Dr. Nathan Schine (he/him/his)

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RESEARCH

Quantum many-body physics, quantum information, quantum metrology
Alkaline earth atom arrays, cavity QED, Rydberg physics, synthetic gauge fields

Assistant Professor of Physics, University of Maryland, College Park	2022-present
Fellow, Joint Quantum Institute,	2022-present
Postdoctoral Associate, Group of Adam Kaufman, JILA, CU Boulder and NIST	2019-2022

EDUCATION

Ph.D. in Physics, The University of Chicago Group of Jonathan Simon, dissertation: *Quantum Hall Physics with Photons*	2013-2019
B.A. in Physics, Williams College, with highest honors, *Magna cum Laude*	2009-2013

HONORS AND AWARDS

Deborah Jin Award for Outstanding Doctoral Thesis Research in Atomic, Molecular, or Optical Physics, finalist	2020
NIST NRC Postdoctoral Research Associateship	2019
Harvard Quantum Initiative Postdoctoral Fellowship, declined	2019
Grainger Graduate Fellowship	2018-2019
National Science Foundation Graduate Research Fellow, finalist	2014 & 2015
LeRoy Apker Award, finalist	2013

STUDENT MENTORSHIP

Graduate Students	
Kayla Rodriguez: PhD, UMD	2023-present
Aaron Young: PhD, JILA	2019-2022
William Eckner: PhD, JILA	2019-2022
Undergraduate Students	
Dongxing (Jaden) He: UG UMD	2022-present
Carl Padgett: UG UChicago (to USCB physics PhD)	2017-2019
Michelle Chalupnik: UG UChicago (to Harvard physics PhD, Aliro Quantum)	2015-2017

SERVICE

Graduate admissions committee	2023
JQI graduate fellowships committee	2023
Investigate strategic partnership between UMD, NASA GSFC, and Lockheed Martin	2022-present
Reviewer for Nature and Physical Review journals, NIST internal review	2019-present

PEER-REVIEW PUBLICATIONS

1. Aaron W. Young, William J. Eckner, Nathan Schine, Andrew M. Childs, and Adam M. Kaufman, **Tweezer-programmable 2D quantum walks in a Hubbard-regime lattice**. *Science,* **377**, 885 (2022)
2. Nathan Schine*, Aaron W. Young*, William J. Eckner, Michael J. Martin, and Adam M. Kaufman, **Long-lived Bell states in an array of optical clock qubits**. *Nature Physics,* **18**, 1067 (2022)
3. William J. Eckner, Aaron W. Young, Nathan Schine, and Adam M. Kaufman, **High-Power, Fiber-Laser-Based Source for Magic-Wavelength Trapping in Neutral-Atom Optical Clocks**. *Review of Scientific Instruments*, **92**, 093001 (2021).
4. Aaron W. Young, William J. Eckner, William R. Milner, Dhruv Kedar, Matthew A. Norcia, Eric Oelker, Nathan Schine, Jun Ye, and Adam M. Kaufman, **Half-minute-scale atomic coherence and high relative stability in a tweezer clock.** *Nature* **588**, 408 (2020) [Selected for a Nature "News and Views"].
5. Logan Clark*, Nathan Schine*, Claire Baum, Ningyuan Jia, Jonathan Simon, **Observation of Laughlin states made of light**. *Nature*, **582**, 41-45, (2020) [Selected for a Nature "News and Views"].

6. Nathan Schine, Michelle Chalupnik, Tankut Can, Andrey Gromov, Jonathan Simon, **Electromagnetic and Gravitational Responses of Photonic Landau Levels.** *Nature* **565**, 173 (2019).

7. Logan Clark, Ningyuan Jia, Nathan Schine, Claire Baum, Alexandros Georgakopoulos, Jonathan Simon, **Interacting Floquet Polaritons.** *Nature* **571**, 532 (2019).

8. Ningyuan Jia, Nathan Schine, Alexandros Georgakopoulos, Albert Ryou, Logan Clark, Ariel Sommer, Jonathan Simon, **A Strongly Interacting Polaritonic Quantum Dot.** *Nature Physics* **14**, 550 (2018).

