,1} F. Bachmaier,^{280,1} L. Biagi,^{280,1} L. Bianchini,^{280,1} M. A. Buchmann,^{280,1} B. Casal,^{280,1} G. Dissertori,^{280,1} M. Dittmar,^{280,1} M. Donega,^{280,1} M. Dünnser,^{280,1} P. Eller,^{280,1} C. Grab,^{280,1} C. Heidegger,^{280,1} D. Hits,^{280,1} J. Hoss,^{280,1} G. Kasieczka,^{280,1} W. Lustermann,^{280,1} B. Mangano,^{280,1} A. C. Marini,^{280,1} M. Marionneau,^{280,1} P. Martinez Ruiz del Arbol,^{280,1} B. Masciovecchio,^{280,1} D. Meister,^{280,1} P. Musella,^{280,1} F. Nesi-Tedaldi,^{280,1} F. Pandolfi,^{280,1} J. Pata,^{280,1} F. Pauss,^{280,1} L. Perrozzi,^{280,1} M. Peruzzo,^{280,1} M. Quittman,^{280,1} M. Rossini,^{280,1} A. Starodumov,^{280,1} M. Tahakoshi,^{280,1} V. R. Tavolari,^{280,1} K. Theofilatos,^{280,1} R. Wallny,^{280,1} H. A. Weber,^{280,1} T. K. Arrestand,^{280,1} C. Amsler,^{280,1} M. F. Canelli,^{280,1} V. Chiochia,^{280,1} A. De Rosa,^{280,1} C. Galloni,^{280,1} A. Hinzmam,^{280,1} T. Hreus,^{280,1} B. Kilminster,^{280,1} C. Lange,^{280,1} J. Ngaduobia,^{280,1} D. Pinna,^{280,1} P. Robmann,^{280,1} F. J. Ronca,^{280,1} D. Salemo,^{280,1} S. Taromi,^{280,1} Y. Yang,^{280,1} M. Cardaci,^{280,1} K. H. Chen,^{280,1} T. H. Doan,^{280,1} C. Ferro,^{280,1} M. Konyushikhin,^{280,1} C. M. Ku,^{280,1} W. Lin,^{280,1} Y. J. Lu,^{280,1} R. Volpe,^{280,1} S. S. Yu,^{280,1} P. Chang,^{280,1} Y. H. Chang,^{280,1} Y. W. Chang,^{280,1} Y. Chao,^{280,1} K. Chen,^{280,1} P. H. Chen,^{280,1} C. Dietz,^{280,1} F. Fiori,^{280,1} U. Grunbler,^{280,1} W.-S. Hou,^{280,1} Y. Hsiung,^{280,1} Y. F. Liu,^{280,1} R.-S. Lu,^{280,1} M. Mifiana Moya,^{280,1} E. Petrucco,^{280,1} J. F. Tsai,^{280,1} Y. M. Tzeng,^{280,1} R. Wilken,^{280,1} B. Asavapibhop,^{280,1} K. Kovitavingtorn,^{280,1} G. Singh,^{280,1} N. Sriwanobhas,^{280,1} N. Suwonjandee,^{280,1} A. Adiguzel,^{280,1} S. Cerci,^{280,1} C. Dozen,^{280,1} S. Girgis,^{280,1} G. Gokbuluk,^{280,1} Y. Guler,^{280,1} E. Gurpinar,^{280,1} I. Hos,^{280,1} E. E. Kangal,^{280,1} A. Kayis Topaksu,^{280,1} G. Onengu,^{280,1} K. Ozdemir,^{280,1} S. Ozturk,^{280,1} B. Tali,^{280,1} H. Topakli,^{280,1} M. Vergili,^{280,1} C. Zorbalmac,^{280,1} I. V. Akin,^{280,1} B. Bilin,^{280,1} S. Bilmis,^{280,1} B. Isildak,^{280,1} G. Karapinar,^{280,1} M. U. Surat,^{280,1} M. Yalzımcı,^{280,1} M. Zeyrek,^{280,1} E. A. Albayrak,^{280,1} E. Gülmelz,^{280,1} M. Kaya,^{280,1} O. Kaya,^{280,1} T. Yetkin,^{280,1} K. Cankocak,^{280,1} S. Sen,^{280,1} F. I. Vardarli,^{280,1} B. Grynyov,^{280,1} L. Levchuk,^{280,1} P. Sorokin,^{280,1} R. Aggleton,^{280,1} F. Ball,^{280,1} L. Beck,^{280,1} J. J. Brooke,^{280,1} E. Clement,^{280,1} D. Cussans,^{280,1} H. Flacher,^{280,1} J. Goldstein,^{280,1} M. Grimes,^{280,1} G. P. Heath,^{280,1} H. F. Heath,^{280,1} A. Poll,^{280,1} T. Sakuma,^{280,1} C. Lucas,^{280,1} Z. Meng,^{280,1} D. M. Newbold,^{280,1} S. Paramesvaran,^{280,1} A. P. Poll,^{280,1} T. Sakuma,^{280,1} S. Seif El Nasr-storey,^{280,1} S. Senkin,^{280,1} D. Smith,^{280,1} V. J. Smith,^{280,1} K. W. Bell,^{280,1} A. Belyaev,^{280,1} C. Brew,^{280,1} R. M. Brown,^{280,1} D. J. A. Cockrel,^{280,1} J. A. Coughlan,^{280,1} K. Harder,^{280,1} S. Harper,^{280,1} E. Olaiya,^{280,1} D. Petly,^{280,1} C. H. Shepherd-Themistocleous,^{280,1} A. Thea,^{280,1} I. R. Tomalin,^{280,1} T. Williams,^{280,1} W. J. Womersley,^{280,1} S. D. Worm,^{280,1} M. Barber,^{280,1} R. Bainbridge,^{280,1} O. Buchmuller,^{280,1} A. Bundock,^{280,1} D. Burton,^{280,1} S. Casasso,^{280,1} M. Citron,^{280,1} D. Colling,^{280,1} L. Corpe,^{280,1} N. Cripps,^{280,1} P. Dauncey,^{280,1} G. Davies,^{280,1} A. De Wit,^{280,1} M. Delta Negra,^{280,1} P. Dunne,^{280,1} A. Elwood,^{280,1} W. Ferguson,^{280,1} J. Fulcher,^{280,1} D. Futyan,^{280,1} G. Hall,^{280,1} G. Iles,^{280,1} G. Karapostoli,^{280,1} M. Kenzie,^{280,1} R. Lane,^{280,1} R. Lucas,^{280,1} L. Lyons,^{280,1} A.-M. Magnan,^{280,1} S. Malik,^{280,1} J. Nash,^{280,1} A. Nikitenko,^{280,1} J. Pela,^{280,1} M. Pesaresi,^{280,1} K. Petridis,^{280,1} D. M. Raymond,^{280,1} A. Richards,^{280,1} A. Rose,^{280,1} C. Seez,^{280,1} P. Sharp,^{280,1} A. Tapper,^{280,1} K. Uchida,^{280,1} M. Vazquez Acosta,^{280,1} T. Verdec,^{280,1} S. C. Zenz,^{280,1} J. E. Cole,^{280,1} R. Hobson,^{280,1} A. Khan,^{280,1} P. Kyberd,^{280,1} D. Leggett,^{280,1} D. Leslie,^{280,1} I. D. Reid,^{280,1} P. Symonds,^{280,1} L. Teodorescu,^{280,1} M. Turner,^{280,1} A. Borzou,^{280,1} J. Dittmar,^{280,1} K. Hatakeyama,^{280,1} A. Kasmi,^{280,1} H. Liu,^{280,1} N. Pastika,^{280,1} O. Charaf,^{280,1} S. J. Cooper,^{280,1} C. H. Henderson,^{280,1} P. Rumerio,^{280,1} A. Avetisyan,^{280,1} T. Bose,^{280,1} C. Fantasia,^{280,1} D. Gaster,^{280,1} P. Lawson,^{280,1} D. Rankin,^{280,1} C. Richardson,^{280,1} J. Rohl,^{280,1} J. St. John,^{280,1} L. Sulak,^{280,1} D. Zou,^{280,1} J. Alimena,^{280,1} E. Berry,^{280,1} S. Bhattacharya,^{280,1} D. Cutts,^{280,1} N. Dhingra,^{280,1} A. Ferapontov,^{280,1} A. Garabedian,^{280,1} U. Heintz,^{280,1} E. Laird,^{280,1} G. Landsberg,^{280,1} Z. Mao,^{280,1} M. Narain,^{280,1} S. Sagiv,^{280,1} T. Senthuprasath,^{280,1} R. Breedon,^{280,1} G. Breto,^{280,1} M. Calderon De La Barca Sanchez,^{280,1} S. Chauhan,^{280,1} M. Chertok,^{280,1} J. Conway,^{280,1} R. Conway,^{280,1} P. T. Cox,^{280,1} R. Erbacher,^{280,1} M. Gardner,^{280,1} W. Ko,^{280,1} R. Lander,^{280,1} M. Mulhearn,^{280,1} D. Pellett,^{280,1} J. Pilot,^{280,1} F. Ricci-Tam,^{280,1} S. Shalhout,^{280,1} J. Smith,^{280,1} M. Squires,^{280,1} D. Stolp,^{280,1} M. Tripathi,^{280,1}

- S. Wilbur,^{301,5} R. Yohay,^{301,5} R. Cousins,^{302,1} P. Everaerts,^{302,1} C. Farrell,^{302,1} J. Hauser,^{302,1} M. Ignatenko,^{302,1}
 G. Rakness,^{302,1} D. Saltzberg,^{302,1} E. Takasugi,^{302,1} V. Valusek,^{302,1} M. Weber,^{302,1} K. Burt,^{303,1} R. Clare,^{303,1} J. Ellison,^{303,1}
 J. W. Gary,^{303,1} G. Hansson,^{303,1} J. Heilmann,^{303,1} M. Iovva Rikova,^{303,1} P. Janard,^{303,1} E. Kennedy,^{303,1} F. Lacroix,^{303,1}
 O. R. Long,^{303,1} A. Luthra,^{303,1} M. Malberti,^{303,1} M. Olmedo Negrete,^{303,1} A. Shrimivas,^{303,1} S. Sumowidagdo,^{303,1}
 H. Wei,^{303,1} S. Wimpenny,^{303,1} J. G. Branson,^{304,1} G. B. Cerati,^{304,1} S. Cittolin,^{304,1} R. T. D'Agnolet,^{304,1} A. Holzner,^{304,1}
 R. Kelley,^{304,1} D. Klein,^{304,1} J. Letts,^{304,1} I. Macneill,^{304,1} D. Olivito,^{304,1} S. Padhi,^{304,1} M. Pieri,^{304,1} M. Sani,^{304,1}
 V. Sharma,^{304,1} S. Simon,^{304,1} M. Tadel,^{304,1} Y. Tu,^{304,1} A. Vartak,^{304,1} S. Wasserbaech,^{304,1} C. Welke,^{304,1}
 F. Würthwein,^{304,1} A. Yagil,^{304,1} G. Zevi Delta Porta,^{304,1} D. Barge,^{305,1} J. Bradmiller-Feld,^{305,1} C. Campagnari,^{305,1}
 A. Dishaw,^{305,1} V. Dutta,^{305,1} K. Flowers,^{305,1} M. Franco Sevilla,^{305,1} P. Geffert,^{305,1} C. George,^{305,1} F. Golf,^{305,1}
 L. Gouskos,^{305,1} J. Gran,^{305,1} J. Incandela,^{305,1} C. Justus,^{305,1} N. Mccoll,^{305,1} S. D. Mullin,^{305,1} J. Richman,^{305,1} D. Stuart,^{305,1}
 I. Suarez,^{305,1} W. To,^{305,1} C. West,^{305,1} J. Yoo,^{305,1} D. Anderson,^{306,1} A. Apresyan,^{306,1} A. Bornheim,^{306,1} J. Bunn,^{306,1}
 Y. Chen,^{306,1} J. Duarte,^{306,1} A. Mott,^{306,1} H. B. Newman,^{306,1} C. Penna,^{306,1} M. Pierini,^{306,1} M. Spiropulu,^{306,1}
 J. R. Litzner,^{307,1} Paulin,^{307,1} S. Xie,^{306,1} R. Y. Zhu,^{306,1} V. Azzolini,^{307,1} A. Calamia,^{307,1} B. Carlson,^{307,1} T. Ferguson,^{307,1}
 Y. Iiyama,^{308,1} Paulin,^{307,1} J. Russ,^{307,1} M. Sun,^{307,1} H. Vogel,^{307,1} J. P. Cumalat,^{308,1} W. T. Ford,^{308,1}
 A. Gaz,^{308,1} F. Jensen,^{308,1} A. Johnson,^{308,1} M. Krohn,^{308,1} T. Mulholland,^{308,1} U. Nauenberg,^{308,1} J. G. Smith,^{308,1}
 K. Stenson,^{308,1} S. R. Wagner,^{308,1} J. Alexander,^{309,1} A. Chatterjee,^{309,1} J. Chaves,^{309,1} J. Chu,^{309,1} S. Dittmer,^{309,1}
 N. Eggert,^{309,1} N. Mirman,^{309,1} G. Nicolas Kaufman,^{309,1} J. R. Patterson,^{309,1} A. Rinkevicius,^{309,1} A. Ryd,^{309,1}
 L. Skinnari,^{309,1} L. Sofoff,^{309,1} W. Sun,^{309,1} S. M. Tan,^{309,1} W. D. Teo,^{309,1} J. Thom,^{309,1} J. Thompson,^{309,1} J. Tucker,^{309,1}
 Y. Weng,^{309,1} P. Watiach,^{309,1} S. Abdulai,^{310,1} M. Albrow,^{310,1} J. Anderson,^{310,1} G. Apollinaris,^{310,1} L. A. T. Bauerdick,^{310,1}
 A. Beretvas,^{310,1} J. Berryhill,^{310,1} P. C. Bhagat,^{310,1} G. Bella,^{310,1} K. Burkett,^{310,1} J. N. Butler,^{310,1} H. W. K. Cheung,^{310,1}
 F. Chlebana,^{310,1} S. Chang,^{310,1} V. D. Elvira,^{310,1} I. Fisk,^{310,1} J. Freeman,^{310,1} E. Gottschalk,^{310,1} L. Gray,^{310,1} D. Green,^{310,1}
 S. Grünendahl,^{310,1} O. Gutsche,^{310,1} J. Hanlon,^{310,1} D. Hare,^{310,1} R. M. Harris,^{310,1} J. Hirschauer,^{310,1} B. Hooberman,^{310,1}
 Z. Hu,^{310,1} S. Jindariani,^{310,1} M. Johnson,^{310,1} U. Joshi,^{310,1} A. W. Jung,^{310,1} B. Klime,^{310,1} B. Kreis,^{310,1} S. Kwan,^{310,1}
 S. Lammel,^{310,1} J. Linacre,^{310,1} D. Lincoln,^{310,1} T. Liu,^{310,1} R. Lopes De Sa,^{310,1} J. Lytken,^{310,1}
 K. Maeshima,^{310,1} J. M. Marrapino,^{310,1} V. I. Martinez,^{310,1} Outschorn,^{310,1} S. Maruyama,^{310,1} D. Mason,^{310,1} P. McBride,^{310,1}
 P. Merkel,^{310,1} K. Mishra,^{310,1} S. Mrenna,^{310,1} S. Nahm,^{310,1} C. Newman-Holmes,^{310,1} V. O'Dell,^{310,1} O. Prokofyev,^{310,1}
 E. Sexton-Kennedy,^{310,1} A. Soha,^{310,1} W. J. Spalding,^{310,1} L. Spiegel,^{310,1} L. Taylor,^{310,1} S. Tkaczy,^{310,1} N. V. Tran,^{310,1}
 L. Uplegger,^{310,1} E. W. Vaandering,^{310,1} C. Vernieri,^{310,1} M. Verzocchi,^{310,1} R. Vidal,^{310,1} A. Whitehead,^{310,1} F. Yang,^{310,1}
 H. Yin,^{310,1} D. Acosta,^{310,1} P. Avery,^{311,1} P. Bortignon,^{311,1} D. Bourikoff,^{311,1} A. Carnes,^{311,1} M. Carver,^{311,1} D. Curry,^{311,1}
 S. Das,^{311,1} G. P. Di Giovanni,^{311,1} R. D. Field,^{311,1} P. Fisher,^{311,1} L. K. Furic,^{311,1} J. Hugon,^{311,1} J. Konigsberg,^{311,1}
 A. Korytov,^{311,1} J. F. Low,^{311,1} P. Ma,^{311,1} K. Matchev,^{311,1} H. Mei,^{311,1} P. Milennovic,^{311,1} G. Mitselmanker,^{311,1}
 L. Muniz,^{311,1} D. Rank,^{311,1} L. Shchukina,^{311,1} G. Martinez,^{311,1} M. Snowball,^{311,1} D. Sperka,^{311,1} S. J. Wang,^{311,1} J. Yeltos,^{311,1}
 S. Hewamanage,^{311,1} S. Linn,^{311,1} P. Markowitz,^{311,1} K. Martinec,^{311,1} L. J. Rodriguez,^{311,1} A. Ackert,^{311,1} R. Adams,^{311,1}
 T. Adams,^{311,1} A. Askew,^{311,1} J. Bochenek,^{311,1} B. Diamond,^{311,1} J. Haas,^{311,1} S. Hapogian,^{311,1} V. Hapogian,^{311,1}
 K. F. Johnson,^{311,1} A. Khatiwadi,^{311,1} H. Prosper,^{311,1} S. Veeraraghavan,^{311,1} M. Weinberg,^{311,1} V. Bhopatkar,^{311,1}
 M. Hohmann,^{311,1} H. Kalakshety,^{311,1} D. Mareska-paleck,^{311,1} T. Roy,^{311,1} F. Yumiceva,^{311,1} M. R. Adams,^{311,1}
 L. Apanasevich,^{311,1} D. Berry,^{311,1} R. R. Betts,^{311,1} I. Bucimski,^{311,1} R. Cavannah,^{311,1} O. Evdokimov,^{311,1}
 L. Gauthier,^{311,1} C. E. Gerber,^{311,1} D. J. Hofman,^{311,1} P. Kurt,^{311,1} C. O'Brien,^{311,1} D. J. Sandoval Gonzalez,^{311,1}
 C. Silkworth,^{311,1} P. Turner,^{311,1} N. Varelas,^{311,1} Z. Wu,^{311,1} M. Zakaria,^{311,1} B. Bilki,^{311,1} W. Clara,^{311,1} K. Dilisiz,^{311,1}
 S. Durgut,^{311,1} P. R. Gundrajuja,^{311,1} M. Haytmyradov,^{311,1} V. Khristensen,^{311,1} J.-P. Merlo,^{311,1} H. Memerkaya,^{311,1}
 A. Mestvirishvili,^{311,1} J. Moeller,^{311,1} J. Nachtman,^{311,1} H. Ogul,^{311,1} Y. Onel,^{311,1} F. Ozok,^{311,1} A. Penzo,^{311,1}
 C. Snyder,^{311,1} P. Tan,^{311,1} E. Tiras,^{311,1} J. Wetzel,^{311,1} K. Yi,^{311,1} I. Anderson,^{311,1} B. A. Barnett,^{311,1} B. Blumenfeld,^{311,1}
 D. Fehling,^{311,1} L. Feng,^{311,1} A. V. Gritsan,^{311,1} P. Makrisovic,^{311,1} C. Martin,^{311,1} K. Nash,^{311,1} M. Osherson,^{311,1}
 M. Swartz,^{311,1} M. Xiao,^{311,1} Y. Xin,^{311,1} P. Baringer,^{311,1} A. Bean,^{311,1} G. Benelli,^{311,1} C. Bruner,^{311,1} J. Gray,^{311,1}
 R. P. Kenny III,^{311,1} D. Majumder,^{311,1} M. Malek,^{311,1} M. Murray,^{311,1} D. Noonan,^{311,1} S. Sanders,^{311,1} R. Stringer,^{311,1}
 Q. Wang,^{311,1} J. S. Wood,^{311,1} I. Chakaberia,^{311,1} A. Ivanov,^{311,1} K. Kaadze,^{311,1} S. Khalil,^{311,1} M. Makouski,^{311,1}
 Y. Maravin,^{311,1} L. K. Saini,^{311,1} N. Skhirtladze,^{311,1} I. Svintradze,^{311,1} S. Toda,^{311,1} D. Lange,^{311,1} F. Rebassoo,^{311,1}
 D. Wright,^{311,1} C. Anelli,^{311,1} A. Baden,^{311,1} O. Baron,^{311,1} A. Belloni,^{311,1} B. Calvert,^{311,1} S. C. Eno,^{311,1} C. Ferraioli,^{311,1}
 J. A. Gomez,^{311,1} N. J. Hadley,^{311,1} S. Jabeen,^{311,1} R. G. Kellogg,^{311,1} T. Kolberg,^{311,1} J. Kunkle,^{311,1} Y. Lu,^{311,1}

