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: *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 [cond-mat.str-el]

[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 [cond-mat.str-el]

[15] S. D. Pace, A. Chatterjee, and S.-H. Shao, *Lattice T-duality from non-invertible symmetries in quantum spin chains*, SciPost Phys. **18**, 121 (2025), arXiv:2412.18606 [cond-mat.str-el]

[14] S. D. Pace, H. T. Lam, and Ö. M. Aksoy, *(SPT-)LSM theorems from projective non-invertible symmetries*, SciPost Phys. **18**, 028 (2025), arXiv:2409.18113 [cond-mat.str-el]

[13] A. Chatterjee, S. D. Pace, and S.-H. Shao, *Quantized axial charge of staggered fermions and the chiral anomaly*, Phys. Rev. Lett. **134**, 021601 (2025), arXiv:2409.12220 [hep-th]

[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**, 021 (2025), arXiv:2406.12962 [cond-mat.str-el]

[11] S. D. Pace and Y. L. Liu *Topological aspects of brane fields: Solitons and higher-form symmetries*, SciPost Phys. **16**, 128 (2024), arXiv:2311.09293 [hep-th]

[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**, 195149 (2024), arXiv:2310.08554 [cond-mat.str-el]

[9] S. D. Pace *Emergent generalized symmetries in ordered phases and applications to quantum disordering*, SciPost Phys. **17**, 080 (2024), arXiv:2308.05730 [cond-mat.str-el]

[8] S. D. Pace and X.-G. Wen, *Exact emergent higher-form symmetries in bosonic lattice models*, Phys. Rev. B **108**, 195147 (2023), arXiv:2301.05261 [cond-mat.str-el]

[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**, 155151 (2023), arXiv:2301.04706 [cond-mat.str-el]

[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**, 075112 (2023), arXiv:2207.03544 [cond-mat.str-el]

[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**, 045145 (2022), arXiv:2204.07111 [cond-mat.str-el]

[4] S. D. Pace, C. Castelnovo, and C. R. Laumann, *Dynamical Axions in $U(1)$ Quantum Spin Liquids*, Phys. Rev. Lett. **130**, 076701 (2023), arXiv:2109.06890 [cond-mat.str-el]

[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**, 117205 (2021), arXiv:2009.04499 [cond-mat.str-el]

[2] S. D. Pace, K. A. Reiss, and D. K. Campbell, *The β Fermi-Pasta-Ulam-Tsingou Recurrence Problem*, Chaos **29**, 113107 (2019), arXiv:1908.00564 [nlin.PS]

[1] S. D. Pace and D. K. Campbell, *Behavior and breakdown of higher-order Fermi-Pasta-Ulam-Tsingou recurrences*, Chaos **29**, 023132 (2019), arXiv:1811.00663 [nlin.PS]

Invited Talks

Oxford [*slides to appear*]	Nov '25
Simons Center for Geometry and Physics [*slides to appear*]	Oct '25
CU Boulder CTQM Theory Colloquium [*slides to appear*]	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 on 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 on 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

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