Salvatore D. Pace

Curriculum Vitae

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Education

Massachusetts Institute of Technology — September 2021 - Present
- Ph.D. in Physics — GPA: 5.00/5.00
- Advisor: Xiao-Gang Wen

University of Cambridge (Churchill Scholar) — October 2020 - August 2021
- MPhil in Physics
- Thesis: Emergent Axions in $U(1)$ Quantum Spin Liquids
- Advisor: Claudio Castelnovo

Boston University — September 2016 - May 2020
- B.A. *with honors* in Physics & M.A. in Physics — GPA: 4.00/4.00
- Thesis: The Fine Structure Constant in Quantum Spin Ice
- Advisor: Chris Laumann

Selected Awards and Honors

- APS LeRoy Apker Award Finalist — June 2020
- BU College Prize for Excellence in the Physics Department — May 2020
- National Science Foundation Graduate Research Fellowship — March 2020
- Churchill Scholarship — January 2020
- Learning Assistant of the Year — May 2019
- Goldwater Scholarship — April 2019

Scientific Papers

[11] Salvatore D. Pace and Yu Leon Liu *Topological aspects of brane fields: solitons and higher-form symmetries*, arXiv:2311.09293

[10] Salvatore D. Pace, Chenchang Zhu, Agnès Beaudry, and Xiao-Gang Wen *Generalized symmetries in singularity-free nonlinear σ-models and their disordered phases*, arXiv:2310.08554

[9] Salvatore D. Pace, *Emergent generalized symmetries in ordered phases*, arXiv:2308.05730

[8] Salvatore D. Pace and Xiao-Gang Wen, *Exact emergent higher-form symmetries in bosonic lattice models*, arXiv:2301.05261

[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

- Oxford's Symmetry Seminar (invited) — September 2023
  "Emergent generalized symmetries in ordered phases and their spontaneous breaking"
- American Physical Society March Meeting — March 2023
  "Exact emergent higher-form symmetries"
- Caltech CMT Seminar — February 2023
  "Higher-form symmetries and topological phases"
- Boston University CMT Seminar, *Boston University* (invited) — June 2022
  "UV/IR Mixing in the $\mathbb{Z}_N$ rank-2 toric code"
- American Physical Society March Meeting, *Virtual* — March 2021
  "The Emergent Fine Structure Constant of Quantum Spin Ice is Large"
- Highly Frustrated Magnetism Conference (wHFM21), *Virtual* — January 2021
  "The Emergent Fine Structure Constant of Quantum Spin Ice is Large"
- MPIPKS Condensed matter seminar, *Virtual* (invited) — November 2020
  "The fine structure constant of quantum spin ice"
- American Physical Society March Meeting, *Virtual* — March 2020
  "The β Fermi-Pasta-Ulam-Tsingou Recurrence Problem"
- Greater Boston Area Stat. Mech. Meeting, *Brandeis University* — October 2019
  "The β Fermi-Pasta-Ulam-Tsingou Recurrence Problem"
- American Physical Society March Meeting, *Boston, MA* — March 2019
  "Behavior and Breakdown of Higher-Order FPUT Recurrences"
- Dynamical Systems Seminar Series, *Boston University* (invited) — November 2018
  "Behavior and Breakdown of Higher-Order FPUT Recurrences"
- Greater Boston Undergraduate Physics Conference, *MIT* — November 2018
  "Behavior and Breakdown of Higher-Order FPUT Recurrences"

Poster Presentations

- Princeton Summer School on Condensed Matter Physics, July 2023
  "Generalized symmetries in ordered phases: bridging the ordinary and the exotic"
- 22nd annual Undergraduate Research Symposium, *Boston University* October 2019
  "Recurrences in the β FPUT Chain"
- Greater Boston Undergraduate Physics Conference, *MIT* November 2018
  "Behavior and Breakdown of Higher-Order FPUT Recurrences"
- 21st annual Undergraduate Research Symposium, *Boston University* October 2018
  "Behavior and Breakdown of Higher-Order FPUT Recurrences"

Teaching Experience

Massachusetts Institute of Technology

- Two time guest lecturer of 8.513: Modern Quantum Many-Body Physics Fall 2023
- Two time guest lecturer of 8.231: Physics of Solids I Fall 2022

Boston University

- Undergraduate Teaching Assistant (Learning Assistant)
  - PY406: Electromagnetic Fields and Waves II Spring 2020
  - PY405: Electromagnetic Fields and Waves I Fall 2019
  - PY452: Quantum Physics II Fall 2019
  - PY451: Quantum Physics I Spring 2019
  - PY410: Statistical Physics & Thermodynamics Spring 2019
  - PY351: Modern Physics I Fall 2018
  - PY313: Waves and Modern Physics Fall 2018
- Guest lecturer of PY410: Statistical Physics & Thermodynamics Spring 2019

Mentorship and Academic Services

- MIT UROP Supervisor September 2022 - May 2023
- MIT Physics Graduate Student Council Officer June 2021 - Present
- Mentor for Project SHORT August 2020 - Present
- Mentor for Boston University's PRISM September 2018 - May 2020