

# Salvatore D. Pace

## *Curriculum Vitae*

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### Education

Massachusetts Institute of Technology	Cambridge, MA
Ph.D. in Physics	2026 (expected)
Advisor: Xiao-Gang Wen	
University of Cambridge	Cambridge, UK
MPhil in Physics	2021
Thesis: <i>Emergent Axions in U(1) Quantum Spin Liquids</i>	
Advisor: Claudio Castelnovo	
Boston University	Boston, MA
B.A. with honors & M.A. in Physics	2020
Thesis: <i>The Fine Structure Constant in Quantum Spin Ice</i>	
Advisor: Christopher Laumann	

### Selected Awards and Honors

Kavli Institute for Theoretical Physics Graduate Fellowship	2025
National Science Foundation Graduate Research Fellowship	2022 – 2025
Churchill Scholarship	2020 – 2021
American Physical Society LeRoy Apker Award Finalist	2020
Learning Assistant of the Year	2019
Goldwater Scholarship	2019

### Scientific Papers [[Google Scholar](#)]

- [18] M. L. Kim, [S. D. Pace](#), and S.-H. Shao, “Symmetry-enforced Fermi surfaces,” [arXiv:2512.04150](#).
- [17] [S. D. Pace](#), Ö. M. Aksoy, and H. T. Lam, “Spacetime symmetry-enriched SymTFT: from LSM anomalies to modulated symmetries and beyond,” *SciPost Phys.* **20** (2026) 007, [[arXiv:2507.02036](#)].
- [16] [S. D. Pace](#), M. L. Kim, A. Chatterjee, and S.-H. Shao, ‘Parity Anomaly from a Lieb-Schultz-Mattis Theorem: Exact Valley Symmetries on the Lattice,’ *Phys. Rev. Lett.* **135** (2025) 236501, [[arXiv:2505.04684](#)].
- [15] [S. D. Pace](#), A. Chatterjee, and S.-H. Shao, “Lattice T-duality from non-invertible symmetries in quantum spin chains,” *SciPost Phys.* **18** (2025) 121, [[arXiv:2412.18606](#)].
- [14] [S. D. Pace](#), H. T. Lam, and Ö. M. Aksoy, “(SPT-)LSM theorems from projective non-invertible symmetries,” *SciPost Phys.* **18** (2025) 028, [[arXiv:2409.18113](#)].
- [13] A. Chatterjee, [S. D. Pace](#), and S.-H. Shao, “Quantized axial charge of staggered fermions and the chiral anomaly,” *Phys. Rev. Lett.* **134** (2025) 021601, [[arXiv:2409.12220](#)].

- [12] S. D. Pace, G. Delfino, H. T. Lam, and Ö. M. Aksoy, “Gauging modulated symmetries: Kramers-Wannier dualities and non-invertible reflections,” *SciPost Phys.* **18** (2025) 021, [[arXiv:2406.12962](#)].
- [11] S. D. Pace and Y. L. Liu, “Topological aspects of brane fields: Solitons and higher-form symmetries,” *SciPost Phys.* **16** (2024) 128, [[arXiv:2311.09293](#)].
- [10] S. D. Pace, C. Zhu, A. Beaudry, and X.-G. Wen, “Generalized symmetries in singularity-free nonlinear  $\sigma$  models and their disordered phases,” *Phys. Rev. B* **110** (2024) 195149, [[arXiv:2310.08554](#)].
- [9] S. D. Pace, “Emergent generalized symmetries in ordered phases and applications to quantum disordering,” *SciPost Phys.* **17** (2024) 080, [[arXiv:2308.05730](#)].
- [8] S. D. Pace and X.-G. Wen, “Exact emergent higher-form symmetries in bosonic lattice models,” *Phys. Rev. B* **108** (2023) 195147, [[arXiv:2301.05261](#)].
- [7] Y.-T. Oh, S. D. Pace, J. H. Han, Y. You, and H.-Y. Lee, “Aspects of  $\mathbb{Z}_N$  rank-2 gauge theory in (2 + 1) dimensions: Construction schemes, holonomies, and sublattice one-form symmetries,” *Phys. Rev. B* **107** (2023) 155151, [[arXiv:2301.04706](#)].
- [6] S. D. Pace and X.-G. Wen, “Emergent higher-symmetry protected topological orders in the confined phase of  $U(1)$  gauge theory,” *Phys. Rev. B* **107** (2023) 075112, [[arXiv:2207.03544](#)].
- [5] S. D. Pace and X.-G. Wen, “Position-dependent excitations and UV/IR mixing in the  $\mathbb{Z}_N$  rank-2 toric code and its low-energy effective field theory,” *Phys. Rev. B* **106** (2022) 045145, [[arXiv:2204.07111](#)].
- [4] S. D. Pace, C. Castelnovo, and C. R. Laumann, “Dynamical Axions in  $U(1)$  Quantum Spin Liquids,” *Phys. Rev. Lett.* **130** (2023) 076701, [[arXiv:2109.06890](#)].
- [3] S. D. Pace, S. C. Morampudi, R. Moessner, and C. R. Laumann, “Emergent Fine Structure Constant of Quantum Spin Ice Is Large,” *Phys. Rev. Lett.* **127** (2021) 117205, [[arXiv:2009.04499](#)].
- [2] S. D. Pace, K. A. Reiss, and D. K. Campbell, “The  $\beta$  Fermi-Pasta-Ulam-Tsingou Recurrence Problem,” *Chaos* **29** (2019) 113107, [[arXiv:1908.00564](#)].
- [1] S. D. Pace and D. K. Campbell, “Behavior and breakdown of higher-order Fermi-Pasta-Ulam-Tsingou recurrences,” *Chaos* **29** (2019) 023132, [[arXiv:1811.00663](#)].

