

Ross Dempsey

Ph.D. Candidate, Princeton University Department of Physics

Education

- Princeton University Princeton, NJ
Ph.D. Physics 2019 – 2025
- Johns Hopkins University Baltimore, MD
BS Physics; BA, MA Mathematics 2016 – 2018

Awards and Honors

- Charlotte Elizabeth Procter Fellowship 2024 – 2025
Princeton University
- Graduate Research Fellow 2019 – 2024
National Science Foundation
- First Place 2019
International Theoretical Physics Olympiad
- Kerr Memorial Prize 2019
Johns Hopkins University

Publications

Papers

- Ross Dempsey et al. “Small Circle Expansion for Adjoint QCD₂ with Periodic Boundary Conditions”. In: (June 2024). arXiv: 2406.17079 [hep-th]
- Ross Dempsey et al. “Global Symmetry and Integral Constraint on Superconformal Lines in Four Dimensions”. In: (May 2024). arXiv: 2405.10914 [hep-th]
- Shai M. Chester, Ross Dempsey, and Silviu S. Pufu. “Level repulsion in $\mathcal{N} = 4$ super-Yang-Mills via integrability, holography, and the bootstrap”. In: *JHEP* 07 (2024), p. 059. DOI: 10.1007/JHEP07(2024)059. arXiv: 2312.12576 [hep-th]
- Ross Dempsey et al. “Lattice Hamiltonian for adjoint QCD₂”. In: *JHEP* 08 (2024), p. 009. DOI: 10.1007/JHEP08(2024)009. arXiv: 2311.09334 [hep-th]
- Ross Dempsey et al. “Phase Diagram of the Two-Flavor Schwinger Model at Zero Temperature”. In: *Phys. Rev. Lett.* 132.3 (2024), p. 031603. DOI: 10.1103/PhysRevLett.132.031603. arXiv: 2305.04437 [hep-th]
- Ross Dempsey et al. “Discrete chiral symmetry and mass shift in the lattice Hamiltonian approach to the Schwinger model”. In: *Phys. Rev. Res.* 4 (4 Nov. 2022), p. 043133. arXiv: 2206.05308
- Ross Dempsey and Peter Weck. “Compactifying the Kerr-Schild double copy”. In: *JHEP* 05 (2023), p. 198. DOI: 10.1007/JHEP05(2023)198. arXiv: 2211.14327 [hep-th]

- Ross Dempsey et al. “Adjoint Majorana QCD₂ at finite N”. in: *JHEP* 04 (2023), p. 107. DOI: 10.1007/JHEP04(2023)107. arXiv: 2210.10895 [hep-th]
- Shai M. Chester, Ross Dempsey, and Silviu S. Pufu. “Bootstrapping $\mathcal{N} = 4$ super-Yang-Mills on the conformal manifold”. In: *JHEP* 01 (2023), p. 038. DOI: 10.1007/JHEP01(2023)038. arXiv: 2111.07989
- Ross Dempsey, Igor R. Klebanov, and Silviu S. Pufu. “Exact symmetries and threshold states in two-dimensional models for QCD”. in: *JHEP* 10 (2021), p. 096. DOI: 10.1007/JHEP10(2021)096. arXiv: 2101.05432 [hep-th]
- Kelsey M. Hallinen et al. “Decoding locomotion from population neural activity in moving *C. elegans*”. In: *bioRxiv* (2021). DOI: 10.1101/445643
- Ross Dempsey and Charles Guinn. “A Phase Transition in Minesweeper”. In: *10th International Conference on Fun with Algorithms (FUN 2021)*. Vol. 157. Leibniz International Proceedings in Informatics (LIPIcs). 2020, 12:1–12:10. DOI: 10.4230/LIPIcs.FUN.2021.12
- Ross Dempsey, Nadia L. Zakamska, and James E. Owen. “Formation of Orion fingers”. In: *MNRAS* 495.1 (May 2020), pp. 1172–1187. DOI: 10.1093/mnras/staa1264. arXiv: 2005.01902
- Ibrahima Bah, Ross Dempsey, and Peter Weck. “Kerr-Schild Double Copy and Complex Worldlines”. In: *JHEP* 02 (2020), p. 180. DOI: 10.1007/JHEP02(2020)180. arXiv: 1910.04197 [hep-th]
- J. Chen et al. “The spatial extension of extended narrow line regions in MaNGA AGN”. in: *MNRAS* 489.1 (Oct. 2019), pp. 855–867. DOI: 10.1093/mnras/stz2183. arXiv: 1908.02885
- Ross Dempsey and Nadia L. Zakamska. “The size-luminosity relationship of quasar narrow-line regions”. In: *MNRAS* 477 (July 2018), pp. 4615–4626. DOI: 10.1093/mnras/sty941. arXiv: 1804.05848

