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Samuel D. Homiller

Education

- **Stony Brook University – Dept. of Physics and Astronomy**
  Ph.D. in Physics (Expected Summer 2020) Advisor: Prof. Patrick Meade
- **University of Illinois at Urbana-Champaign – Dept. of Physics**
  B.S., Physics – Magna cum Laude, Highest Distinction, May 2015
  Thesis: Search for Nucleon Decays into Invisible Channels in Xe-136 Advisor: Prof. Liang Yang
  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. *Flavorful light scalars and the KOTO anomaly*,
   with D. Egaña-Ugrinovic and P. Meade, [arXiv:1911.10203], submitted to PRL.
3. *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].
4. *Higgs bosons with large couplings to light quarks*,
   with D. Egaña-Ugrinovic and P. Meade, Phys. Rev. D **100**, 115041 (2019) [arXiv:1908.11376].
5. *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].
6. *Aligned and Spontaneous Flavor Violation*,
   with D. Egaña-Ugrinovic and P. Meade, Phys. Rev. Lett **123** 031802 (2019) [arXiv:1811.00017].
7. *Measurement of the Triple Higgs Coupling at a HE-LHC*,
   with P. Meade, JHEP **03** 055 (2019) [arXiv:1811.02572].
8. *Search for nucleon decays with EXO-200*,
   J. B. Albert et al. (EXO-200 Collaboration), Phys. Rev. D **97** 072007 (2018). [arXiv:1710.07670].
9. *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

- *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.
  Phenomenolgy Symposium 2019, University of Pittsburgh.
- *Measuring the Higgs Trilinear Coupling at an HE-LHC*, October 19, 2018.
  High Energy Theory Lunch Discussion, 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 2018 Symposium, 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
- Member of the “New Light Weakly Coupled Particles" sub-Working Group for the Snowmass 2021 process.

Workshops & Schools Attended

- 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 Sterman 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 Oustanding 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:
  - 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