Curriculum Vitae — Scott Lawrence

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Research Interests

Computational methods for out-of-equilibrium and dense field theories; Machine learning acceleration of lattice field theory; Sign problems in Monte Carlo studies of quantum systems; Applications of quantum computers to field theories

History

2023-present	Feynman fellow Theoretical Division T-2, Los Alamos National Laboratory Advisors: Tanmoy Bhattacharya, Duff Neill
2020-2023	Postdoctoral research University of Colorado, Boulder Advisor: Paul Romatschke
2017-2020	Ph.D., Physics University of Maryland, College Park Thesis advisor: Paulo F. Bedaque
2015-2017	Graduate research, Astronomy University of Maryland, College Park
2011-2015	B.S., Physics and Computer Science University of Maryland, College Park.

Papers

[36] S. Lawrence, "Model-free spectral reconstruction via Lagrange duality," Aug. 2024. arXiv: 2408.11766 [hep-lat].

[35] A. Bärtschi *et al.*, "Potential Applications of Quantum Computing at Los Alamos National Laboratory," Jun. 2024. arXiv: 2406.06625 [quant-ph].

[34] S. Lawrence, A. Shelby, and Y. Yamauchi, "Quantum states from normalizing flows," Jun. 2024. arXiv: 2406.02451 [quant-ph].

[33] S. Lawrence, "Schwinger-Dyson control variates for lattice fermions," Apr. 2024. arXiv: 2404.10707 [hep-lat].

[32] S. Lawrence, S. Valgushev, J. Xiao, and Y. Yamauchi, "Contour deformations for non-holomorphic actions," Jan. 2024. arXiv: 2401.16733 [hep-lat].

[31] S. Lawrence and Y. Yamauchi, "Mitigating a discrete sign problem with extreme learning machines," Dec. 2023. arXiv: 2312.12636 [hep-lat].

[30] S. Lawrence and Y. Yamauchi, "Convex optimization of contour deformations," *Phys. Rev. D*, vol. 110, no. 1, p. 014 508, 2024. DOI: 10.1103/PhysRevD.110.014508. arXiv: 2311.13002 [hep-lat].

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[23] S. Lawrence, "Bootstrapping Lattice Vacua," Nov. 2021. arXiv: 2111.13007 [hep-lat].

[22] S. Lawrence, "Resurrecting the Strong KSS Conjecture," Nov. 2021. arXiv: 2111.08158 [hep-th].

[21] T. D. Cohen, H. Lamm, S. Lawrence, and Y. Yamauchi, "Quantum algorithms for transport coefficients in gauge theories," *Phys. Rev. D*, vol. 104, no. 9, p. 094 514, 2021. DOI: 10.1103/PhysRevD.104.094514. arXiv: 2104.02024 [hep-lat].

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Proceedings

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Talks

[10] S. Lawrence, "Machine learning approaches to accelerating lattice simulations," Plenary at Lattice 2024, Aug. 2024.

[9] S. Lawrence, "Real-time dynamics from convex geometry," Lattice 2024, Aug. 2024.

[8] S. Lawrence, "Aspects of large-N_f quantum field theories," Seminar at Keio University, Oct. 2023.

[7] S. Lawrence, "Machine learning approaches for sign and signal-to-noise problems," Santa Fe workshop on "Lattice QCD and Probes of New Physics", Aug. 2023.

[6] S. Lawrence, "Machines learning to solve sign problems," SIGN'22 at Tel Aviv University, 2022.

[5] S. Lawrence, "Sign problems, contour deformations, and computational complexity," Seminar, CU Boulder, 2021.

[4] S. Lawrence, "The quantum computer in the s-matrix," YITP, 2021.

[3] S. Lawrence, "Quantum simulation of gauge theory," Seminar, the George Washington University, 2019.

[2] S. Lawrence, "Beyond thimbles: Integration contours to solve a sign problem," Nuclear theory seminar, University of Maryland, 2018.

[1] S. Lawrence, "Approximating waveforms of rapidly rotating neutron stars," 21st International Conference On General Relativity and Gravitation, 2016.