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	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]

[19] S. D. Pace and D. Bulmash, "Lieb-Schultz-Mattis constraints from stratified anomalies of modulated symmetries," arXiv:2602.11266.

[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 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

Simons Collaboration on Confinement workshop [*Slides to appear*]	May '26
University of Minnesota Seminar [*Slides to appear*]	May '26
University of Minnesota Department Colloquium [*Slides to appear*]	April '26
Aspen Conference: Generalized Symmetries and Defects in QFT and Gravity [*Slides to appear*]	Feb '26
Institute for Advanced Study [Notes]	Jan '26
University of Oxford [Notes]	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 — June '25
[Pre-talk notes], [Main talk slides]

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 — Fall '25
[Lecture 1 recording], [Lecture 2 recording], [Notes]

Invited TA: Atlantic TQFT Spring School 2025 — 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
MIT Ultra Quantum Matter seminar: Organizer	2022 – Present
MIT physics colloquium committee: Graduate student representative	2021 – 2024

Mentorship

Mentor for Project SHORT	2020 – Present
MIT UROP Supervisor	2022 – 2023
Mentor for Boston University's PRISM	2018 – 2020

Journal Referee: SciPost and Physical Review