- A. C. Mignerey,^{321,4} K. Pedro,^{321,4} Y. H. Shin,^{321,4} A. Skuja,^{321,4} M. B. Tonjes,^{321,4} S. C. Tonwar,^{321,4} A. Apyan,^{322,4} R. Barberi,^{322,4} A. Baty,^{322,4} K. Bierwagen,^{322,4} S. Brandt,^{322,4} W. Busza,^{322,4} I. A. Cali,^{322,4} L. Di Matteo,^{322,4} G. Gomez Ceballos,^{322,4} M. Goncharov,^{322,4} D. Gulhan,^{322,4} G. M. Innocenti,^{322,4} M. Klute,^{322,4} D. Kovalsky,^{322,4} Y. S. Lai,^{322,4} Y.-J. Lee,^{322,4} A. Levin,^{322,4} P. D. Luckey,^{322,4} C. Mcginn,^{322,4} X. Niu,^{322,4} C. Paus,^{322,4} D. Ralph,^{322,4} C. Roland,^{322,4} G. Roland,^{322,4} G. S. F. Stephens,^{322,4} K. Sumorok,^{322,4} M. Varma,^{322,4} D. Velicanu,^{322,4} J. Veverka,^{322,4} J. Wang,^{322,4} T. W. Wang,^{322,4} B. Wyslouch,^{322,4} M. Yang,^{322,4} V. Zhukova,^{322,4} B. Dahmes,^{323,4} A. Finkel,^{323,4} A. Gude,^{323,4} P. Hansen,^{323,4} S. Kalafut,^{323,4} S. C. Kao,^{323,4} K. Klapoetke,^{323,4} Y. Kubota,^{323,4} Z. Lesko,^{323,4} J. Mans,^{323,4} S. Nourbakhsh,^{323,4} N. Rückstuhl,^{323,4} R. Rusack,^{323,4} N. Tambe,^{323,4} J. Turkevitch,^{323,4} J. G. Acosta,^{324,4} S. Oliveros,^{324,4} E. Avdeeva,^{325,4} K. Bloom,^{325,4} S. Bose,^{325,4} D. R. Claes,^{325,4} A. Dominguez,^{325,4} C. Fangmeier,^{325,4} R. Gonzalez Suarez,^{325,4} K. Kamaleddin,^{325,4} J. Keller,^{325,4} D. Knollton,^{325,4} I. Kravchenko,^{325,4} J. Lazo-Flores,^{325,4} F. Meier,^{325,4} J. Monroe,^{325,4} F. Ratnikow,^{325,4} J. E. Siado,^{325,4} G. R. Snow,^{325,4} M. Alyari,^{326,4} J. Dolen,^{326,4} J. George,^{326,4} A. Godshalk,^{326,4} I. Iashvili,^{326,4} J. Kaisen,^{326,4} A. Kharchilava,^{326,4} A. Kumar,^{326,4} S. Rappoccio,^{326,4} G. Alversen,^{327,4} E. Barbeis,^{327,4} D. Baumgartel,^{327,4} M. Chasco,^{327,4} A. Hortingtham,^{327,4} A. Massironi,^{327,4} D. M. Morse,^{327,4} D. Nash,^{327,4} T. Orimoto,^{327,4} R. Teixeira De Lima,^{327,4} D. Trocino,^{327,4} R.-J. Wang,^{327,4} D. Wood,^{327,4} J. Zhang,^{327,4} K. A. Hahn,^{328,4} A. Kubik,^{328,4} N. Mucia,^{328,4} N. Odell,^{328,4} B. Pollack,^{328,4} A. Poznyakov,^{328,4} M. Schmitt,^{328,4} S. Stoynev,^{328,4} K. Sung,^{328,4} M. Trovato,^{328,4} M. Velasco,^{328,4} S. Won,^{328,4} A. Brinkerhoff,^{329,4} N. Dev,^{329,4} M. Hildreth,^{329,4} C. Jessop,^{329,4} D. J. Karmgard,^{329,4} N. Kellams,^{329,4} K. Lamont,^{329,4} S. Lynch,^{329,4} N. Marinelli,^{329,4} F. Meng,^{329,4} C. Mueller,^{329,4} Y. Musienko,^{329,4} T. Pearson,^{329,4} M. Planer,^{329,4} R. Ruchti,^{329,4} S. Smith,^{329,4} N. Valla,^{329,4} M. Wayne,^{329,4} M. Wolf,^{329,4} A. Woodard,^{330,4} L. Antonelli,^{330,4} J. Brinson,^{330,4} B. Bylsma,^{330,4} L. S. Durkin,^{330,4} S. Flowers,^{330,4} A. Hart,^{330,4} C. Hill,^{330,4} R. Hughes,^{330,4} K. Kotov,^{330,4} T. Y. Liang,^{330,4} B. Liu,^{330,4} W. Luo,^{330,4} D. Puigh,^{330,4} M. Rodenburg,^{330,4} B. L. Winer,^{330,4} H. W. Wilson,^{330,4} O. Driga,^{331,4} P. Elmer,^{331,4} J. Hardenbrook,^{331,4} P. Hebdon,^{331,4} S. A. Koay,^{331,4} P. Lujan,^{331,4} D. Marlow,^{331,4} T. Medvedeva,^{331,4} M. Mooney,^{331,4} J. Olsen,^{331,4} C. Palmer,^{331,4} P. Piroue,^{331,4} X. Quan,^{331,4} H. Saka,^{331,4} D. Stickland,^{331,4} C. Tully,^{331,4} J. S. Werner,^{331,4} A. Zuranski,^{331,4} V. E. Barnes,^{332,4} D. Benedetti,^{332,4} D. Bortoletto,^{332,4} L. Gutay,^{332,4} K. Jha,^{332,4} M. Jones,^{332,4} K. Jung,^{332,4} M. Kress,^{332,4} N. Leonardo,^{332,4} D. H. Miller,^{332,4} N. Neumeister,^{332,4} F. Primavera,^{332,4} B. C. Radburn-Smith,^{332,4} X. Shi,^{332,4} T. Shipsey,^{332,4} D. Silver,^{332,4} J. Sun,^{332,4} A. Svatikovsky,^{332,4} F. Wang,^{332,4} W. Xie,^{332,4} L. Xu,^{332,4} J. Zablocki,^{332,4} J. Stupak,^{333,4} A. Adair,^{334,4} B. Akgun,^{334,4} Z. Chen,^{334,4} K. M. Ecklund,^{334,4} F. J. M. Geurts,^{334,4} M. Guibal,^{334,4} W. Li,^{334,4} B. Michlin,^{334,4} M. Northup,^{334,4} B. P. Padley,^{334,4} R. Redjimi,^{334,4} J. Roberts,^{334,4} J. Rorie,^{334,4} Z. Tu,^{334,4} J. Zabel,^{334,4} B. Beitchart,^{335,4} A. Bodek,^{335,4} P. Barbour,^{335,4} R. Demina,^{335,4} Y. Eshaq,^{335,4} T. Ferbel,^{335,4} M. Galanti,^{335,4} A. Garcia-Bellido,^{335,4} P. Goldenzweig,^{335,4} J. Han,^{335,4} A. Harel,^{335,4} O. Hindrichs,^{335,4} C. Khukhunashvili,^{335,4} G. Petrillo,^{335,4} M. Verzetti,^{335,4} L. Demortier,^{336,4} S. Arora,^{337,4} A. Barker,^{337,4} J. P. Chou,^{337,4} C. Contreras-Campana,^{337,4} E. Contreras-Campana,^{337,4} D. Duggan,^{337,4} D. Ferencz,^{337,4} Y. Gershtein,^{337,4} R. Gray,^{337,4} E. Halkiadakis,^{337,4} D. Hidas,^{337,4} E. Hughes,^{337,4} Y. Kaplan,^{337,4} R. Kumawalkam-Elayavalli,^{337,4} A. Lath,^{337,4} S. Panwalkar,^{337,4} M. Park,^{337,4} S. Salur,^{337,4} S. Schnetzer,^{337,4} D. Shefield,^{337,4} S. Somalwar,^{337,4} R. Stone,^{337,4} S. Thomas,^{337,4} P. Thomassen,^{337,4} M. Walker,^{337,4} M. Woerner,^{338,4} G. Riley,^{338,4} K. Rose,^{338,4} S. Spanier,^{338,4} A. York,^{338,4} O. Bouhal,^{339,4} A. Castaneda Hernandez,^{339,4} M. Dalchenko,^{339,4} M. De Mattia,^{339,4} A. Delgado,^{339,4} S. Dildick,^{339,4} R. Eusebi,^{339,4} W. Flanagan,^{339,4} J. Gilmore,^{339,4} T. Kamon,^{339,4} V. Krutelyov,^{339,4} M. Montalvo,^{339,4} R. Mueller,^{339,4} I. Ospisoven,^{339,4} Y. Pakhotin,^{339,4} R. Patel,^{339,4} A. Perloff,^{339,4} J. Roe,^{339,4} A. Rose,^{339,4} A. Safonov,^{339,4} A. Tatarinov,^{339,4} K. A. Ulmer,^{339,4} N. Akchurin,^{340,4} C. Cowden,^{340,4} J. Damgov,^{340,4} C. Dragoiu,^{340,4} P. R. Duderio,^{340,4} J. Falkner,^{340,4} S. Kunori,^{340,4} K. Lamichhane,^{340,4} S. W. Lee,^{340,4} T. Libeiro,^{340,4} S. Undleeb,^{340,4} I. Volobouev,^{340,4} E. Appelt,^{341,4} A. G. Delanomy,^{341,4} S. Greene,^{341,4} A. Gurrola,^{341,4} R. Janjan,^{341,4} W. Johns,^{341,4} C. Maguire,^{341,4} Y. Mao,^{341,4} A. Melo,^{341,4} P. Sheldon,^{341,4} B. Snook,^{341,4} S. Tuo,^{341,4} J. Velkovska,^{341,4} Q. Xu,^{341,4} M. W. Arenton,^{342,4} S. Bouille,^{342,4} B. Cox,^{342,4} B. Francis,^{342,4} J. Goodell,^{342,4} R. Hirosky,^{342,4} A. Ledovskoy,^{342,4} H. Li,^{342,4} C. Lin,^{342,4} C. Neu,^{342,4} E. Wolfe,^{342,4} J. Wood,^{342,4} F. Xia,^{342,4} C. Clarke,^{343,4} R. Harr,^{343,4} P. E. Karchin,^{343,4} C. Kottachchi Kankanaage Don,^{343,4} P. Lamichhane,^{343,4} J. Sturdy,^{343,4} D. A. Belknap,^{344,4} D. Carlsmith,^{344,4} M. Cepeda,^{344,4} A. Christian,^{344,4} S. Daus,^{344,4} J. Dodd,^{344,4} S. Duric,^{344,4} E. Fries,^{344,4} B. Gomber,^{344,4} R. Hall-Wilton,^{344,4} M. Herndon,^{344,4} A. Hervé,^{344,4} P. Klabbens,^{344,4} A. Lanaro,^{344,4} A. Levine,^{344,4} K. Long,^{344,4} R. Loveless,^{344,4} A. Mohapatra,^{344,4} I. Ojalvo,^{344,4} T. Perry,^{344,4} G. A. Pierro,^{344,4} G. Polese,^{344,4} L. Ross,^{344,4} T. Ruggles,^{344,4} T. Sarangi,^{344,4} A. Savin,^{344,4} A. Sharma,^{344,4} N. Smith,^{344,4} W. H. Smith,^{344,4} D. Taylor,^{344,4} and N. Woods^{344,4}

(ATLAS Collaboration)[†]
(CMS Collaboration)[‡]