Books

- Ross Dempsey and Andrew M. Leifer. *Undergraduate Physics in a Hurry*. Princeton University Press, forthcoming

Talks

Invited Research Talks

- New Approaches to Adjoint QCD₂ July 2024
Bootstrap 2024 UCM (Madrid)
- Adjoint QCD₂ on the Hamiltonian Lattice May 2024
Confining Strings SwissMAP (Les Diablerets)
- Level Repulsion in $\mathcal{N} = 4$ super-Yang-Mills May 2024
Bootstrap, Localization and Holography YITP (Kyoto)
- Phase Diagram of the Two-Flavor Schwinger Model at Zero Temperature February 2024
High-energy Theory Seminar Princeton University
- Studying 2D Gauge Theories on the Hamiltonian Lattice October 2023
RBRC Seminar Brookhaven National Laboratory

- Fun with the Lattice Schwinger Model
High-energy Theory Seminar June 2023
Johns Hopkins University
- Phase Diagram of the Two-Flavor Schwinger Model at Zero Temperature
Quark Confinement 2023 May 2023
University of Minnesota
- Adjoint QCD₂ at Finite N
Simons Confinement Collaboration Inaugural Workshop September 2022
Princeton University

Outreach Talks

- Physics of the Solar Eclipse
Stone Hill Learning Center (Princeton, NJ) May 2024
- Quarks, Billiards, and Dualities
Warrior-Scholar Project (Princeton, NJ) July 2024
Stone Hill Learning Center (Princeton, NJ) February 2024
Warrior-Scholar Project (Princeton, NJ) July 2023
Sant High School Physics Club (Ulaanbaatur, Mongolia) October 2022
William & Mary Society of Physics Students (Williamsburg, VA) September 2022
Da Vinci Science High School (Los Angeles, CA) February 2022
Warrior-Scholar Project (Princeton, NJ) June 2021
- Imaginary Numbers for Real Black Holes
EDI Summer Research Talks (Princeton, NJ) July 2022
- From Cookie Sheets to Superconductivity
Hillsborough High School (Tampa, FL) October 2021

Miscellaneous

- Mathematica Hogwarts: Becoming a Wizard
Workshop during Wintersession January 2024
Princeton University

Teaching

Princeton

Assistant in Instruction:

- PHY 208: Principles of Quantum Mechanics Spring 2022
- PHY 103: General Physics I Fall 2021

Undergraduate projects co-advised:

- Noah Luch Senior Thesis: “1+1D QCD with Quarks and Adjoint Fermions at Finite N ”
- George Zhou Senior Thesis: “Entanglement Dynamics in the Schwinger Model”
- George Zhou JP: “Second Order Phase Transition in the Lattice Schwinger Model”
- Loki Lin Senior Thesis: “Discretized Light-Cone Quantization of Two-Dimensional $SU(N)$ Gauge Theories”
- Alex McDonald JP: “Supersymmetry in DLCQ for Two Dimensional Adjoint QCD”

- Loki Lin JP: “A Two-Dimensional $SU(N)$ Theory of Quarks”

Prison Teaching Initiative

- CSIT-103: Computer Concepts and Literacy Fall 2022
South Woods State Prison
- Cisy-102: Computer Literacy Spring 2022
Edna Mahan Correctional Facility for Women
- MATH-020: Elementary Algebra Fall 2021
Garden State Youth Correctional Facility
- MATH-020: Elementary Algebra Summer 2021
Edna Mahan Correctional Facility for Women
- MAT-033: Pre-algebra Spring 2020
FCI Fort Dix (abbreviated due to COVID)

Service

Princeton

- Conference for Undergraduate Women in Physics (CUWiP) August 2022 – January 2023
Local Organizing Committee
- Broader Outreach Committee 2021 – present
“Zoom a Princeton Physicist” talks
Science demonstrations at local schools and libraries
- Graduate Physics Ambassadors September 2021 – January 2022
Panelist for graduate admissions webinars
Panelist + speaker for Princeton Physics PhD Preview program

External

- Department of Energy National Science Bowl 2020 – present
Competition official, question writer, question editor, Subject Matter Expert for physics
- Peer Reviewer Since 2024
Physical Review D
Nuclear Physics B Since 2024
Journal of High Energy Physics Since 2023
Physical Review Letters Since 2022