

CURRICULUM VITAE

Phoebe Meredith Hamilton¹

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EDUCATION AND EMPLOYMENT

- **University of Maryland** College Park, MD
Assistant Professor 2023–present
- **University of Maryland** College Park, MD
Faculty Specialist 2020–2023
Research Associate 2012–2020
- **University of Maryland** College Park, MD
Ph.D. – 2013, M.S. – 2011 2007–2012
 - Dissertation: “Studies of B_s production and semileptonic decay, and of antideuteron production in Υ decay and quark fragmentation at BaBar”
 - Advisor: Abolhassan Jawahery
- **Youngstown State University** Youngstown, OH
B.S. (Honors)–2007 2003–2007
 - Advisor: Michael Crescimanno

RESEARCH AND TEACHING EXPERIENCE

- **Research Associate / Faculty Specialist** College Park, MD
University of Maryland 2012–2023

Research Areas:

Experimental particle physics with the LHCb experiment

- Study of lepton flavor universality (LFU) in semileptonic B decays. My efforts helped to initiate this program at LHCb using a novel technique to measure rates of semileptonic B decays to τ despite multiple missing neutrinos. Our first result was the first measurement of any $B \rightarrow X\tau$ process at a hadron collider, and we have significantly expanded and refined our technique to simultaneously cover different final states to provide greater discriminating power between possible new interactions. Served as sub-convener for semileptonic B decays to τ for LHCb, where I helped to advise and review measurements in the new program launched by this measurement.
- Contributed to the development of a new technique for measurements of b hadron decays without a reconstructible secondary vertex using $B^+ \rightarrow K^+\pi^0$ decays as a prototype. The new techniques led directly to competitive CP violation measurements in these channels using the Run2 dataset which were previously considered impossible at LHCb.

¹Formerly published under B.K. Hamilton

- Design and development for the LHCb upstream tracker upgrade, focusing on near electronics and low voltage power distribution. Worked with professional PCB design tools both to validate and produce original designs, and worked in prototype and pilot validation and testing in the lab.

- **Research Assistant**
University of Maryland

College Park, MD
2009–2012

Research Areas:

- Analysis of data collected above the $\Upsilon(4S)$ resonance by the BaBar experiment to measure the inclusive B_s semileptonic branching fraction. The work also resulted in the first measurement of B_s production as a function of energy in this region.
- Measurement of antideuteron production in e^+e^- annihilation and in decays of Υ resonances at BABAR. Accelerator measurements inform models of antideuteron production in parton showers and directly impact the sensitivity of indirect dark matter searches, for example at AMS. This analysis required new approaches to overcome limitations in the GEANT4 package and the BABAR simulation and reconstruction of light antinuclei.

- **Teaching Assistant**
University of Maryland

College Park, MD
2007–2009

Courses Taught:

- General Physics: Mechanics and Particle Dynamics, Recitation
- Principles of Physics I, Lab
- Fundamentals of Physics I, Recitation & Lab

- **Research Assistant**
Youngstown State University

Youngstown, OH
2006–2007

Research Topics:

- Worked on application of Poisson algebras deformed by damping to understanding the time evolution of orbits in the Kepler problem with damping linear in the momentum. Published in *J. Phys. A* **41**, 235205 (2008).

SEMINARS AND TALKS

- “Joint Measurement of $\mathcal{R}(D)$ vs $\mathcal{R}(D^*)$ using $\tau \rightarrow \mu\nu\bar{\nu}$ at LHCb”, Workshop on Implications of LHCb Measurements and Future Prospects, CERN, October 19, 2022
- “Probing Lepton Flavor Universality at LHCb”, 2022 APS April Meeting (invited), April 11, 2022
- “Unexpected LHCb: neutrals, neutrinos, taus, and all that”, 2021 Belle II Physics Week, December 2, 2021
- “Pushing the Envelope at LHCb (& MoEDAL)”, 2020 CERN Council Meeting, Dec. 11, 2020
- “Results on Lepton Flavor Universality Tests at LHCb”, 2019 APS Division of Particles and Fields Meeting, July 30, 2019
- “Flavor observables at HE/HL LHC in view of anomalies”, Workshop on physics of the high luminosity LHC and perspectives at a high energy LHC, Fermilab, April 4, 2018

- “Beauty hadron physics and the Lepton Universality tensions”, EPFL physics seminar, March 22, 2018
- “Testing lepton universality in semileptonic B decays at LHCb”, UMD High-Energy Physics seminar, March 17, 2018
- “Experimental overview of lepton universality measurements in semileptonic b -hadron decays”, ECFA Plenary, Geneva, November 16, 2017
- “ $\mathcal{R}(D)$ and $\mathcal{R}(D^*)$ measurements in LHCb – muonic channels“, Workshop on Semi-tauonic decays, Orsay, November 13, 2017
- “Testing Lepton Flavor Universality at LHCb”, SLAC Experimental Seminar, August 8, 2017
- “Tests of Lepton Flavor Universality with B decays at LHCb”, XIIth International Conference on Beauty, Charm, and Hyperons in Hadronic Interactions, Valencia, June 16, 2016
- “Experimental overview of lepton nonuniversality results and prospects from B physics”, 2015 Meeting of the APS Division of Particles and Fields, Ann Arbor, MI, August 7, 2015
- “Measurement of the semitauonic decay $\bar{B}^0 \rightarrow D^{*+} \tau^- \bar{\nu}_\tau$ at LHCb”, CERN LHC Seminar, June 30, 2015
- “Semileptonic Decays at LHCb”, 27th Recontres de Blois, June 2, 2015
- “New Results from LHCb”, LBNL Research Progress Seminar, April 14, 2015
- “Semileptonic Decays at LHCb”, 37th International Conference on High Energy Physics, Valencia, Spain, July 5, 2014
- “Antideuteron Production Measurements at BABAR”, First Cosmic Ray Antideuteron Workshop, Los Angeles, CA, June 5, 2014
- “Probing for New Physics Effects in B Decays to τ ”, UMD High energy physics seminar, November 13, 2013
- “The LHCb Upgrade”, Intensity Frontier Workshop, Argonne National Laboratory, April 26, 2013
- “Recent Results in Semileptonic B Decays with BaBar”, APS Meeting of the Division of Particles and Fields, Providence, RI, August 10, 2011 [arXiv:1110.2141 [hep-ex]]
- “Measurements of the B_s Semileptonic Branching Fraction and B_s Production Above the $\Upsilon(4S)$ ”, APS April Meeting, Anaheim, CA, May 2, 2011.
- “Measurements of the B_s Semileptonic Branching Fraction and B_s Production Above the $\Upsilon(4S)$ ”, Lake Louise Winter Institute, Canada, Feb 23, 2011.