- ¹Department of Physics, University of Adelaide, Adelaide, Australia
²Physics Department, SUNY Albany, Albany, New York, USA
³Department of Physics, University of Alberta, Edmonton, Alberta, Canada
⁴Department of Physics, Ankara University, Ankara, Turkey
⁵Istanbul Aydin University, Istanbul, Turkey
⁶Division of Physics, TOBB University of Economics and Technology, Ankara, Turkey
⁷LAPP, CNRS/IN2P3 and Université Savoie Mont Blanc, Annecy-le-Vieux, France
⁸High Energy Physics Division, Argonne National Laboratory, Argonne, Illinois, USA
⁹Department of Physics, University of Arizona, Tucson, Arizona, USA
¹⁰Department of Physics, The University of Texas at Arlington, Arlington, Texas, USA
¹¹Physics Department, University of Athens, Athens, Greece
¹²Physics Department, National Technical University of Athens, Zografou, Greece
¹³Institut of Physics, Azerbaijan Academy of Sciences, Baku, Azerbaijan
¹⁴Institut de Física d'Altes Energies and Departament de Física de la Universitat Autònoma de Barcelona, Barcelona, Spain
¹⁵Institute of Physics, University of Belgrade, Belgrade, Serbia
¹⁶Department for Physics and Technology, University of Bergen, Bergen, Norway
¹⁷Albert Einstein Center for Fundamental Physics and Laboratory for High Energy Physics, University of Bern, Bern, Switzerland
¹⁸School of Physics and Astronomy, University of Birmingham, Birmingham, United Kingdom
¹⁹Department of Physics, Boğaziçi University, Istanbul, Turkey
²⁰Department of Physics, Dogaç University, Istanbul, Turkey
²¹Department of Physics Engineering, Gaziantepe University, Gaziantep, Turkey
²²INFN Sezione di Bologna, Bologna, Italy
²³Dipartimento di Fisica e Astronomia, Università di Bologna, Bologna, Italy
²⁴Physikalisches Institut, University of Bonn, Bonn, Germany
²⁵Department of Physics, Boston University, Boston, Massachusetts, USA
²⁶Department of Physics, Brandeis University, Waltham, Massachusetts, USA
²⁷Universidade Federal do Rio De Janeiro COPPE/EEIP, Rio de Janeiro, Brazil
²⁸Electrical Circuits Department, Federal University of Juiz de Fora (UFJF), Juiz de Fora, Brazil
²⁹Federal University of Sao Joao del Rei (UFSJ), Sao Joao del Rei, Brazil
³⁰Instituto de Física, Universidade de São Paulo, São Paulo, Brazil
³¹Physics Department, Brookhaven National Laboratory, Upton, New York, USA
³²National Institute of Physics and Nuclear Engineering, Bucharest, Romania
³³National Institute for Research and Development of Isotopic and Molecular Technologies, Physics Department, Cluj Napoca, Romania
³⁴University Politehnica Bucharest, Bucharest, Romania
³⁵West University in Timisoara, Timisoara, Romania
³⁶Departamento de Física, Universidad de Buenos Aires, Buenos Aires, Argentina
³⁷Cavendish Laboratory, University of Cambridge, Cambridge, United Kingdom
³⁸Department of Physics, Carleton University, Ottawa, Ontario, Canada
³⁹CERN, Geneva, Switzerland
⁴⁰Enrico Fermi Institute, University of Chicago, Chicago, Illinois, USA
⁴¹Departamento de Física, Pontificia Universidad Católica de Chile, Santiago, Chile
⁴²Departamento de Física, Universidad Técnica Federico Santa María, Valparaíso, Chile
⁴³Institute of High Energy Physics, Chinese Academy of Sciences, Beijing, China
⁴⁴Department of Modern Physics, University of Science and Technology of China, Anhui, China
⁴⁵Department of Physics, Nanjing University, Jiangsu, China
⁴⁶School of Physics, Shandong University, Shandong, China
⁴⁷Department of Physics and Astronomy, Shanghai Key Laboratory for Particle Physics and Cosmology, Shanghai Jiao Tong University, Shanghai, China
⁴⁸Physics Department, Tsinghua University, Beijing 100084, China
⁴⁹Laboratoire de Physique Corpusculaire, Clermont Université and Université Blaise Pascal and CNRS/IN2P3, Clermont-Ferrand, France
⁵⁰Nevis Laboratory, Columbia University, Irvington, New York, USA
⁵¹Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark

- ^{37a}INFN Gruppo Collegato di Cosenza, Laboratori Nazionali di Frascati, Frascati, Italy
^{37b}Dipartimento di Fisica, Università della Calabria, Rende, Italy
- ^{38a}AGH University of Science and Technology, Faculty of Physics and Applied Computer Science, Krakow, Poland
^{38b}Marian Smoluchowski Institute of Physics, Jagiellonian University, Krakow, Poland
³⁹Institute of Nuclear Physics Polish Academy of Sciences, Krakow, Poland
⁴⁰Physics Department, Southern Methodist University, Dallas, Texas, USA
⁴¹Physics Department, University of Texas at Dallas, Richardson, Texas, USA
⁴²DESY, Hamburg, Hamburg, Germany
⁴³Institut für Experimentelle Physik IV, Technische Universität Dortmund, Dortmund, Germany
⁴⁴Institut für Kern- und Teilchenphysik, Technische Universität Dresden, Dresden, Germany
⁴⁵Department of Physics, Duke University, Durham, North Carolina, USA
⁴⁶SUPA-School of Physics and Astronomy, University of Edinburgh, Edinburgh, United Kingdom
⁴⁷INFN Laboratori Nazionali di Frascati, Frascati, Italy
⁴⁸Fakultät für Mathematik und Physik, Albert-Ludwigs-Universität Freiburg, Freiburg, Germany
⁴⁹Section de Physique, Université de Genève, Geneva, Switzerland
⁵⁰INFN Sezione di Genova, Genova, Italy
^{51b}Dipartimento di Fisica, Università di Genova, Genova, Italy
^{51c}E. Andronikashvili Institute of Physics, I. Javakhishvili Tbilisi State University, Tbilisi, Georgia
^{51d}High Energy Physics Institute, Tbilisi State University, Tbilisi, Georgia
⁵²H Physikalisches Institut, Justus-Liebig-Universität Giessen, Giessen, Germany
⁵³SUPA-School of Physics and Astronomy, University of Glasgow, Glasgow, United Kingdom
⁵⁴H Physikalisches Institut, Georg-August-Universität, Göttingen, Germany
⁵⁵Laboratoire de Physique Subatomique et de Cosmologie, Université Grenoble-Alpes, CNRS/IN2P3, Grenoble, France
⁵⁶Department of Physics, Hampton University, Hampton, Virginia, USA
⁵⁷Laboratory for Particle Physics and Cosmology, Harvard University, Cambridge, Massachusetts, USA
⁵⁸Kirchhoff-Institut für Physik, Ruprecht-Karls-Universität Heidelberg, Heidelberg, Germany
⁵⁹Physikalisches Institut, Ruprecht-Karls-Universität Heidelberg, Heidelberg, Germany
^{59c}ZITI Institut für technische Informatik, Ruprecht-Karls-Universität Heidelberg, Mannheim, Germany
⁶⁰Faculty of Applied Information Science, Hiroshima Institute of Technology, Hiroshima, Japan
⁶¹Department of Physics, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong, China
⁶²Department of Physics, The University of Hong Kong, Hong Kong, China
⁶³Department of Physics, The Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong, China
⁶⁴Department of Physics, Indiana University, Bloomington, Indiana, USA
⁶⁵Institut für Astro- und Teilchenphysik, Leopold-Franzens-Universität, Innsbruck, Austria
⁶⁶University of Iowa, Iowa City, Iowa, USA
⁶⁷Department of Physics and Astronomy, Iowa State University, Ames, Iowa, USA
⁶⁸Joint Institute for Nuclear Research, JINR Dubna, Dubna, Russia
⁶⁹KEK, High Energy Accelerator Research Organization, Tsukuba, Japan
⁷⁰Graduate School of Science, Kobe University, Kobe, Japan
⁷¹Faculty of Science, Kyoto University, Kyoto, Japan
⁷²Kyoto University of Education, Kyoto, Japan
⁷³Department of Physics, Kyushu University, Fukuoka, Japan
⁷⁴Instituto de Física La Plata, Universidad Nacional de La Plata and CONICET, La Plata, Argentina
⁷⁵Physics Department, Lancaster University, Lancaster, United Kingdom
⁷⁶INFN Sezione di Lecce, Lecce, Italy
^{77b}Dipartimento di Matematica e Fisica, Università del Salento, Lecce, Italy
⁷⁸Oliver Lodge Laboratory, University of Liverpool, Liverpool, United Kingdom
⁷⁹Department of Physics, Jožef Stefan Institute and University of Ljubljana, Ljubljana, Slovenia
^{79c}School of Physics and Astronomy, Queen Mary University of London, London, United Kingdom
^{79d}Department of Physics, Royal Holloway University of London, Surrey, United Kingdom
^{79e}Department of Physics and Astronomy, University College London, London, United Kingdom
⁸⁰Louisiana Tech University, Ruston, Louisiana, USA
⁸¹Laboratoire de Physique Nucléaire et de Hautes Energies, UPMC and Université Paris-Diderot and CNRS/IN2P3, Paris, France
⁸²Fysiska institutionen, Lunds universitet, Lund, Sweden
⁸³Departamento de Física Teórica C-15, Universidad Autónoma de Madrid, Madrid, Spain
⁸⁴Institut für Physik, Universität Mainz, Mainz, Germany
^{84c}School of Physics and Astronomy, University of Manchester, Manchester, United Kingdom
⁸⁵CPPM, Aix-Marseille Université and CNRS/IN2P3, Marseille, France
⁸⁶Department of Physics, University of Massachusetts, Amherst, Massachusetts, USA
⁸⁷Department of Physics, McGill University, Montreal, Quebec, Canada

- ³³School of Physics, University of Melbourne, Victoria, Australia
³⁰Department of Physics, The University of Michigan, Ann Arbor, Michigan, USA
³⁰Department of Physics and Astronomy, Michigan State University, East Lansing, Michigan, USA
³¹Dipartimento di Fisica, Università di Milano, Milano, Italy
³²R.I. Stefanov Institute of Physics, National Academy of Sciences of Belarus, Minsk, Republic of Belarus
³³National Scientific and Educational Centre for Particle and High Energy Physics, Minsk, Republic of Belarus
³⁴Department of Physics, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA
³⁵Group of Particle Physics, University of Montreal, Montreal, Québec, Canada
³⁶P.N. Lebedev Institute of Physics, Academy of Sciences, Moscow, Russia
³⁷Institute for Theoretical and Experimental Physics (ITEP), Moscow, Russia
³⁸National Research Nuclear University MEPhI, Moscow, Russia
³⁹Skobeltsyn Institute of Nuclear Physics, M.V. Lomonosov Moscow State University, Moscow, Russia
⁴⁰Fakultät für Physik, Ludwig-Maximilians-Universität München, München, Germany
⁴⁰Max-Planck-Institut für Physik (Werner-Heisenberg-Institut), München, Germany
⁴¹Nagasaki Institute of Applied Science, Nagasaki, Japan
⁴²Graduate School of Science and Kobayashi-Maskawa Institute, Nagoya University, Nagoya, Japan
⁴³INFN Sezione di Napoli, Napoli, Italy
⁴⁴Dipartimento di Fisica, Università di Napoli, Napoli, Italy
⁴⁵Department of Physics and Astronomy, University of New Mexico, Albuquerque, New Mexico, USA
⁴⁶Institute for Mathematics, Astrophysics and Particle Physics, Radboud University Nijmegen/Nikhef, Nijmegen, Netherlands
⁴⁷Nikhef National Institute for Subatomic Physics and University of Amsterdam, Amsterdam, Netherlands
⁴⁸Department of Physics, Northern Illinois University, DeKalb, Illinois, USA
⁴⁹Budker Institute of Nuclear Physics, SB RAS, Novosibirsk, Russia
⁵⁰Department of Physics, New York University, New York, New York, USA
⁵¹The Ohio State University, Columbus, Ohio, USA
⁵²Faculty of Science, Okayama University, Okayama, Japan
⁵³Homer L. Dodge Department of Physics and Astronomy, University of Oklahoma, Norman, Oklahoma, USA
⁵⁴Department of Physics, Oklahoma State University, Stillwater, Oklahoma, USA
⁵⁵Faculty of Mathematics, University of Paderborn, Paderborn, Germany
⁵⁶Center for High Energy Physics, University of Oregon, Eugene, Oregon, USA
⁵⁷LAL, Université Paris-Sud and CNRS/IN2P3, Orsay, France
⁵⁸Graduate School of Science, Osaka University, Osaka, Japan
⁵⁹Department of Physics, University of Oslo, Oslo, Norway
⁶⁰Department of Physics, Oxford University, Oxford, United Kingdom
⁶¹INFN Sezione di Pavia, Pavia, Italy
⁶²Dipartimento di Fisica, Università di Pavia, Pavia, Italy
⁶³Department of Physics, University of Pennsylvania, Philadelphia, Pennsylvania, USA
⁶⁴National Research Centre "Kurchatov Institute" B.P.Konstantinov Petersburg Nuclear Physics Institute, St. Petersburg, Russia
⁶⁵INFN Sezione di Pisa, Pisa, Italy
⁶⁶Dipartimento di Fisica E. Fermi, Università di Pisa, Pisa, Italy
⁶⁷Department of Physics and Astronomy, University of Pittsburgh, Pittsburgh, Pennsylvania, USA
⁶⁸Laboratorio de Instrumentación e Física Experimental de Partículas-LIP, Lisboa, Portugal
⁶⁹Faculdade de Ciências, Universidade de Lisboa, Lisboa, Portugal
⁷⁰Department of Physics, University of Coimbra, Coimbra, Portugal
⁷¹Centro de Física Nuclear da Universidade de Lisboa, Lisboa, Portugal
⁷²Departamento de Física, Universidade do Minho, Braga, Portugal
⁷³Departamento de Física Teórica y del Cosmos and CAFPE, Universidad de Granada, Granada (Spain), Portugal
⁷⁴Dep. Física and CEFITEC of Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, Caparica, Portugal
⁷⁵Institute of Physics, Academy of Sciences of the Czech Republic, Praha, Czech Republic
⁷⁶Czech Technical University in Prague, Praha, Czech Republic
⁷⁷Faculty of Mathematics and Physics, Charles University in Prague, Praha, Czech Republic
⁷⁸State Research Center Institute for High Energy Physics, Protvino, Russia
⁷⁹Particle Physics Department, Rutherford Appleton Laboratory, Didcot, United Kingdom
⁸⁰INFN Sezione di Roma, Roma, Italy
⁸¹Dipartimento di Fisica, Sapienza Università di Roma, Roma, Italy
⁸²INFN Sezione di Roma Tor Vergata, Roma, Italy
⁸³Dipartimento di Fisica, Università di Roma Tor Vergata, Roma, Italy
⁸⁴INFN Sezione di Roma Tre, Roma, Italy
⁸⁵Dipartimento di Matematica e Fisica, Università Roma Tre, Roma, Italy

