Salvatore D. Pace

Curriculum Vitae

Website: salpace.github.io Email: sdpace4@gmail.com

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: *Emergent Axions in U(1) Quantum Spin Liquids*
- Advisor: Claudio Castelnovo

Boston University — Boston, MA
- B.A. with honors & M.A. in Physics — 2020
- Thesis: *The Fine Structure Constant in Quantum Spin Ice*
- Advisor: Christopher Laumann

Selected Awards and Honors

Kavli Institute for Theoretical Physics Graduate Fellowship	2024
National Science Foundation Graduate Research Fellowship	2021 – 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]

[17] S. D. Pace, Ö. M. Aksoy, and H. T. Lam, "Spacetime symmetry-enriched SymTFT: from LSM anomalies to modulated symmetries and beyond," arXiv:2507.02036.

[16] S. D. Pace, M. L. Kim, A. Chatterjee, and S.-H. Shao, "Parity anomaly from LSM: exact valley symmetries on the lattice," 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 σ 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 β 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

Oxford [*slides to appear*]	Nov '25
Simons Center for Geometry and Physics [Notes], [Recording]	Oct '25
CU Boulder CTQM Theory Colloquium [Slides]	Sept '25
OIST TSVP Symposium: Aspects of Generalized Symmetries [Slides]	June '25
OIST Thematic Program: Generalized Symmetries in Quantum Matter [Pre-talk notes], [Main talk slides]	June '25
Georgia Tech [Slides]	May '25
KITP Program: Generalized Symmetries in Quantum Field Theory: High Energy Physics, Condensed Matter, and Quantum Gravity [Slides], [Recording]	Apr '25
UCLA [Pre-talk notes], [Main talk slides]	Feb '25
Symmetry Seminar [Slides], [Recording]	Feb '25
IBS PCS Workshop: Effective Field Theory Beyond Ordinary Symmetries [Slides], [Recording]	Dec '24
Perimeter Institute for Theoretical Physics [Slides], [Recording]	Nov '24
Ohio State University [Slides]	Oct '24

Harvard [Slides] Oct '24

SCGP Workshop: Applications of Generalized Symmetries and Topological Defects to Quantum Matter [Slides], [Recording] Sept '24

Boston University [Notes] May '24

Symmetry Seminar [Slides], [Recording] Sept '23

Boston University [Slides] June '22

Max Planck Institute for the Physics of Complex Systems [Slides] Nov '20

Teaching Experience

Schools and workshops

Invited TA: The Physics and Mathematics of Boundaries, Impurities, and Defects [Lecture 1], [Lecture 2], [Notes] Fall '25

Invited TA: Atlantic TQFT Spring School 2025 Spring '25

Massachusetts Institute of Technology

Two-time guest lecturer of 8.513: Modern Quantum Many-Body Physics Fall '23

Two-time guest lecturer of 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 of PY410: Statistical Physics & Thermodynamics Spring '19

Mentorship and Academic Services

SciPost referee

Physical Review referee

Mentor for Project SHORT 2020 – Present

MIT Physics Graduate Student Council Officer 2021 – 2024

MIT UROP Supervisor 2022 – 2023

Mentor for Boston University's PRISM 2018 – 2020