9. Kevin Cox, David Meyer, Nathan Schine, Fredrik Fatemi, Paul Kunz, **30-fold increase in atom-cavity coupling using a parabolic ring cavity.** *Journal of Physics, B* **51**, 195002 (2018).

10. Jia Ningyuan, Nathan Schine, Alexandros Georgakopoulos, Albert Ryou, Ariel Sommer, Jonathan Simon, **Photons and polaritons in a broken-time-reversal non-planar resonator.** *Phys. Rev. A* **97**, 013802 (2018). [Selected for an APS "Physics Focus" and Nature Photonics "Highlight"]

11. Nathan Schine, Albert Ryou, Andrey Gromov, Ariel Sommer, Jonathan Simon, **Synthetic Landau Levels for Photons.** *Nature* **534**, 671-5 (2016). [Selected for a Physics Today "Physics Update"]

12. Jia Ningyuan, Alexandros Georgakopoulos, Albert Ryou, Nathan Schine, Ariel Sommer, Jonathan Simon, **Observation and characterization of cavity Rydberg polaritons.** *Phys. Rev. A.* **93**, 041802(R) (2016).

13. Gambir Ranjit, Nathan Schine, Antonio Lorenzo, Anders Schneider, Protik Majumder, **Measurement of the scalar polarizability with the $5P_{1/2}$-$6S_{1/2}$ 410-nm transition in atomic indium.** *Phys. Rev. A.* **87**, 032506 (2013).

INVITED RESEARCH PRESENTATIONS

Invited Seminar, JQI Seminar, University of Maryland. College Park MD, January 31, 2023; *Entanglement and measurement in atom arrays.*

Invited Talk, University of Maryland. College Park MD, March 29, 2022; *Quantum science with photons and neutral atoms.*

Invited Seminar, UCLA. (virtual), March 4, 2022; *Quantum science with photons and neutral atoms.*

Invited Seminar, Stony Brook University. (virtual), February 25, 2022; *Quantum science with photons and neutral atoms.*

Invited Seminar, McGill University. (virtual), February 24, 2022; *Quantum science with photons and neutral atoms.*

Physics Colloquium, New York University. New York NY, February 21, 2022; *Quantum science with photons and neutral atoms.*

Physics Colloquium, Rice University. Houston TX, February 15, 2022; *Quantum science with photons and neutral atoms.*

Physics Colloquium, UT Austin. (virtual), February 11, 2022; *Quantum science with photons and neutral atoms.*

Invited Talk, University of Oklahoma. Norman OK, February 3, 2022; *Quantum science with photons and neutral atoms.*

Physics Colloquium, USC. (virtual), January 26, 2022; *Quantum science with photons and neutral atoms.*

Physics Colloquium, Grinnell College. Grinnell Iowa, December 17, 2021; *Quantum science with photons and neutral atoms.*

Quantum Matter Seminar, Caltech. Pasadena California, November 10, 2021; *Long lived clock qubit entanglement in strontium tweezer arrays.*

Invited Tutorial Speaker, APS March Meeting. virtual, March 14, 2021; Tutorial session on Synthetic Photonic Systems: *Building quantum dots and Laughlin puddles from optical photons.*

Invited Speaker, DAMOP. Portland, OR (virtual), June 2, 2020; *Fractional quantum Hall physics with photons.*

Invited Speaker, 5th international conference on optical angular momentum. Ottawa Canada, June 17, 2019; *Quantum materials made of light.*

Invited Speaker, APS March Meeting. Boston, Massachusetts, March 2019; *Topological invariants in a photonic quantum Hall material.*

Physics Colloquium, Williams College. Williamstown, Massachusetts, March 1st 2019; *Materials made of light.*

Physics Seminar, Harvard University. Cambridge, Massachusetts, January 30th 2019; *Quantum Hall physics with photons.*

Physics Seminar, Princeton University. Princeton, New Jersey, January 17th 2019; *Quantum Hall physics with photons.*

Physics Seminar, JILA. The University of Colorado, Boulder. Boulder, Colorado, November 19th 2018; *Quantum Hall physics with photons.*

Invited Speaker, 4th international conference on optical angular momentum. Anacapri Italy, September 2017; *Photons in the lowest Landau level.*

Invited Speaker, Physics of Quantum Electronics. Snowbird Utah, January 2016; *Photonic Landau levels on cones.*