- ^{135a}Faculté des Sciences Ain Chock, Réseau Universitaire de Physique des Hautes Energies-Université Hassan II, Casablanca, Morocco
- ^{135b}Centre National de l'Energie des Sciences Techniques Nucléaires, Rabat, Morocco
- ^{135c}Faculté des Sciences Semlalia, Université Cadi Ayyad, LPHEA-Marrakech, Morocco
- ^{135d}Faculté des Sciences, Université Mohamed Premier et LPTPM, Oujda, Morocco
- ^{135e}Faculté des sciences, Université Mohammed V-Agdal, Rabat, Morocco
- ¹³⁶DSM/IRFU (Institut de Recherches sur les Lois Fondamentales de l'Univers), CEA Saclay (Commissariat à l'Energie Atomique et aux Energies Alternatives), Gif-sur-Yvette, France
- ¹³⁷Santa Cruz Institute for Particle Physics, University of California, Santa Cruz, Santa Cruz, California, USA
- ¹³⁸Department of Physics, University of Washington, Seattle, Washington, USA
- ¹³⁹Department of Physics and Astronomy, University of Sheffield, Sheffield, United Kingdom
- ¹⁴⁰Department of Physics, Shinshu University, Nagano, Japan
- ¹⁴¹Fachbereich Physik, Universität Siegen, Siegen, Germany
- ¹⁴²Department of Physics, Simon Fraser University, Burnaby, British Columbia, Canada
- ¹⁴³SLAC National Accelerator Laboratory, Stanford, California, USA
- ¹⁴⁴Faculty of Mathematics, Physics & Informatics, Comenius University, Bratislava, Slovak Republic
- ^{144b}Department of Subnuclear Physics, Institute of Experimental Physics of the Slovak Academy of Sciences, Košice, Slovak Republic
- ¹⁴⁵Department of Physics, University of Cape Town, Cape Town, South Africa
- ¹⁴⁶Department of Physics, University of Johannesburg, Johannesburg, South Africa
- ¹⁴⁸School of Physics, University of the Witwatersrand, Johannesburg, South Africa
- ¹⁴⁹Department of Physics, Stockholm University, Sweden
- ^{149b}The Oskar Klein Centre, Stockholm, Sweden
- ¹⁴⁷Physics Department, Royal Institute of Technology, Stockholm, Sweden
- ^{148b}Departments of Physics & Astronomy, Stony Brook University, Stony Brook, New York, USA
- ^{149b}Department of Physics and Astronomy, University of Sussex, Brighton, United Kingdom
- ¹⁵⁰School of Physics, University of Sydney, Sydney, Australia
- ¹⁵¹Institute of Physics, Academia Sinica, Taipei, Taiwan
- ¹⁵²Department of Physics, Technion - Israel Institute of Technology, Haifa, Israel
- ¹⁵³Raymond and Beverly Sackler School of Physics and Astronomy, Tel Aviv University, Tel Aviv, Israel
- ¹⁵⁴Department of Physics, Aristotle University of Thessaloniki, Thessaloniki, Greece
- ¹⁵⁵International Center for Elementary Particle Physics and Department of Physics, The University of Tokyo, Tokyo, Japan
- ¹⁵⁶Graduate School of Science and Technology, Tokyo Metropolitan University, Tokyo, Japan
- ¹⁵⁷Department of Physics, Tokyo Institute of Technology, Tokyo, Japan
- ¹⁵⁸Department of Physics, University of Toronto, Toronto, Ontario, Canada
- ¹⁵⁹TRIUMF, Vancouver, British Columbia, Canada
- ^{159b}Department of Physics and Astronomy, York University, Toronto, Ontario, Canada
- ¹⁶⁰Faculty of Pure and Applied Sciences, University of Tsukuba, Tsukuba, Japan
- ¹⁶¹Department of Physics and Astronomy, Tufts University, Medford, Massachusetts, USA
- ¹⁶²Centro de Investigaciones, Universidad Antonio Narino, Bogota, Colombia
- ¹⁶³Department of Physics and Astronomy, University of California Irvine, Irvine, California, USA
- ¹⁶⁴INFN Gruppo Collegato di Udine, Sezione di Trieste, Udine, Italy
- ^{164b}ICTP, Trieste, Italy
- ^{164c}Dipartimento di Chimica, Fisica e Ambiente, Università di Udine, Udine, Italy
- ¹⁶⁵Department of Physics, University of Illinois, Urbana, Illinois, USA
- ¹⁶⁶Department of Physics and Astronomy, University of Uppsala, Uppsala, Sweden
- ¹⁶⁷Instituto de Física Corpuscular (IFIC) y Departamento de Física Atómica, Molecular y Nuclear y Departamento de Ingeniería Electrónica y Instituto de Microelectrónica de Barcelona (IMB-CNM), University of Valencia and CSIC, Valencia, Spain
- ¹⁶⁸Department of Physics, University of British Columbia, Vancouver, British Columbia, Canada
- ¹⁶⁹Department of Physics and Astronomy, University of Victoria, Victoria, British Columbia, Canada
- ¹⁷⁰Department of Physics, University of Warwick, Coventry, United Kingdom
- ¹⁷¹Waseda University, Tokyo, Japan
- ¹⁷²Department of Particle Physics, The Weizmann Institute of Science, Rehovot, Israel
- ¹⁷³Department of Physics, University of Wisconsin, Madison, Wisconsin, USA
- ¹⁷⁴Fakultät für Physik und Astronomie, Julius-Maximilians-Universität, Würzburg, Germany
- ¹⁷⁵Fachbereich C Physik, Bergische Universität Wuppertal, Wuppertal, Germany
- ¹⁷⁶Department of Physics, Yale University, New Haven, Connecticut, USA
- ¹⁷⁷Yerevan Physics Institute, Yerevan, Armenia
- ¹⁷⁸Centre de Calcul de l'Institut National de Physique Nucléaire et de Physique des Particules (IN2P3), Villeurbanne, France
- ¹⁷⁹Yerevan Physics Institute, Yerevan, Armenia
- ¹⁸⁰Institut für Hochenergiephysik der OeAW, Wien, Austria

- ¹⁸¹National Centre for Particle and High Energy Physics, Minsk, Belarus
¹⁸²Universiteit Antwerpen, Antwerpen, Belgium
¹⁸³Vrije Universiteit Brussel, Brussel, Belgium
¹⁸⁴Université Libre de Bruxelles, Bruxelles, Belgium
¹⁸⁵Ghent University, Ghent, Belgium
¹⁸⁶Université Catholique de Louvain, Louvain-la-Neuve, Belgium
¹⁸⁷Université de Montréal, Montréal, Québec, Canada
¹⁸⁸Centro Brasileiro de Pesquisas Físicas, Rio de Janeiro, Brazil
¹⁸⁹Universidade do Estado do Rio de Janeiro, Rio de Janeiro, Brazil
^{190a}Universidade Estadual Paulista, São Paulo, Brazil
^{190b}Universidade Federal do ABC, São Paulo, Brazil
¹⁹¹Institute for Nuclear Research and Nuclear Energy, Sofia, Bulgaria
¹⁹²University of Sofia, Sofia, Bulgaria
¹⁹³Institute of High Energy Physics, Beijing, China
¹⁹⁴State Key Laboratory of Nuclear Physics and Technology, Peking University, Beijing, China
¹⁹⁵Universidad de Los Andes, Bogotá, Colombia
¹⁹⁶University of Split, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, Split, Croatia
¹⁹⁷University of Split, Faculty of Science, Split, Croatia
¹⁹⁸Institute Rudjer Bosković, Zagreb, Croatia
¹⁹⁹University of Cyprus, Nicosia, Cyprus
²⁰⁰Charles University, Prague, Czech Republic
²⁰¹Academy of Scientific Research and Technology of the Arab Republic of Egypt, Egyptian Network of High Energy Physics, Cairo, Egypt
²⁰²National Institute of Chemical Physics and Biophysics, Tallinn, Estonia
²⁰³Department of Physics, University of Helsinki, Helsinki, Finland
²⁰⁴Helsinki Institute of Physics, Helsinki, Finland
²⁰⁵Lappeenranta University of Technology, Lappeenranta, Finland
²⁰⁶DSM/IRFU, CEA/Saclay, Gif-sur-Yvette, France
²⁰⁷Laboratoire Leprince-Ringuet, Ecole Polytechnique IN2P3-CNRS, Palaiseau, France
²⁰⁸Institut Pluridisciplinaire Hubert Curien, Université de Strasbourg, Université de Haute Alsace Mulhouse, CNRS/IN2P3, Strasbourg, France
²⁰⁹Centre de Calcul de l'Institut National de Physique Nucléaire et de Physique des Particules, CNRS/IN2P3, Villeurbanne, France
²¹⁰Université de Lyon, Université Claude Bernard Lyon 1, CNRS-IN2P3, Institut de Physique Nucléaire de Lyon, Villeurbanne, France
²¹¹Institute of High Energy Physics and Informationization, Tbilisi State University, Tbilisi, Georgia
²¹²RWTH Aachen University, I. Physikalisches Institut, Aachen, Germany
²¹³RWTH Aachen University, III. Physikalisches Institut A, Aachen, Germany
²¹⁴RWTH Aachen University, III. Physikalisches Institut B, Aachen, Germany
²¹⁵Deutsches Elektronen-Synchrotron, Hamburg, Germany
²¹⁶University of Hamburg, Hamburg, Germany
²¹⁷Institut für Experimentelle Kernphysik, Karlsruhe, Germany
²¹⁸Institute of Nuclear and Particle Physics (INPP), NCSR Demokritos, Aghia Paraskevi, Greece
²¹⁹University of Athens, Athens, Greece
²²⁰University of Ioannina, Ioannina, Greece
²²¹Wigner Research Centre for Physics, Budapest, Hungary
²²²Institute of Nuclear Research ATOMKI, Debrecen, Hungary
²²³University of Debrecen, Debrecen, Hungary
²²⁴National Institute of Science Education and Research, Bhubaneswar, India
²²⁵Panjab University, Chandigarh, India
²²⁶University of Delhi, Delhi, India
²²⁷Saha Institute of Nuclear Physics, Kolkata, India
²²⁸Bhabha Atomic Research Centre, Mumbai, India
²²⁹Tata Institute of Fundamental Research, Mumbai, India
²³⁰Indian Institute of Science Education and Research (IISER), Pune, India
²³¹Institute for Research in Fundamental Sciences (IPM), Tehran, Iran
²³²University College Dublin, Dublin, Ireland
²³³INFN Sezione di Bari, Bari, Italy
²³⁴Università di Bari, Bari, Italy
²³⁵Politecnico di Bari, Bari, Italy
²³⁶INFN Sezione di Bologna, Bologna, Italy
²³⁷Università di Bologna, Bologna, Italy

- ²³⁵*INFN Sezione di Catania, Catania, Italy*
²³⁶*Università di Catania, Catania, Italy*
²³⁷*CSEPNM, Catania, Italy*
²³⁸*INFN Sezione di Firenze, Firenze, Italy*
²³⁹*Università di Firenze, Firenze, Italy*
²⁴⁰*INFN Laboratori Nazionali di Frascati, Frascati, Italy*
²⁴¹*INFN Sezione di Genova, Genova, Italy*
²⁴²*Università di Genova, Genova, Italy*
²⁴³*INFN Sezione di Milano-Bicocca, Milano, Italy*
²⁴⁴*Università di Milano-Bicocca, Milano, Italy*
²⁴⁵*INFN Sezione di Napoli, Napoli, Italy*
²⁴⁶*Università di Napoli "Federico II," Napoli, Italy*
²⁴⁷*Università della Basilicata, Roma, Italy*
²⁴⁸*Università G. Marconi, Roma, Italy*
²⁴⁹*INFN Sezione di Padova, Padova, Italy*
²⁵⁰*Università di Padova, Padova, Italy*
²⁵¹*INFN Sezione di Pavia, Pavia, Italy*
²⁵²*Università di Pavia, Pavia, Italy*
²⁵³*INFN Sezione di Perugia, Perugia, Italy*
²⁵⁴*Università di Perugia, Perugia, Italy*
²⁵⁵*INFN Sezione di Pisa, Pisa, Italy*
²⁵⁶*Università di Pisa, Pisa, Italy*
²⁵⁷*Schola Normale Superiore di Pisa, Pisa, Italy*
²⁵⁸*INFN Sezione di Roma, Roma, Italy*
²⁵⁹*Università di Roma, Roma, Italy*
²⁶⁰*INFN Sezione di Torino, Novara, Italy*
²⁶¹*Università di Torino, Novara, Italy*
²⁶²*Universita del Piemonte Orientale, Novara, Italy*
²⁶³*INFN Sezione di Trieste, Trieste, Italy*
²⁶⁴*Università di Trieste, Trieste, Italy*
²⁶⁵*Kangwon National University, Chunchon, Korea*
²⁶⁶*Kyungpook National University, Daegu, Korea*
²⁶⁷*Chonnam National University, Jeonju, Korea*
²⁶⁸*Chonbuk National University, Jeonju, Korea*
²⁶⁹*Chonnam National University, Institute for Universe and Elementary Particles, Kwangju, Korea*
²⁷⁰*Korea University, Seoul, Korea*
²⁷¹*Seoul National University, Seoul, Korea*
²⁷²*University of Seoul, Seoul, Korea*
²⁷³*Sungkyunkwan University, Suwon, Korea*
²⁷⁴*Vilnius University, Vilnius, Lithuania*
²⁷⁵*National Centre for Particle Physics, Universiti Malaya, Kuala Lumpur, Malaysia*
²⁷⁶*Centro de Investigación y de Estudios Avanzados del IPN, Mexico City, Mexico*
²⁷⁷*Universidad Iberoamericana, Mexico City, Mexico*
²⁷⁸*Benedictine Universidad Autónoma de Puebla, Puebla, Mexico*
²⁷⁹*Universidad Autónoma de San Luis Potosí, San Luis Potosí, Mexico*
²⁸⁰*University of Auckland, Auckland, New Zealand*
²⁸¹*University of Canterbury, Christchurch, New Zealand*
²⁸²*National Centre for Physics, Quaid-I-Azam University, Islamabad, Pakistan*
²⁸³*National Centre for Nuclear Research, Swierk, Poland*
²⁸⁴*Instituto de Experimental Física, Faculty of Physics, University of Warsaw, Warsaw, Poland*
²⁸⁵*Laboratório de Instrumentação e Física Experimental de Partículas, Lisboa, Portugal*
²⁸⁶*Joint Institute for Nuclear Research, Dubna, Russia*
²⁸⁷*Petersburg Nuclear Physics Institute, Gatchina (St. Petersburg), Russia*
²⁸⁸*Institute for Nuclear Research, Moscow, Russia*
²⁸⁹*Institute for Theoretical and Experimental Physics, Moscow, Russia*
²⁹⁰*P.N. Lebedev Physical Institute, Moscow, Russia*
²⁹¹*Skobeltsyn Institute of Nuclear Physics, Lomonosov Moscow State University, Moscow, Russia*
²⁹²*State Research Center of Russian Federation, Institute for High Energy Physics, Protvino, Russia*
²⁹³*University of Belgrade, Faculty of Physics and Vinca Institute of Nuclear Sciences, Belgrade, Serbia*
²⁹⁴*Centro de Investigaciones Energéticas Medioambientales y Tecnológicas (CIEMAT), Madrid, Spain*

- ²⁷⁷Universidad Autónoma de Madrid, Madrid, Spain
²⁷⁸Universidad de Oviedo, Oviedo, Spain
²⁷⁹Instituto de Física de Cantabria (IFCA), CSIC-Universidad de Cantabria, Santander, Spain
²⁸⁰CERN, European Organization for Nuclear Research, Geneva, Switzerland
²⁸¹Scherrer Institut, Villigen, Switzerland
²⁸²Institute for Particle Physics, ETH Zurich, Zurich, Switzerland
²⁸³Universität Zürich, Zurich, Switzerland
²⁸⁴National Central University, Chung-Li, Taiwan
²⁸⁵National Taiwan University (NTU), Taipei, Taiwan
²⁸⁶Chulalongkorn University, Faculty of Science, Department of Physics, Bangkok, Thailand
²⁸⁸Middle East Technical University, Physics Department, Ankara, Turkey
²⁸⁹Bogazici University, Istanbul, Turkey
²⁹⁰Istanbul Technical University, Istanbul, Turkey
²⁹¹Institute for Scintillation Materials of National Academy of Science of Ukraine, Kharkov, Ukraine
²⁹²National Scientific Center, Kharkov Institute of Physics and Technology, Kharkov, Ukraine
²⁹³University of Bristol, Bristol, United Kingdom
²⁹⁴Rutherford Appleton Laboratory, Didcot, United Kingdom
²⁹⁵Imperial College, London, United Kingdom
²⁹⁶Brunei University, Uxbridge, United Kingdom
²⁹⁷Baylor University, Waco, Texas, USA
²⁹⁸The University of Alabama, Tuscaloosa, Alabama, USA
²⁹⁹Boston University, Boston, Massachusetts, USA
³⁰⁰Brown University, Providence, Rhode Island, USA
³⁰¹University of California, Davis, Davis, California, USA
³⁰²University of California, Los Angeles, Los Angeles, California, USA
³⁰³University of California, Riverside, Riverside, California, USA
³⁰⁴University of California, San Diego, La Jolla, California, USA
³⁰⁵University of California, Santa Barbara, Santa Barbara, California, USA
³⁰⁶California Institute of Technology, Pasadena, California, USA
³⁰⁷Carnegie Mellon University, Pittsburgh, Pennsylvania, USA
³⁰⁸University of Colorado at Boulder, Boulder, Colorado, USA
³⁰⁹Cornell University, Ithaca, New York, USA
³¹⁰Fermi National Accelerator Laboratory, Batavia, Illinois, USA
³¹¹University of Florida, Gainesville, Florida, USA
³¹²Florida International University, Miami, Florida, USA
³¹³Florida State University, Tallahassee, Florida, USA
³¹⁴Florida Institute of Technology, Melbourne, Florida, USA
³¹⁵University of Illinois at Chicago (UIC), Chicago, Illinois, USA
³¹⁶The University of Iowa, Iowa City, Iowa, USA
³¹⁷Johns Hopkins University, Baltimore, Maryland, USA
³¹⁸The University of Kansas, Lawrence, Kansas, USA
³¹⁹Kansas State University, Manhattan, Kansas, USA
³²⁰Lawrence Livermore National Laboratory, Livermore, California, USA
³²¹University of Maryland, College Park, Maryland, USA
³²²Massachusetts Institute of Technology, Cambridge, Massachusetts, USA
³²³University of Minnesota, Minneapolis, Minnesota, USA
³²⁴University of Mississippi, Oxford, Mississippi, USA
³²⁵University of Nebraska-Lincoln, Lincoln, Nebraska, USA
³²⁶State University of New York at Buffalo, Buffalo, New York, USA
³²⁷Northeastern University, Boston, Massachusetts, USA
³²⁸Northwestern University, Evanston, Illinois, USA
³²⁹University of Notre Dame, Notre Dame, Indiana, USA
³³⁰The Ohio State University, Columbus, Ohio, USA
³³¹Princeton University, Princeton, New Jersey, USA
³³²Purdue University, West Lafayette, Indiana, USA
³³³Purdue University Calumet, Hammond, Indiana, USA
³³⁴Rice University, Houston, Texas, USA
³³⁵University of Rochester, Rochester, New York, USA
³³⁶The Rockefeller University, New York, New York, USA

- ³³⁷Rutgers, The State University of New Jersey, Piscataway, New Jersey, USA
³³⁸University of Tennessee, Knoxville, Tennessee, USA
³³⁹Texas A&M University, College Station, Maryland, USA
³⁴⁰Texas Tech University, Lubbock, Texas, USA
³⁴¹Vanderbilt University, Nashville, Tennessee, USA
³⁴²University of Virginia, Charlottesville, Virginia, USA
³⁴³Wayne State University, Detroit, Michigan, USA
³⁴⁴University of Wisconsin, Madison, Wisconsin, USA

^bDeceased.

