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]

[18] M. L. Kim, <u>S. D. Pace</u>, and S.-H. Shao, "Symmetry-enforced Fermi surfaces," `arXiv:2512.04150`.

[17] <u>S. D. Pace</u>, 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] <u>S. D. Pace</u>, 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] <u>S. D. Pace</u>, 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] <u>S. D. Pace</u>, 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, <u>S. D. Pace</u>, and S.-H. Shao, "Quantized axial charge of staggered fermions and the chiral anomaly," *Phys. Rev. Lett.* **134** (2025) 021601, [`arXiv:2409.12220`].

[12] <u>S. D. Pace</u>, 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] <u>S. D. Pace</u> and Y. L. Liu, "Topological aspects of brane fields: Solitons and higher-form symmetries," *SciPost Phys.* **16** (2024) 128, [`arXiv:2311.09293`].

[10] <u>S. D. Pace</u>, 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] <u>S. D. Pace</u>, "Emergent generalized symmetries in ordered phases and applications to quantum disordering," *SciPost Phys.* **17** (2024) 080, [`arXiv:2308.05730`].

[8] <u>S. D. Pace</u> 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, <u>S. D. Pace</u>, 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] <u>S. D. Pace</u> 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] <u>S. D. Pace</u> 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] <u>S. D. Pace</u>, C. Castelnovo, and C. R. Laumann, "Dynamical Axions in $U(1)$ Quantum Spin Liquids," *Phys. Rev. Lett.* **130** (2023) 076701, [`arXiv:2109.06890`].

[3] <u>S. D. Pace</u>, 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] <u>S. D. Pace</u>, K. A. Reiss, and D. K. Campbell, "The β Fermi-Pasta-Ulam-Tsingou Recurrence Problem," *Chaos* **29** (2019) 113107, [`arXiv:1908.00564`].

[1] <u>S. D. Pace</u> 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
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 [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 recording], [Lecture 2 recording], [Notes]	Fall '25
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