SELECTED PUBLICATIONS

- R. Aaij *et al.* [LHCb Collaboration] “Measurement of the ratios of branching fractions $R(D^*)$ and $R(D^0)$ ”, LHCb-PAPER-2022-039, (in preparation)
- G. Ciezarek, M. Franco Sevilla, B. Hamilton, R. Kowalewski, T. Kuhr, V. Lüth and Y. Sato, “A Challenge to Lepton Universality in B Meson Decays,” *Nature* **546**, 227 (2017), [arXiv:1703.01766 [hep-ex]]

- R. Aaij *et al.* [LHCb Collaboration], “Measurement of the ratio of branching fractions $\mathcal{B}(\bar{B}^0 \rightarrow D^{*+}\tau^-\bar{\nu}_\tau)/\mathcal{B}(\bar{B}^0 \rightarrow D^{*+}\mu^-\bar{\nu}_\mu)$,” Phys. Rev. Lett. **115**, no. 11, 111803 (2015), [arXiv:1506.08614 [hep-ex]]
- R. Aaij *et al.* [LHCb Collaboration], “Measurement of the ratio of branching fractions $\mathcal{B}(B_c^+ \rightarrow J/\psi\tau^+\nu_\tau)/\mathcal{B}(B_c^+ \rightarrow J/\psi\mu^+\nu_\mu)$,” Phys. Rev. Lett. **120**, no.12, 121801 (2018), [arXiv:1711.05623 [hep-ex]]
- R. Aaij *et al.* [LHCb Collaboration], “Measurement of CP Violation in the Decay $B^+ \rightarrow K^+\pi^0$,” Phys. Rev. Lett. **126**, no.9, 091802 (2021), [arXiv:2012.12789 [hep-ex]]
- J. P. Lees *et al.* [BaBar Collaboration], “Antideuteron production in $\Upsilon(nS)$ decays and in $e^+e^- \rightarrow q\bar{q}$ at $\sqrt{s} \approx 10.58$ GeV,” Phys. Rev. D **89**, R111102 (2014), [arXiv:1403.4409 [hep-ex]]
- J. P. Lees *et al.* (BaBar Collaboration), “A Measurement of the Semileptonic Branching Fraction of the B_s Meson,” Phys. Rev. D **85**, 011101 (2012), [arXiv:1110.5600 [hep-ex]]
- T. Aramaki *et al.*, “Review of the theoretical and experimental status of dark matter identification with cosmic-ray antideuterons,” Phys. Rept. **618**, 1 (2016), [arXiv:1505.07785 [hep-ph]]
- R. Aaij *et al.* [LHCb Collaboration], “ B flavour tagging using charm decays at the LHCb experiment,” JINST **10**, no. 10, P10005 (2015), [arXiv:1507.07892 [hep-ex]]
- R. Aaij *et al.* [LHCb Collaboration], “Measurement of the ratio of the $B^0 \rightarrow D^{*-}\tau^+\nu_\tau$ and $B^0 \rightarrow D^{*-}\mu^+\nu_\mu$ branching fractions using three-prong τ -lepton decays,” Phys. Rev. Lett. **120**, 171802 (2018), arXiv:1708.08856 [hep-ex].
- R. Aaij *et al.* [LHCb Collaboration], “Measurement of the shape of the $\Lambda_b^0 \rightarrow \Lambda_c^+\mu^-\bar{\nu}$ differential decay rate,” Phys. Rev. D **96**, 112005 (2017), arXiv:1709.01920 [hep-ex].
- R. Aaij *et al.* [LHCb Collaboration], “Measurement of the ratio of B_c^+ branching fractions to $J/\psi\pi^+$ and $J/\psi\mu^+\nu_\mu$,” Phys. Rev. D **90**, no. 3, 032009 (2014), [arXiv:1407.2126 [hep-ex]]
- P. del Amo Sanchez *et al.* [BaBar Collaboration], “Search for CP violation in the decay $D^\pm \rightarrow K_S^0\pi^\pm$,” Phys. Rev. D **83**, 071103 (2011), [arXiv:1011.5477 [hep-ex]]
- J. P. Lees *et al.* [BaBar Collaboration], “Search for CP violation in the Decays $D^\pm \rightarrow K_S^0K^\pm$, $D_s^\pm \rightarrow K_S^0K^\pm$, and $D_s^\pm \rightarrow K_S^0\pi^\pm$,” Phys. Rev. D **87**, no. 5, 052012 (2013), [arXiv:1212.3003 [hep-ex]]
- R. Aaij *et al.* [LHCb Collaboration], “Measurement of the time-integrated CP asymmetry in $D^0 \rightarrow K_S^0K_S^0$ decays,” JHEP **10**, 055 (2015), [arXiv:1508.06087 [hep-ex]]