- ^bAlso at Department of Physics, King's College London, London, United Kingdom.
^aAlso at Institute of Physics, Azerbaijan Academy of Sciences, Baku, Azerbaijan.
^aAlso at Novosibirsk State University, Novosibirsk, Russia.
^aAlso at TRIUMF, Vancouver, BC, Canada.
^aAlso at Department of Physics, California State University, Fresno, CA, USA.
^aAlso at Department of Physics, University of Fribourg, Fribourg, Switzerland.
^aAlso at Departamento de Física e Astronomia, Faculdade de Ciências, Universidade do Porto, Portugal.
^aAlso at Tomsk State University, Tomsk, Russia.
^aAlso at CPPM, Aix-Marseille Université and CNRS/IN2P3, Marseille, France.
^aAlso at Università di Napoli Parthenope, Napoli, Italy.
^aAlso at Institute of Particle Physics (IPP), Canada.
^aAlso at Particle Physics Department, Rutherford Appleton Laboratory, Didcot, United Kingdom.
^aAlso at Department of Physics, St. Petersburg State Polytechnical University, St. Petersburg, Russia.
^aAlso at Louisiana Tech University, Ruston, LA, USA.
^aAlso at Institut Català de Recerca i Estudis Avançats, ICREA, Barcelona, Spain.
^aAlso at Department of Physics, National Tsing Hua University, Taiwan.
^aAlso at Department of Physics, The University of Texas at Austin, Austin, TX, USA.
^aAlso at Institute of Theoretical Physics, Ila State University, Tbilisi, Georgia.
^aAlso at CERN, Geneva, Switzerland.
^aAlso at Georgian Technical University (GTU), Tbilisi, Georgia.
^aAlso at Ochanomizu Academic Production, Ochanomizu University, Tokyo, Japan.
^aAlso at Manhattan College, New York, NY, USA.
^aAlso at Institute of Physics, Academia Sinica, Taipei, Taiwan.
^aAlso at LAL, Université Paris-Sud and CNRS/IN2P3, Orsay, France.
^aAlso at Academia Sinica Grid Computing, Institute of Physics, Academia Sinica, Taipei, Taiwan.
^aAlso at School of Physics, Shandong University, Shandong, China.
^aAlso at Moscow Institute of Physics and Technology State University, Dolgoprudny, Russia.
^aAlso at Section de Physique, Université de Genève, Geneva, Switzerland.
^aAlso at International School for Advanced Studies (SISSA), Trieste, Italy.
^aAlso at Department of Physics and Astronomy, University of South Carolina, Columbia, SC, USA.
^aAlso at School of Physics and Engineering, Sun Yat-sen University, Guangzhou, China.
^aAlso at Faculty of Physics, M.V.Lomonosov Moscow State University, Moscow, Russia.
^aAlso at National Research Nuclear University MEPhI, Moscow, Russia.
^aAlso at Department of Physics, Stanford University, Stanford, CA, USA.
^aAlso at Institute for Particle and Nuclear Physics, Wigner Research Centre for Physics, Budapest, Hungary.
^aAlso at Department of Physics, The University of Michigan, Ann Arbor, MI, USA.
^aAlso at Discipline of Physics, University of KwaZulu-Natal, Durban, South Africa.
^aAlso at University of Malaya, Department of Physics, Kuala Lumpur, Malaysia.
^aAlso at Vienna University of Technology, Vienna, Austria.
^aAlso at CERN, European Organization for Nuclear Research, Geneva, Switzerland.
^aAlso at State Key Laboratory of Nuclear Physics and Technology, Peking University, Beijing, China.
^aAlso at Institut Pluridisciplinaire Hubert Curien, Université de Strasbourg, Université de Haute Alsace Mulhouse, CNRS/IN2P3, Strasbourg, France.
^aAlso at National Institute of Chemical Physics and Biophysics, Tallinn, Estonia.
^aAlso at Skobeltsyn Institute of Nuclear Physics, Lomonosov Moscow State University, Moscow, Russia.
^aAlso at Universidade Estadual de Campinas, Campinas, Brazil.
^aAlso at Centre National de la Recherche Scientifique (CNRS)-IN2P3, Paris, France.
^aAlso at Laboratoire Leprince-Ringuet, Ecole Polytechnique, IN2P3-CNRS, Palaiseau, France.
^aAlso at Joint Institute for Nuclear Research, Dubna, Russia.
^aAlso at Ain Shams University, Cairo, Egypt.

- ³⁷Also at British University in Egypt, Cairo, Egypt.
³⁸Also at Helwan University, Cairo, Egypt.
³⁹Also at Suez University, Suez, Egypt.
⁴⁰Also at Cairo University, Cairo, Egypt.
⁴¹Also at Fayoum University, El-Fayoum, Egypt.
⁴²Also at Université de Haute Alsace, Mulhouse, France.
⁴³Also at Brandenburg University of Technology, Cottbus, Germany.
⁴⁴Also at Institute of Nuclear Research ATOMKI, Debrecen, Hungary.
⁴⁵Also at Eötvös Loránd University, Budapest, Hungary.
⁴⁶Also at University of Debrecen, Debrecen, Hungary.
⁴⁷Also at Wigner Research Centre for Physics, Budapest, Hungary.
⁴⁸Also at University of Visva-Bharati, Santiniketan, India.
⁴⁹Also at King Abdulaziz University, Jeddah, Saudi Arabia.
⁵⁰Also at University of Ruhama, Matará, Sri Lanka.
⁵¹Also at Isfahan University of Technology, Isfahan, Iran.
⁵²Also at University of Tehran, Department of Engineering Science, Tehran, Iran.
⁵³Also at Plasma Physics Research Center, Science and Research Branch, Islamic Azad University, Tehran, Iran.
⁵⁴Also at Università degli Studi di Siena, Siena, Italy.
⁵⁵Also at Purdue University, West Lafayette, IN, USA.
⁵⁶Also at International Islamic University of Malaysia, Kuala Lumpur, Malaysia.
⁵⁷Also at Consejo Nacional de Ciencia y Tecnología, Mexico, Mexico.
⁵⁸Also at Institute for Nuclear Research, Moscow, Russia.
⁵⁹Also at Institute of High Energy Physics and Informatization, Tbilisi State University, Tbilisi, Georgia.
⁶⁰Also at St. Petersburg State Polytechnical University, St. Petersburg, Russia.
⁶¹Also at National Research Nuclear University "Moscow Engineering Physics Institute" (MEPhI), Moscow, Russia.
⁶²Also at California Institute of Technology, Pasadena, CA, USA.
⁶³Also at Faculty of Physics, University of Belgrade, Belgrade, Serbia.
⁶⁴Also at Facoltà di Ingegneria, Università di Roma, Roma, Italy.
⁶⁵Also at National Technical University of Athens, Athens, Greece.
⁶⁶Also at Scuola Normale e Sezione dell'INFN, Pisa, Italy.
⁶⁷Also at University of Athens, Athens, Greece.
⁶⁸Also at Warsaw University of Technology, Institute of Electronic Systems, Warsaw, Poland.
⁶⁹Also at Institute for Theoretical and Experimental Physics, Moscow, Russia.
⁷⁰Also at Albert Einstein Center for Fundamental Physics, Bern, Switzerland.
⁷¹Also at Adiyaman University, Adiyaman, Turkey.
⁷²Also at Mersin University, Mersin, Turkey.
⁷³Also at Cag University, Mersin, Turkey.
⁷⁴Also at Piri Reis University, İstanbul, Turkey.
⁷⁵Also at Gaziosmanpasa University, Tokat, Turkey.
⁷⁶Also at Ozyegin University, İstanbul, Turkey.
⁷⁷Also at Izmir Institute of Technology, Izmir, Turkey.
⁷⁸Also at Mimar Sinan University, İstanbul, İstanbul, Turkey.
⁷⁹Also at Marmara University, İstanbul, Turkey.
⁸⁰Also at Yildiz Technical University, İstanbul, Turkey.
⁸¹Also at Hacettepe University, Ankara, Turkey.
⁸²Also at Rutherford Appleton Laboratory, Didcot, United Kingdom.
⁸³Also at School of Physics and Astronomy, University of Southampton, Southampton, United Kingdom.
⁸⁴Also at Instituto de Astrofísica de Canarias, La Laguna, Spain.
⁸⁵Also at Utah Valley University, Orem, UT, USA.
⁸⁶Also at University of Belgrade, Faculty of Physics and Vinca Institute of Nuclear Sciences, Belgrade, Serbia.
⁸⁷Also at Argonne National Laboratory, Argonne, IL, USA.
⁸⁸Also at Erzincan University, Erzincan, Turkey.
⁸⁹Also at Texas A&M University at Qatar, Doha, Qatar.
⁹⁰Also at Kyungpook National University, Daegu, Korea.

Fragile Families Challenge

An overly simple view of stratification research.

$$Y = E(Y | \vec{X}) + \epsilon$$

An overly simple view of stratification research.

$$Y = E(Y | \vec{X}) + \epsilon$$



Attainment

An overly simple view of stratification research.

$$Y = E(Y | \vec{X}) + \epsilon$$



Attainment

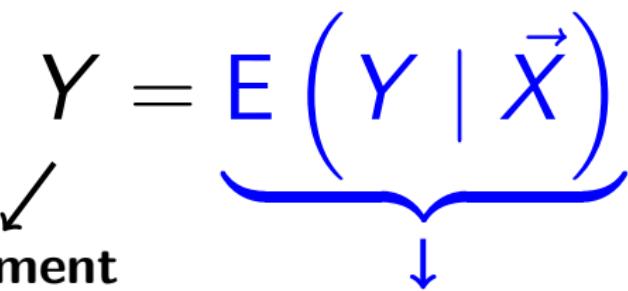
- Academic achievement
- Occupation
- Income

An overly simple view of stratification research.

$$Y = E(Y | \vec{X}) + \epsilon$$

Attainment
– Academic achievement
– Occupation
– Income

Predictable component

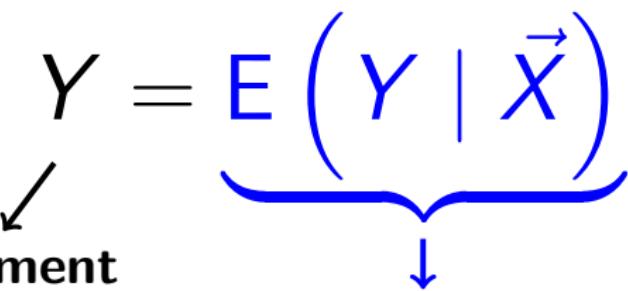


An overly simple view of stratification research.

$$Y = E(Y | \vec{X}) + \epsilon$$

Attainment
– Academic achievement
– Occupation
– Income

Predictable component



An overly simple view of stratification research.

$$Y = \underbrace{\beta_1 X_1 + \beta_2 X_2}_{\text{Predictable component}} + \epsilon$$



Attainment

- Academic achievement
- Occupation
- Income



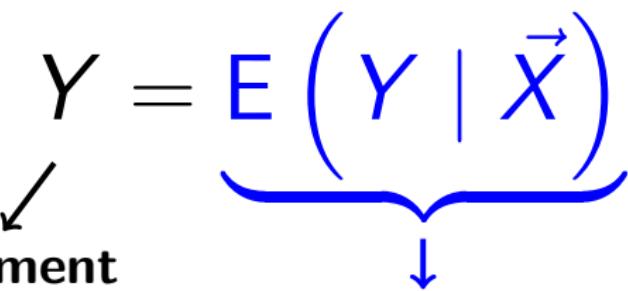
Predictable component

An overly simple view of stratification research.

$$Y = E(Y | \vec{X}) + \epsilon$$

Attainment
– Academic achievement
– Occupation
– Income

Predictable component



An overly simple view of stratification research.

$$Y = E(Y | \vec{X}) + \epsilon$$

Attainment
– Academic achievement
– Occupation
– Income

Predictable component

Unpredictable component

The diagram illustrates the decomposition of a dependent variable Y into a predictable component and an unpredictable component. The predictable component is represented by the expected value of Y given the vector of independent variables X, denoted as E(Y | X). The unpredictable component is represented by the error term epsilon (ε). Arrows point from the labels 'Attainment' and 'Unpredictable component' to their respective parts in the equation.

An overly simple view of stratification research.

$$Y = E(Y | \vec{X}) + \epsilon$$

Attainment
– Academic achievement
– Occupation
– Income

Predictable component

Unpredictable component

The diagram illustrates the decomposition of a dependent variable Y into a predictable component and an unpredictable component. The predictable component is represented by the expected value of Y given the vector of independent variables X, denoted as E(Y | X). The unpredictable component is represented by the error term epsilon (ε). Arrows point from the labels 'Attainment' and 'Unpredictable component' to their respective parts in the equation.

An overly simple view of stratification research.

$$Y = E(Y | \vec{X}) + \epsilon$$

The diagram illustrates the decomposition of a dependent variable Y into a predictable component and an unpredictable component. The equation $Y = E(Y | \vec{X}) + \epsilon$ is shown, where the term $E(Y | \vec{X})$ is bracketed and labeled "Attainment", and the entire right side of the equation is bracketed and labeled "Predictable component". The term ϵ is labeled "Unpredictable component" with an arrow pointing to it.

Theories focus on the predictable component, but empirically the unpredictable component dominates

Why should we care about the predictability of social outcomes?

Why should we care about the predictability of social outcomes?

- ▶ Scientific reasons

Why should we care about the predictability of social outcomes?

- ▶ Scientific reasons
- ▶ Basic social fact

Why should we care about the predictability of social outcomes?

- ▶ Scientific reasons
 - ▶ Basic social fact
 - ▶ Leads to discovery

Why should we care about the predictability of social outcomes?

