Salvatore D. Pace

Curriculum Vitae

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

Education

Massachusetts Institute of Technology 2021 - Present

- Ph.D. in Physics. Advisor: Xiao-Gang Wen

University of Cambridge 2020 - 2021

- MPhil in Physics. Advisor: Claudio Castelnovo
- Thesis: Emergent Axions in U(1) Quantum Spin Liquids

Boston University 2016 - 2020

- B.A. *with honors* & M.A. in Physics. Advisor: Chris Laumann
- Thesis: The Fine Structure Constant in Quantum Spin Ice

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] Salvatore D. Pace, Ömer M. Aksoy, and Ho Tat Lam, *Spacetime symmetry-enriched SymTFT: from LSM anomalies to modulated symmetries and beyond*, arXiv:2507.02036

[16] Salvatore D. Pace, Minho Luke Kim, Arkya Chatterjee, and Shu-Heng Shao, *Parity anomaly from LSM: exact valley symmetries on the lattice*, arXiv:2505.04684

[15] Salvatore D. Pace, Arkya Chatterjee, and Shu-Heng Shao, *Lattice T-duality from non-invertible symmetries in quantum spin chains*, SciPost Phys. **18**, 121 (2025)

[14] Salvatore D. Pace, Ho Tat Lam, and Ömer M. Aksoy, *(SPT-)LSM theorems from projective non-invertible symmetries*, SciPost Phys. **18**, 028 (2025)

[13] Salvatore D. Pace, Guilherme Delfino, Ho Tat Lam, and Ömer M. Aksoy *Gauging modulated symmetries: Kramers-Wannier dualities and non-invertible reflections*, SciPost Phys. **18**, 021 (2025)

[12] Arkya Chatterjee, Salvatore D. Pace, and Shu-Heng Shao, *Quantized axial charge of staggered fermions and the chiral anomaly*, Phys. Rev. Lett. **134**, 021601 (2025)

[11] Salvatore D. Pace, Chenchang Zhu, Agnès Beaudry, and Xiao-Gang Wen *Generalized symmetries in singularity-free nonlinear σ models and their disordered phases*, Phys. Rev. B **110**, 195149 (2024)

[10] Salvatore D. Pace *Emergent generalized symmetries in ordered phases and applications to quantum disordering*, SciPost Phys. **17**, 080 (2024)

[9] Salvatore D. Pace and Yu Leon Liu *Topological aspects of brane fields: Solitons and higher-form symmetries*, SciPost Phys. **16**, 128 (2024)

[8] Salvatore D. Pace and Xiao-Gang Wen, *Exact emergent higher-form symmetries in bosonic lattice models*, Phys. Rev. B **108**, 195147 (2023)

[7] Yun-Tak Oh, Salvatore D. Pace, Jung Hoon Han, Yizhi You, and Hyun-Yong 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)

[6] Salvatore D. Pace, Claudio Castelnovo, and Chris R. Laumann, *Dynamical Axions in $U(1)$ Quantum Spin Liquids*, Phys. Rev. Lett. **130**, 076701 (2023)

[5] Salvatore D. Pace and Xiao-Gang Wen, *Emergent higher-symmetry protected topological orders in the confined phase of $U(1)$ gauge theory*, Phys. Rev. B **107**, 075112 (2023)

[4] Salvatore D. Pace and Xiao-Gang 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)

[3] Salvatore D. Pace, Siddhardh C. Morampudi, Roderich Moessner, and Chris R. Laumann, *Emergent Fine Structure Constant of Quantum Spin Ice Is Large*, Phys. Rev. Lett. **127**, 117205 (2021) **[Editors' Suggestion and Featured in Physics]**

[2] Salvatore D. Pace, Kevin A. Reiss, and David K. Campbell, *The β Fermi-Pasta-Ulam-Tsingou Recurrence Problem*, Chaos **29**, 113107 (2019)

[1] Salvatore D. Pace and David K. Campbell, *Behavior and breakdown of higher-order Fermi-Pasta-Ulam-Tsingou recurrences*, Chaos **29**, 023132 (2019) **[Selected as an Editor's Pick]**

Research Presentations

Oral Presentations

- OIST TSVP Symposium: Aspects of Generalized Symmetries (invited)
  June '25 [slides]
- OIST Generalized Symmetries in Quantum Matter Thematic Program (invited)
  June '25 [pre-talk notes] [main talk slides]
- Caltech CMT Seminar
  May '25 [slides]
- Georgia Tech CMT Seminar (invited)
  May '25 [slides]
- KITP Generalized Symmetries in Quantum Field Theory Program (invited)
  April '25 [slides] [recording]
- UCSD CMT Seminar
  February '25 [slides]
- UCLA CMT Seminar (invited)
  February '25 [pre-talk notes] [main talk slides]
- The Symmetry Seminar (invited)
  February '25 [slides] [recording]
- Effective Field Theory Beyond Ordinary Symmetries, IBS PCS (invited)
  November '24 [slides] [recording]

- Perimeter Institute Seminar (invited)
  November '24 [slides] [recording]
- Ohio State University Quantum Symmetries Seminar (invited)
  October '24 [slides]
- Harvard CMT Kids Seminar (invited)
  October '24 [slides]
- SCGP Workshop on Applications of Generalized Symmetries and Topological Defects to Quantum Matter (invited)
  September '24 [slides] [recording]
- Paths to Quantum Field Theory 2024
  July '24 [slides]
- IHES Summer School – Symmetries and Anomalies: a Modern Take, Seminar
  July '24 [slides]
- Boston University CMT Seminar, (invited)
  May '24 [notes]
- American Physical Society March Meeting
  March '24 [slides]
- The Symmetry Seminar (invited)
  September '23 [slides] [recording]
- American Physical Society March Meeting
  March '23 [slides]
- Caltech CMT Seminar
  February '23 [slides]
- Boston University CMT Seminar (invited)
  June '22 [slides]
- American Physical Society March Meeting
  March '21 [slides]
- Highly Frustrated Magnetism Conference (wHFM21),
  January '21 [slides]
- MPIPKS Condensed matter seminar, (invited)
  November '20 [slides]
- American Physical Society March Meeting,
  March '20 [slides]
- Greater Boston Area Stat. Mech. Meeting, *Brandeis University*
  October '19 [slides]
- American Physical Society March Meeting,
  March '19 [slides]
- Boston University Dynamical Systems Seminar Series, (invited)
  November '18 [slides]
- Greater Boston Undergraduate Physics Conference, *MIT*
  November '18 [slides]

Poster Presentations

- UQM Winter 2025 meeting,
  January '25 [poster]

- Symmetries 2024,
  August '24 [poster]
- Prospects in Theoretical Physics 2024,
  July '24 [poster]
- UQM Winter 2024 meeting,
  January '24 [poster]
- Princeton Summer School on Condensed Matter Physics,
  July '23 [poster]
- 22nd annual Undergraduate Research Symposium, *Boston University*
  October '19 [poster]
- Greater Boston Undergraduate Physics Conference, *MIT*
  November '18 [poster]
- 21st annual Undergraduate Research Symposium, *Boston University*
  October '18 [poster]

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