## Invited Talks

Simons Collaboration on Confinement workshop [ <a href="#">Slides to appear</a> ]	May '26
University of Minnesota Seminar [ <a href="#">Slides to appear</a> ]	May '26
University of Minnesota Department Colloquium [ <a href="#">Slides to appear</a> ]	April '26
Aspen Conference: Generalized Symmetries and Defects in QFT and Gravity [ <a href="#">Slides to appear</a> ]	Feb '26
Institute for Advanced Study [ <a href="#">Notes</a> ]	Jan '26
University of Oxford [ <a href="#">Notes</a> ]	Nov '25
Simons Center for Geometry and Physics [ <a href="#">Notes</a> ], [ <a href="#">Recording</a> ]	Oct '25
CU Boulder CTQM Theory Colloquium [ <a href="#">Slides</a> ]	Sept '25
OIST TSVP Symposium: Aspects of Generalized Symmetries [ <a href="#">Slides</a> ]	June '25
OIST Thematic Program: Generalized Symmetries in Quantum Matter [ <a href="#">Pre-talk notes</a> ], [ <a href="#">Main talk slides</a> ]	June '25

Georgia Tech [ <a href="#">Slides</a> ]	May '25
KITP Program: Generalized Symmetries in Quantum Field Theory: High Energy Physics, Condensed Matter, and Quantum Gravity [ <a href="#">Slides</a> ], [ <a href="#">Recording</a> ]	Apr '25
UCLA [ <a href="#">Pre-talk notes</a> ], [ <a href="#">Main talk slides</a> ]	Feb '25
Symmetry Seminar [ <a href="#">Slides</a> ], [ <a href="#">Recording</a> ]	Feb '25
IBS PCS Workshop: Effective Field Theory Beyond Ordinary Symmetries [ <a href="#">Slides</a> ], [ <a href="#">Recording</a> ]	Dec '24
Perimeter Institute for Theoretical Physics [ <a href="#">Slides</a> ], [ <a href="#">Recording</a> ]	Nov '24
Ohio State University [ <a href="#">Slides</a> ]	Oct '24
Harvard [ <a href="#">Slides</a> ]	Oct '24
SCGP Workshop: Applications of Generalized Symmetries and Topological Defects to Quantum Matter [ <a href="#">Slides</a> ], [ <a href="#">Recording</a> ]	Sept '24
Boston University [ <a href="#">Notes</a> ]	May '24
Symmetry Seminar [ <a href="#">Slides</a> ], [ <a href="#">Recording</a> ]	Sept '23
Boston University [ <a href="#">Slides</a> ]	June '22
Max Planck Institute for the Physics of Complex Systems [ <a href="#">Slides</a> ]	Nov '20

## Teaching Experience

### *Schools and workshops*

Invited TA: <a href="#">The Physics and Mathematics of Boundaries, Impurities, and Defects</a>	Fall '25
[ <a href="#">Lecture 1 recording</a> ], [ <a href="#">Lecture 2 recording</a> ], [ <a href="#">Notes</a> ]	
Invited TA: <a href="#">Atlantic TQFT Spring School 2025</a>	Spring '25

### *Massachusetts Institute of Technology*

TA: 8.02, Physics II	Spring '26
Two-time guest lecturer: 8.513, Modern Quantum Many-Body Physics	Fall '23
Two-time guest lecturer: 8.231, Physics of Solids I	Fall '22

### *Boston University*

Undergraduate Teaching Assistant (Learning Assistant)	
– PY406, Electromagnetic Fields and Waves II	Spring '20
– PY405, Electromagnetic Fields and Waves I	Fall '19
– PY452, Quantum Physics II	Fall '19
– PY451, Quantum Physics I	Spring '19
– PY410, Statistical Physics & Thermodynamics	Spring '19
– PY351, Modern Physics I	Fall '18
– PY313, Waves and Modern Physics	Fall '18
Guest lecturer: PY410, Statistical Physics & Thermodynamics	Spring '19

## Academic Services

### *Organizing*

Symmetry seminar: Co-organizer	2025 – Present
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MIT Ultra Quantum Matter seminar: Organizer	2022 – Present
MIT physics colloquium committee: Graduate student representative	2021 – 2024

*Mentorship*

Mentor for <a href="#">Project SHORT</a>	2020 – Present
MIT UROP Supervisor	2022 – 2023
Mentor for <a href="#">Boston University's PRISM</a>	2018 – 2020

*Journal Referee:* SciPost and Physical Review