- ▶ Scientific reasons
 - ▶ Basic social fact
 - ▶ Leads to discovery
- ▶ Policy reasons



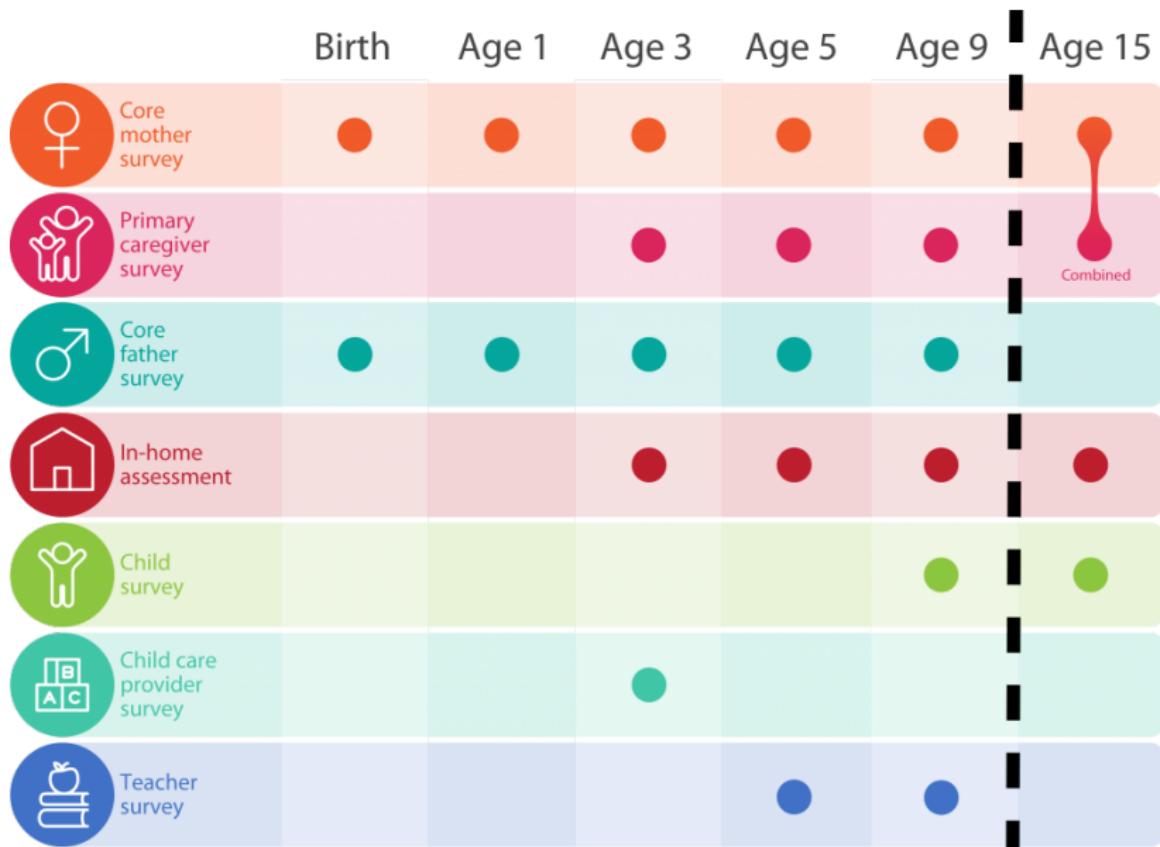
FF Fragile Families

& Child Wellbeing Study
PRINCETON | COLUMBIA



- ▶ Birth cohort panel study
- ▶ ≈ 5,000 children born in 20 U.S. cities with an over-sample of non-marital births
- ▶ Followed from birth through age 15
- ▶ Already used in hundreds of papers and dozens of dissertations

	Birth	Age 1	Age 3	Age 5	Age 9
 Core mother survey	●	●	●	●	●
 Primary caregiver survey			●	●	●
 Core father survey	●	●	●	●	●
 In-home assessment			●	●	●
 Child survey					●
 Child care provider survey			●		
 Teacher survey				●	●



5,000 families

Birth to age 9
12,000 features

Age 15
1,500 features

4,242 families

12,942 features
birth to age 9

6 outcomes
age 15

Training

Leaderboard

Holdout

Outcomes

- ▶ Child: GPA (continuous), Grit (continuous)
- ▶ Household: Eviction (binary), Material hardship (continuous)
- ▶ Primary care giver: Job training (binary), Job loss (binary)

459 researchers applied to participate. Many worked in interdisciplinary teams. Goal: Make a prediction that minimizes mean square error on the hold-out set

$$MSE_{\text{holdout}} = \frac{\sum_{i \in \text{holdout}} (\hat{y}_i - y_i)^2}{n_{\text{holdout}}}$$

More on privacy and ethics audit:
<https://arxiv.org/abs/1809.00103>

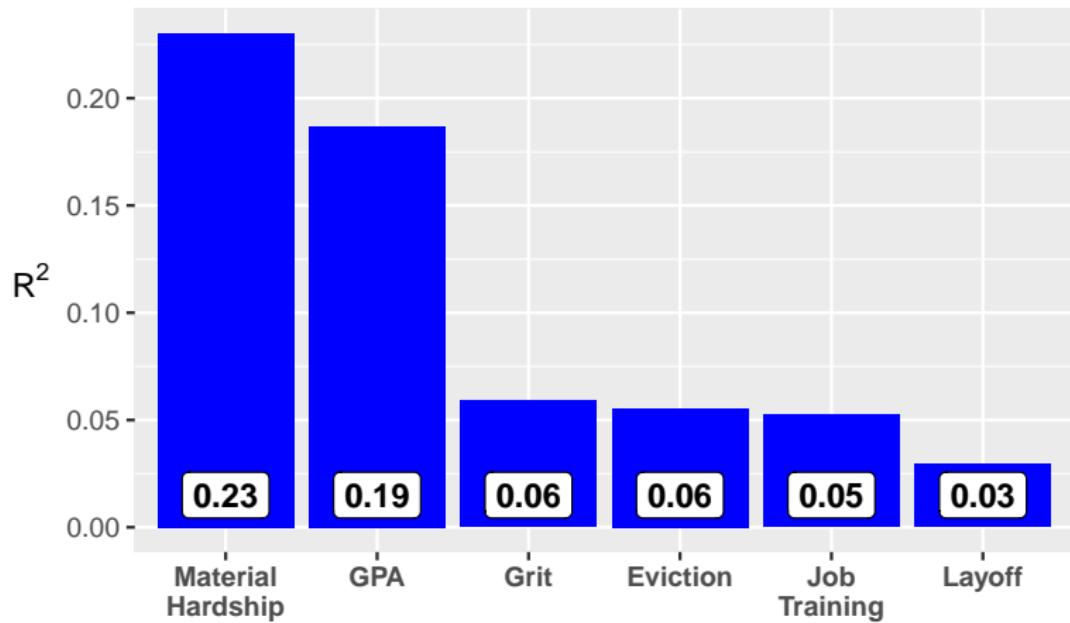
Using a large, high-quality social science dataset collected since birth and modern machine learning methods, how accurately can we predict outcomes from children, parents, and families?

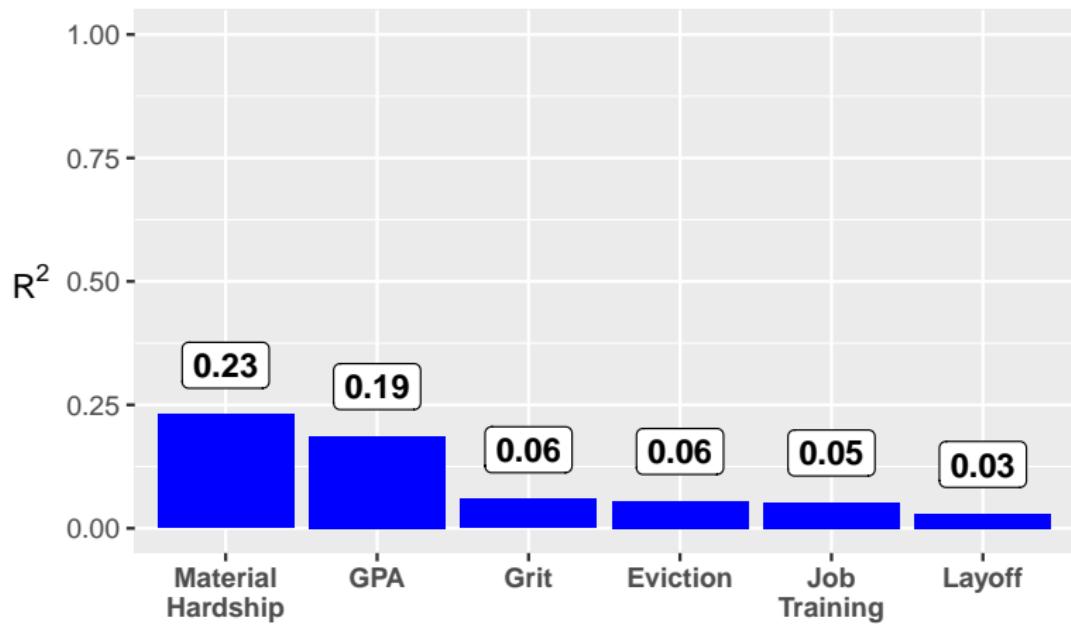
$$R_{holdout}^2 = 1 - \frac{\sum_{i \in holdout} (\hat{y}_i - y_i)^2}{\sum_{i \in holdout} (\bar{y}_{train} - y_i)^2}$$

Using a large, high-quality social science dataset collected since birth and modern machine learning methods, how accurately can we predict outcomes from children, parents, and families?

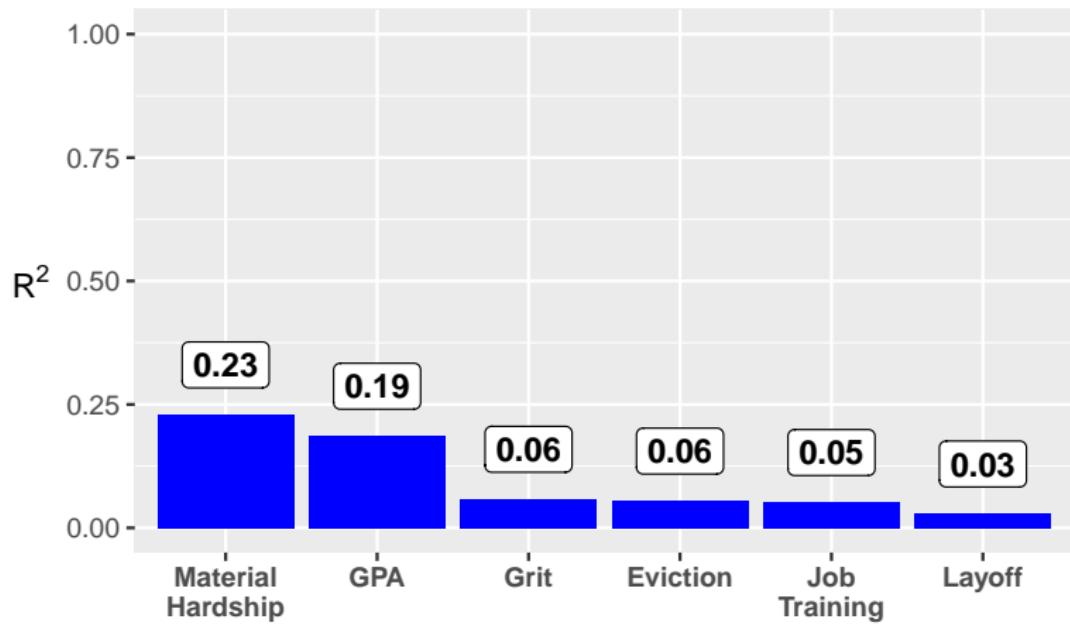
$$R^2_{holdout} = 1 - \frac{\sum_{i \in holdout} (\hat{y}_i - y_i)^2}{\sum_{i \in holdout} (\bar{y}_{train} - y_i)^2}$$

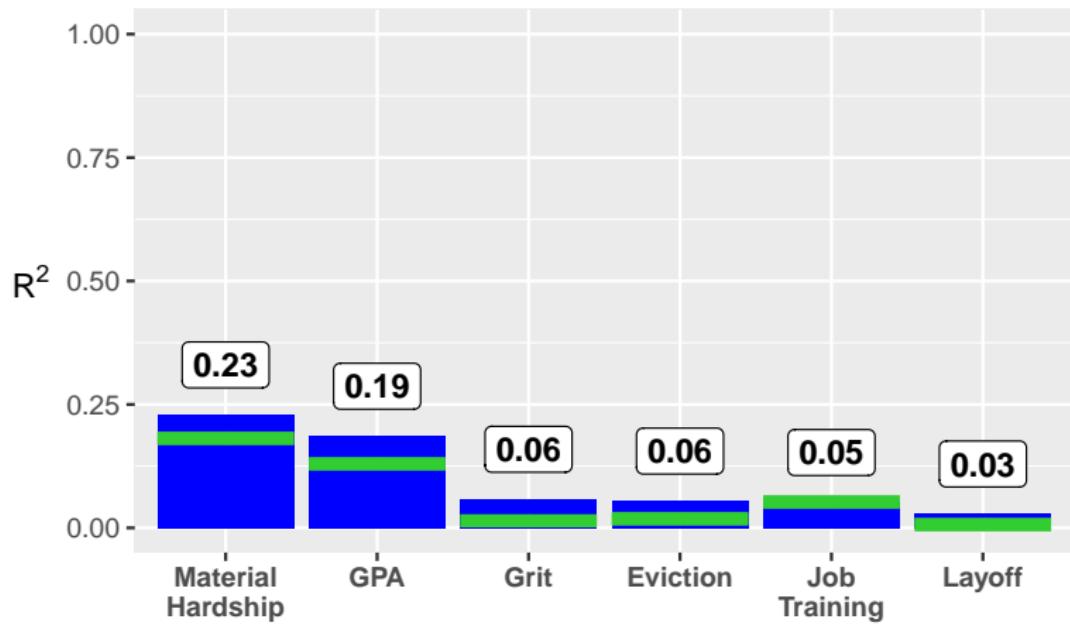
Before I show the results, let's vote . . .





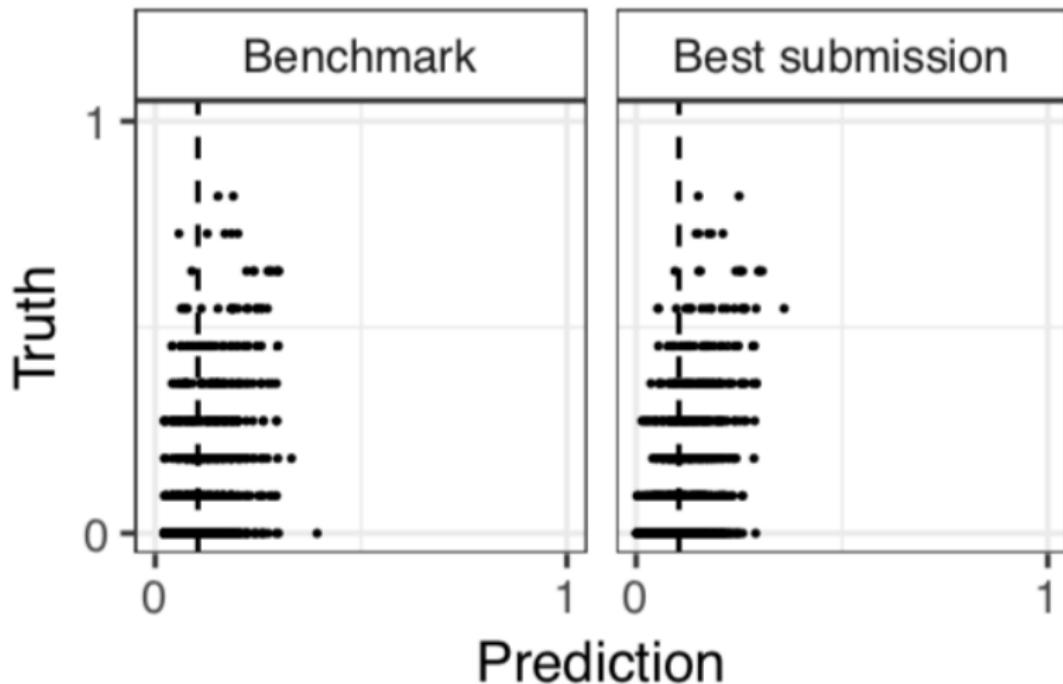
Is this even better than a benchmark model?

