

Samuel D. Homiller

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Education

- **Stony Brook University – Dept. of Physics and Astronomy**
Ph.D. in Physics (Expected Summer 2020) Advisor: Prof. Patrick Meade
Thesis: Higgs Couplings as a Gateway to New Fundamental Physics
- **University of Illinois at Urbana-Champaign – Dept. of Physics**
B.S., Physics – Magna cum Laude, Highest Distinction, May 2015 Advisor: Prof. Liang Yang
Thesis: Search for Nucleon Decays into Invisible Channels in Xe-136
B.S., Mathematics – Magna cum Laude, Highest Distinction, May 2015
- **North Carolina School of Science and Math**
High School Diploma

Research Interests

Theoretical particle physics including Higgs and electroweak physics, beyond the Standard Model physics, effective field theories, model building, flavor physics, LHC and future collider phenomenology, dark matter, and early universe cosmology.

Academic Positions

- **Research Assistant**, C. N. Yang Institute for Theoretical Physics, Stony Brook University
May 2017 - Present
Advisor: Patrick Meade
- **DOE Graduate Research Fellow**, Brookhaven National Laboratory
August 2018 - August 2019
Host Scientist: Sally Dawson
- **Undergraduate Research Asst.**, Nuclear Experimental Group, University of Illinois
August 2012 - August 2015
Advisor: Liang Yang
- **Undergraduate Research Asst.**, Inst. for Condensed Matter Theory, University of Illinois
May 2015 - August 2015
Advisor: Karin Dahmen
- **Undergraduate Researcher (NSF REU)**, Dept. of Physics, Louisiana State University
June 2012 - August 2012
Advisor: Thomas Kutter

■ Publications

1. *Di-Higgs production via quark fusion*,
with D. Egaña-Ugrinovic and P. Meade, in preparation,
2. *Putting SMEFT Fits to Work*,
with S. Dawson and S. Lane, [arXiv:2007.01296], to be submitted to PRD.
3. *Validity of SMEFT Studies of VH and VV Production at NLO*,
with J. Baglio, S. Dawson, S. Lane and I. Lewis, Phys. Rev. D **101** 115004 (2020) [arXiv:2003.07862].
4. *Light scalars and the KOTO anomaly*,
with D. Egaña-Ugrinovic and P. Meade, Phys. Rev. Lett **124** 191801 (2020) [arXiv:1911.10203].
5. *QCD Corrections in SMEFT Fits to WZ and WW Production*,
with J. Baglio and S. Dawson, Phys. Rev. D **100**, 113010 (2019) [arXiv:1909.11576].
6. *Higgs bosons with large couplings to light quarks*,
with D. Egaña-Ugrinovic and P. Meade, Phys. Rev. D **100**, 115041 (2019) [arXiv:1908.11376].
7. *Benchmarking simplified template cross sections in WH production*,
with J. Brehmer, S. Dawson, F. Kling and T. Plehn, JHEP **11** 034 (2019) [arXiv:1908.06980].
8. *Aligned and Spontaneous Flavor Violation*,
with D. Egaña-Ugrinovic and P. Meade, Phys. Rev. Lett **123** 031802 (2019) [arXiv:1811.00017].
9. *Measurement of the Triple Higgs Coupling at a HE-LHC*,
with P. Meade, JHEP **03** 055 (2019) [arXiv:1811.02572].
10. *Search for nucleon decays with EXO-200*,
J. B. Albert et al. (EXO-200 Collaboration), Phys. Rev. D **97** 072007 (2018). [arXiv:1710.07670].
11. *First search for Lorentz and CPT violation in double beta decay with EXO-200*,
J. B. Albert et al. (EXO-200 Collaboration), Phys. Rev. D **93** 072001 (2016). [arXiv:1601.07266].

Community Reports, White Papers & Conference Proceedings

- *Higgs Physics at the HL-LHC and HE-LHC*,
[arXiv:1902.00134].

■ Talks Given

- *SMEFT Fits and the Higgs Inverse Problem*, July 7, 2020.
Preparatory Joint Sessions on "Open questions and News Ideas", Snowmass Energy Frontier Meeting.
- *Light Scalars and the KOTO Anomaly*, May 4, 2020.
Phenomenology Symposium 2020, University of Pittsburgh.
- *Flavorful Higgs Physics from the MeV to TeV scale*, May 1, 2020.
High Energy Theory Lunch Seminar, Brookhaven National Laboratory.
- *Light Scalars and the KOTO Anomaly*, April 21, 2020.
APS April Meeting 2020, Washington D.C.
- *The Higgs and New Physics with Flavor*, April 10, 2020.
LHC/BSM Journal Club, MIT Center for Theoretical Physics.
- *The Higgs and New Physics with Flavor*, April 9, 2020.
YITP Seminar, Stony Brook University.