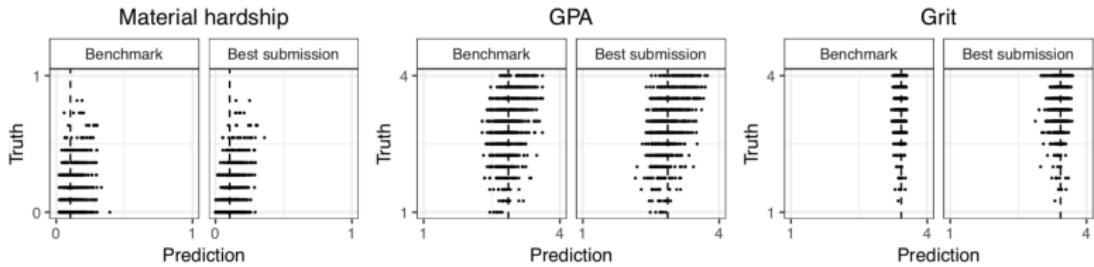




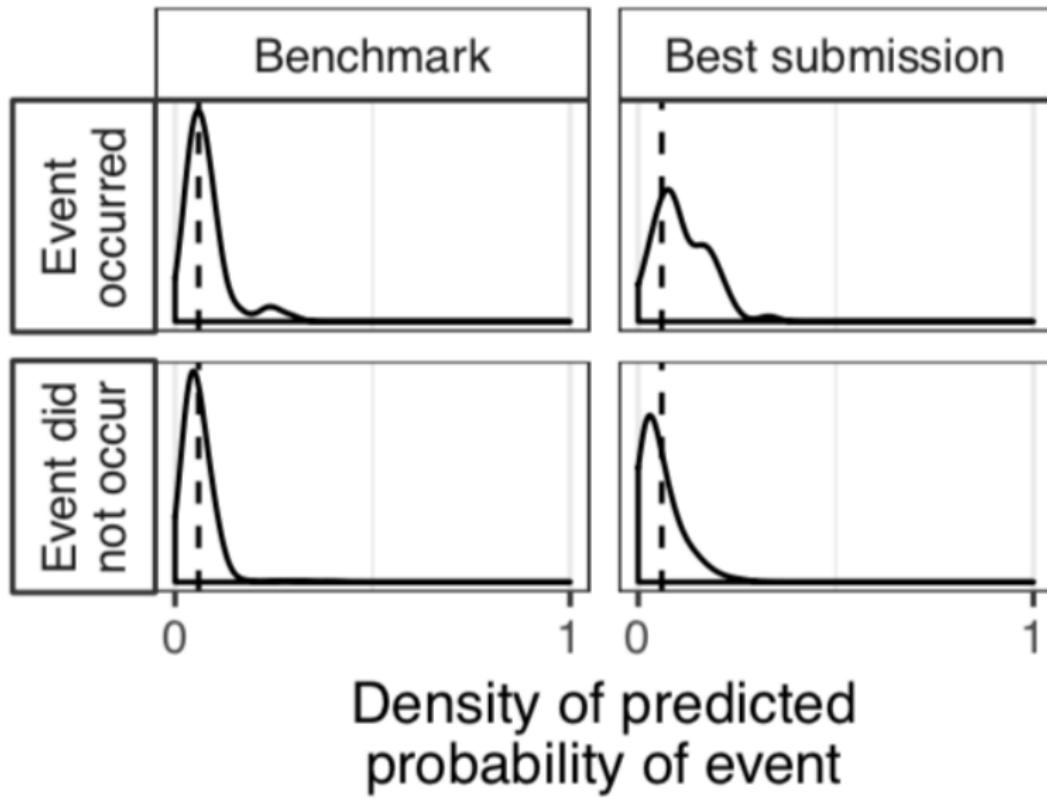
Green line: 4 variable linear regression model

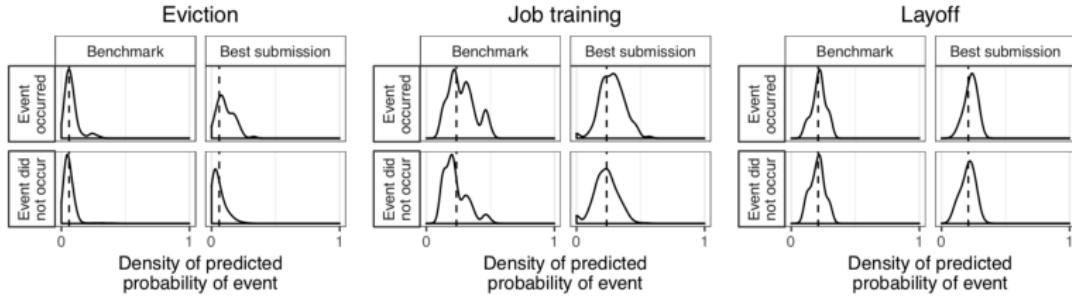
Material hardship





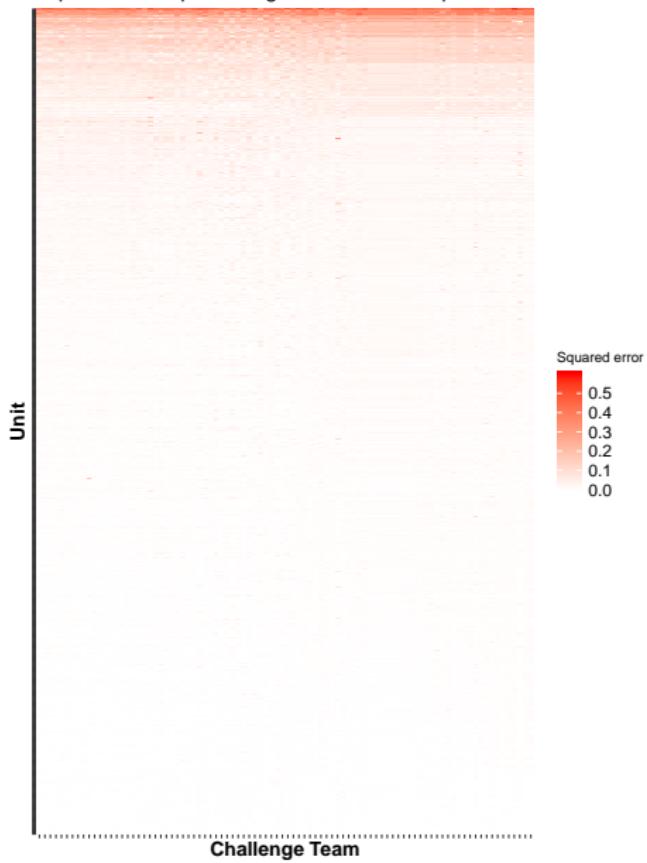
Eviction

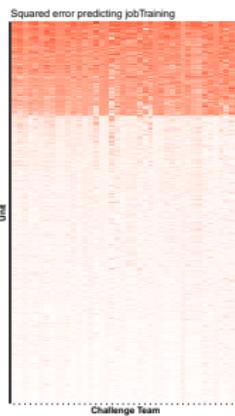
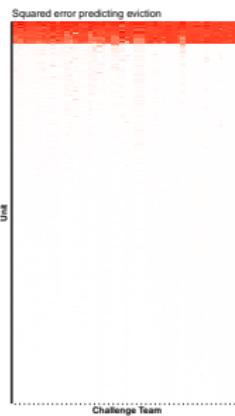
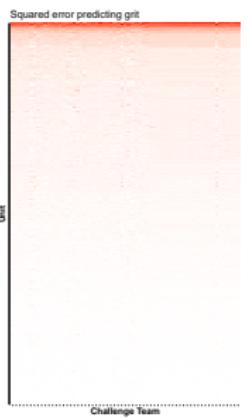
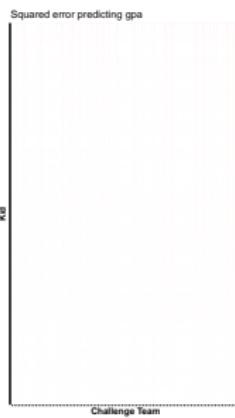
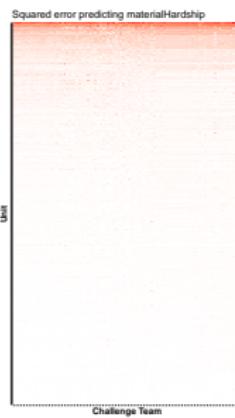




What can we learn looking at all the predictions?

Squared error predicting materialHardship





What do these results mean?

- ▶ Is it possible to get better predictive performance for this data and prediction task?

- ▶ Is it possible to get better predictive performance for this data and prediction task?
- ▶ Why is the unpredictability so high even using modern machine learning methods and what many social scientists would consider to be large and high-quality data?

Why is the unpredictability so high even using modern machine learning methods and what many social scientists would consider to be large and high-quality data?

- ▶ Not enough cases

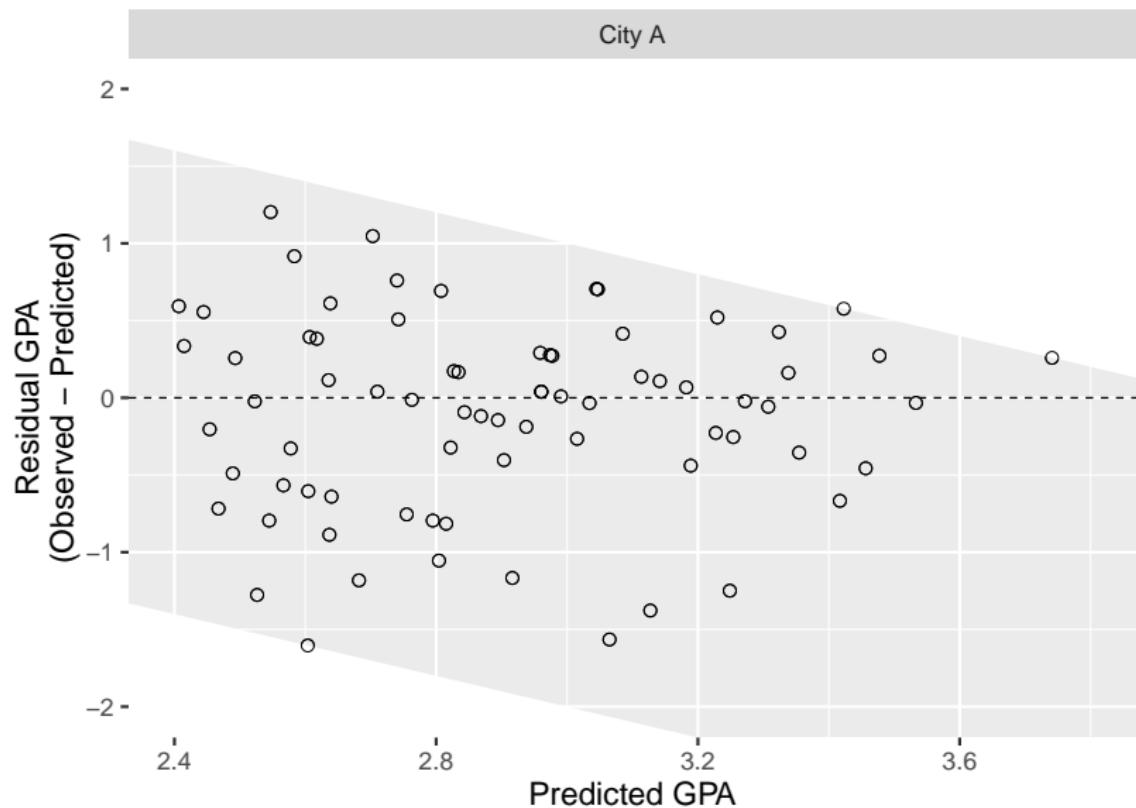
Why is the unpredictability so high even using modern machine learning methods and what many social scientists would consider to be large and high-quality data?

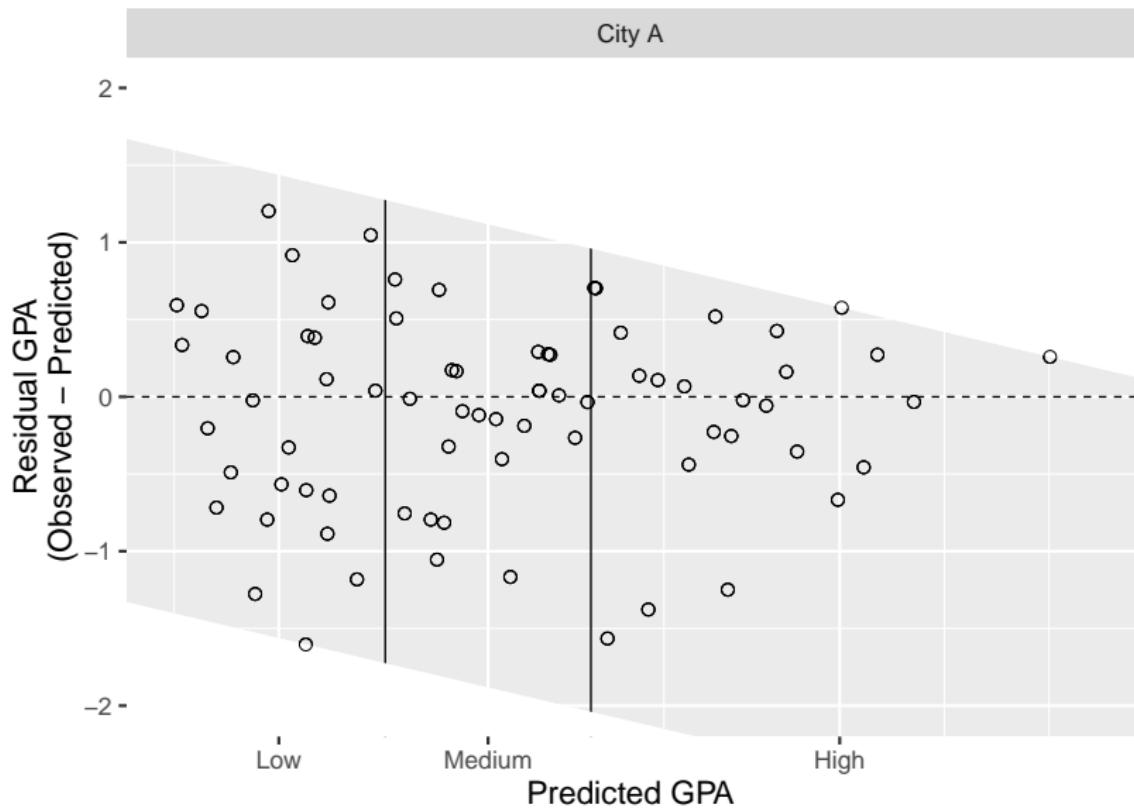
- ▶ Not enough cases
- ▶ Measurement error in existing variables (particularly outcomes)

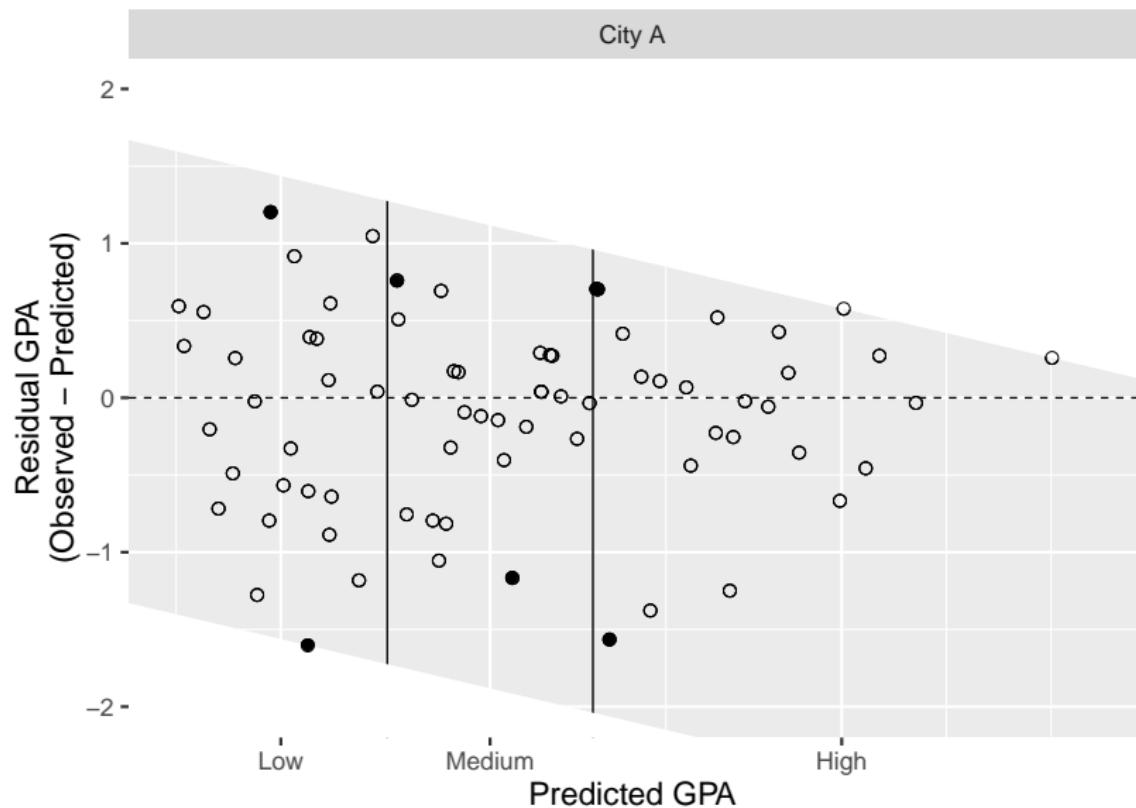
Why is the unpredictability so high even using modern machine learning methods and what many social scientists would consider to be large and high-quality data?

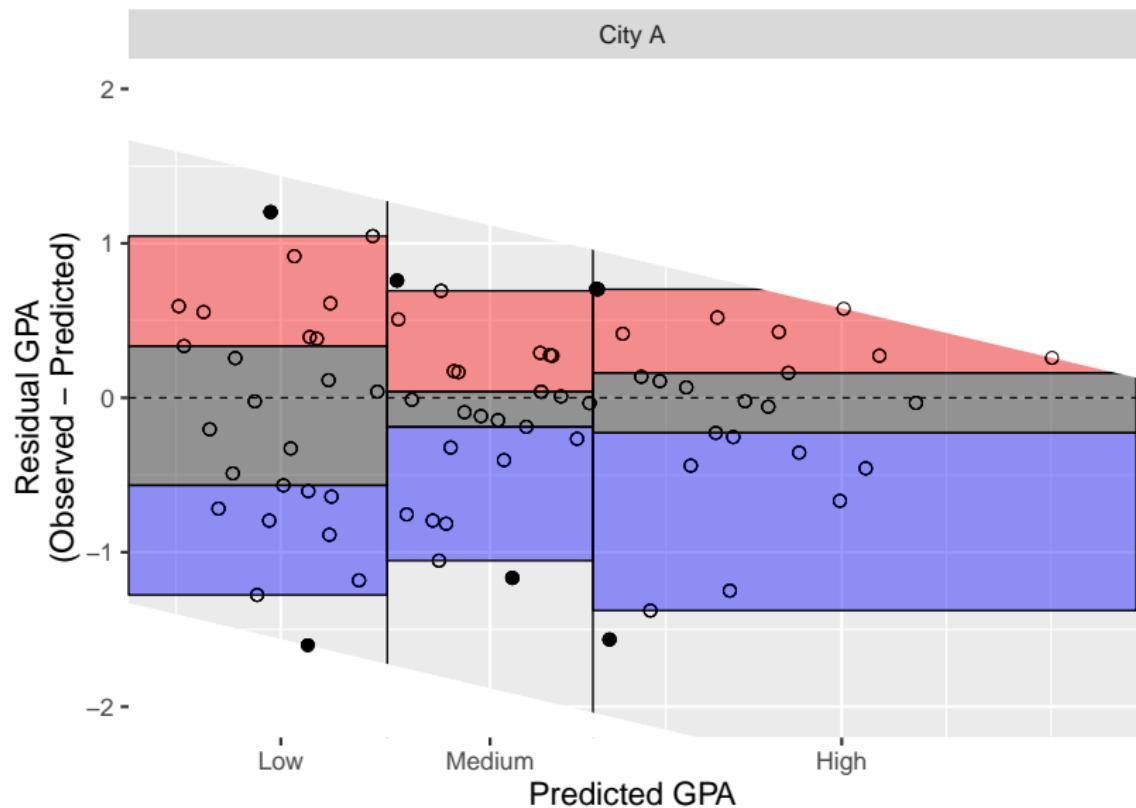
- ▶ Not enough cases
- ▶ Measurement error in existing variables (particularly outcomes)
- ▶ Important unmeasured variables

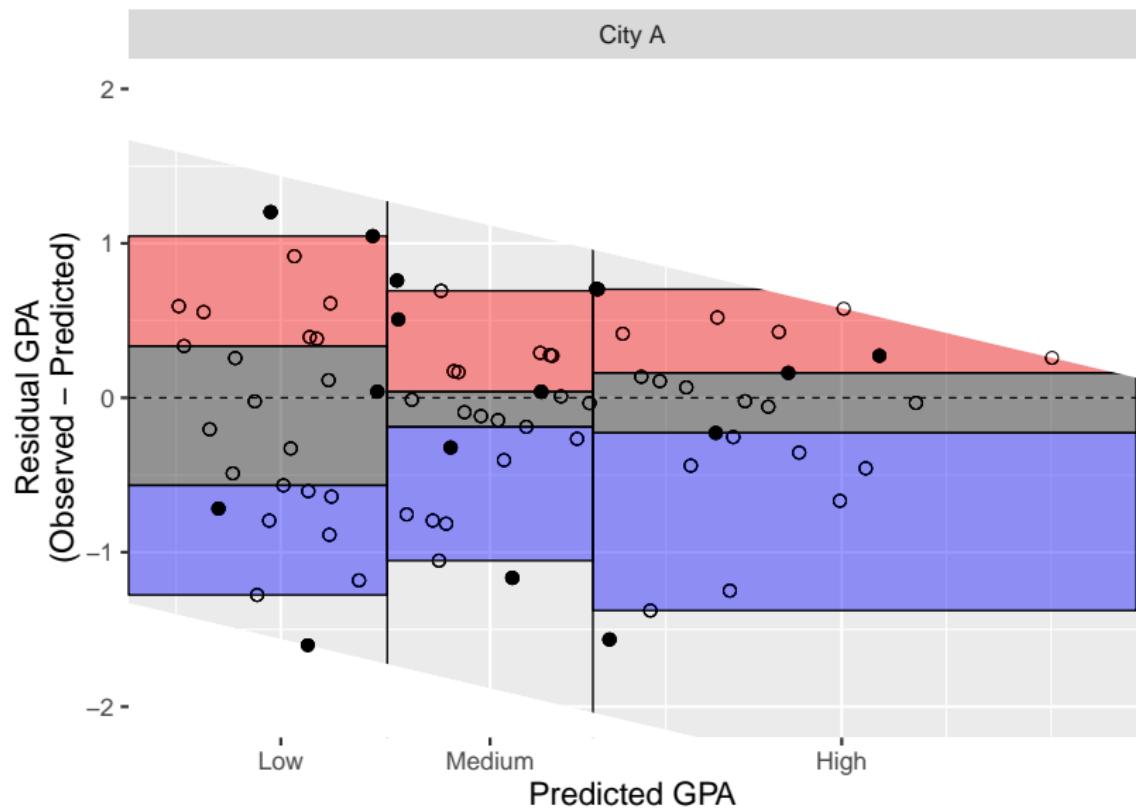
How can we learn about important measurement error and unmeasured variables?

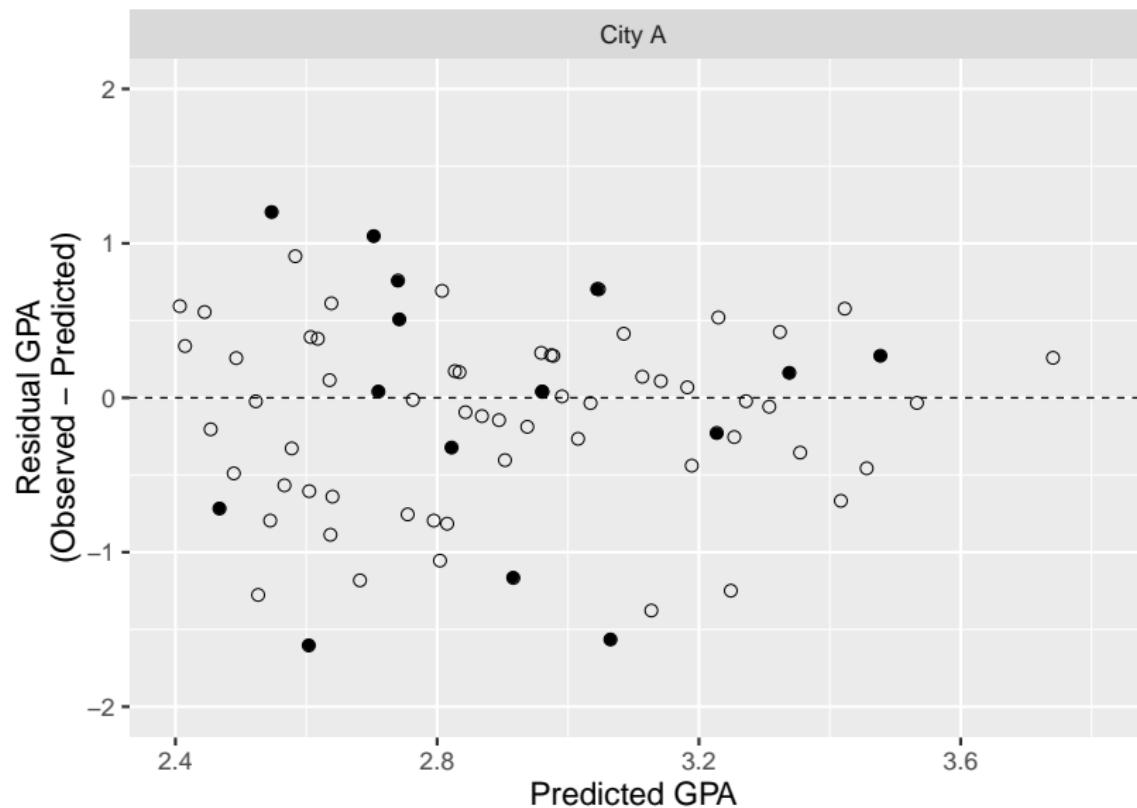


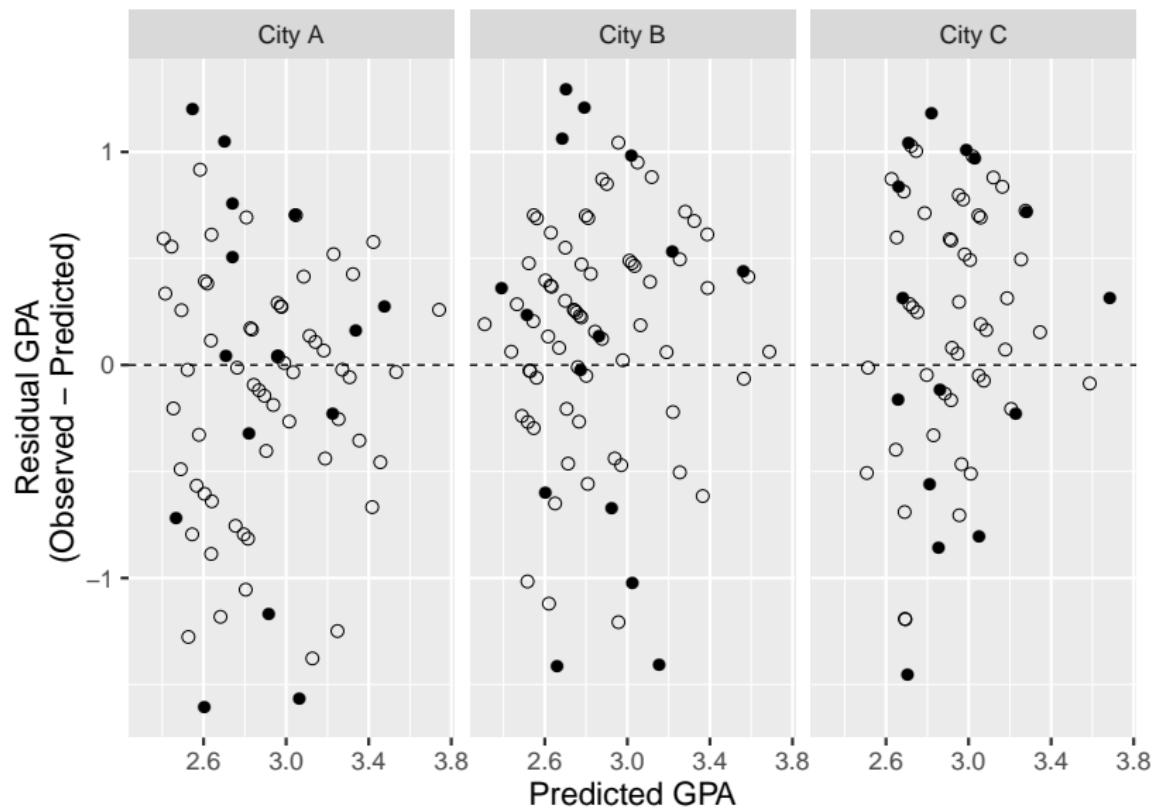


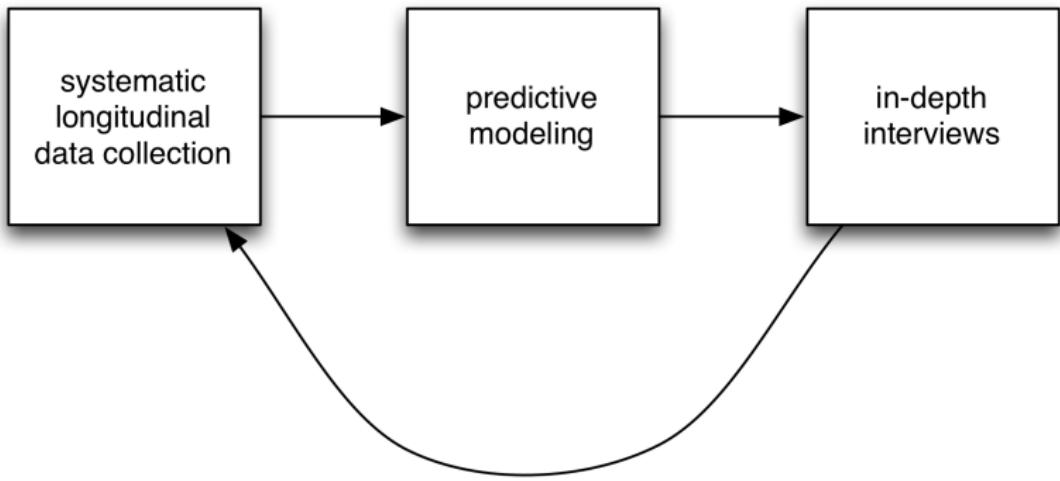












What's next?

Next steps:

- ▶ One community paper (including all code and predictions)

Next steps:

- ▶ One community paper (including all code and predictions)
- ▶ Special issue of *Socius*
 - ▶ 12 submitted manuscripts from Challenge participants (all with accompanying code and computing environment)

Next steps:

- ▶ One community paper (including all code and predictions)
- ▶ Special issue of *Socius*
 - ▶ 12 submitted manuscripts from Challenge participants (all with accompanying code and computing environment)
 - ▶ 3 papers from our group

Next steps:

- ▶ One community paper (including all code and predictions)
- ▶ Special issue of *Socius*
 - ▶ 12 submitted manuscripts from Challenge participants (all with accompanying code and computing environment)
 - ▶ 3 papers from our group
 - ▶ "Privacy, ethics, and data access: A case study of the Fragile Families Challenge" by Lundberg, Narayanan, Levy, & Salganik, <https://arxiv.org/abs/1809.00103>

Next steps:

- ▶ One community paper (including all code and predictions)
- ▶ Special issue of *Socius*
 - ▶ 12 submitted manuscripts from Challenge participants (all with accompanying code and computing environment)
 - ▶ 3 papers from our group
 - ▶ "Privacy, ethics, and data access: A case study of the Fragile Families Challenge" by Lundberg, Narayanan, Levy, & Salganik, <https://arxiv.org/abs/1809.00103>
 - ▶ "Improving metadata infrastructure for complex surveys: Insights from the Fragile Families Challenge" by Kindel, Catena, Hartshorne, Jaeger, Koffman, McLanahan, Phillips, Rouhani, Vinh, & Salganik, <https://osf.io/93ywg/>

Next steps:

- ▶ One community paper (including all code and predictions)
- ▶ Special issue of *Socius*
 - ▶ 12 submitted manuscripts from Challenge participants (all with accompanying code and computing environment)
 - ▶ 3 papers from our group
 - ▶ "Privacy, ethics, and data access: A case study of the Fragile Families Challenge" by Lundberg, Narayanan, Levy, & Salganik, <https://arxiv.org/abs/1809.00103>
 - ▶ "Improving metadata infrastructure for complex surveys: Insights from the Fragile Families Challenge" by Kindel, Catena, Hartshorne, Jaeger, Koffman, McLanahan, Phillips, Rouhani, Vinh, & Salganik, <https://osf.io/93ywg/>
 - ▶ "Successes and struggles with computational reproducibility in the Fragile Families Challenge" by Liu & Salganik

Questions