- *Higgs bosons with large couplings to light quarks*, September 26, 2019.
Brookhaven Forum 2019, Brookhaven National Laboratory.
- *Unearthing Kinematic Information in WH Production*, August 01, 2019.
APS DPF Meeting 2019, Northeastern University.
- *Spontaneous Flavor Violation and the 2HDM*, May 07, 2019.
Phenomenology Symposium 2019, University of Pittsburgh.
- *Spontaneous Flavor Violation and the 2HDM*, April 19, 2019.
High Energy Theory Lunch Seminar, Brookhaven National Laboratory.
- *Measuring the Higgs Trilinear Coupling at an HE-LHC*, October 19, 2018.
High Energy Theory Lunch Seminar, Brookhaven National Laboratory.
- *Exploring the Higgs Sector*, June 22, 2018.
TASI 2018 Student Talk, University of Colorado, Boulder.
- *Measuring the Higgs Trilinear Coupling at an HE-LHC*, May 8, 2018.
Phenomenology Symposium 2018, University of Pittsburgh.
- *The Higgs Self-Coupling and Future Colliders*, April 16, 2018.
Hang Yuan Physics Lecture (No. 109), Shaanxi Normal University, Xi'an, China.
- *Measuring the Higgs Trilinear Coupling at an HE-LHC*, April 5, 2018.
HL/HE-LHC Meeting, Fermi National Accelerator Laboratory.
- *Measuring the Higgs Trilinear Coupling at an HE-LHC*, October 12, 2017.
Brookhaven Forum 2017, Brookhaven National Laboratory.
- *Search for Nucleon Decays in ^{136}Xe with EXO-200*, January 30, 2015.
Physics Undergraduate Research Symposium, University of Illinois at Urbana-Champaign.

■ Professional Service

- Referee for *Physical Review Letters*, *Physical Review D*, *Nuclear Physics B*
- Member of Working Group 2 (Higgs Physics) on the Physics of the HL-LHC, and Perspectives at the HE-LHC Program

■ Workshops, Programs & Schools Attended

- Lighting new Lampposts for Dark Matter and Beyond the Standard Model,
February 23 - April 8, 2020, Simons Center for Geometry and Physics, Stony Brook, NY.
- ICTP Summer School on Particle Physics, June 2019,
Abdus Salam International Center for Theoretical Physics, Trieste, Italy.
- Theoretical Advanced Study Institute (TASI), *Theory in an Era of Data*,
June 2018, University of Colorado, Boulder, CO.
- Prospects in Theoretical Physics (PiTP), *Particle Physics at the LHC and Beyond*,
July 2017, Institute for Advanced Study, Princeton, NJ.
- Workshop: Beyond WIMPs: From Theory to Detection, March 2017.
Simons Center for Geometry and Physics, Stony Brook, NY.

■ Experimental Collaborations

- REDTOP Collaboration, *Member*.
- EXO-200 Collaboration, *Undergraduate Researcher, Data Analysis*.

■ Awards and Fellowships

- DOE Office of Science Graduate Research Fellowship, 2018 - 2019.
- Rosaline and Milton Stermann Travel Award, 2019.
- American Physical Society Division of Particles and Fields (DPF) Meeting Travel Award, 2019.
- Silsbee Prize (Travel Award), 2017.
- Ernest M. Lyman Prize (Outstanding Graduating Senior in Physics), 2015.
- Robert E. Hetrick Outstanding Senior Thesis Award, 2015.
- Lorella M. Jones Summer Research Award, 2014.
- James Scholar, University of Illinois at Urbana-Champaign, 2011 - 2015.
- Dean's List, University of Illinois at Urbana-Champaign, Fall 2011 - Spring 2015.
- University Achievement Scholar, University of Illinois at Urbana-Champaign, 2011 - 2015.

■ Teaching Experience

- **Teaching Assistant, Dept. of Physics, Stony Brook University**
August 2015 - May 2018

Courses Taught or Graded For:

- PHY 524: Graduate Cosmology (Grader), Spring 2020
- PHY 610: Quantum Field Theory I (Grader), Spring 2018
- PHY 252: Modern Physics Laboratory, Fall 2016, Spring 2017
- PHY 123: Classical Physics A (Laboratory), Summer 2016
- PHY 134: Classical Physics Laboratory II, Spring 2016
- PHY 133: Classical Physics Laboratory I, Fall 2015