Abhi Saxena

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Education

University of Washington, Seattle September, 2018 - August, 2023
Ph.D. in Electrical Engineering; GPA: 3.98/4.0
Advisors: Arka Majumdar, Rahul Trivedi

Indian Institute of Technology Delhi, New Delhi July, 2014 - May, 2018
B.Tech. in Electrical Engineering; GPA: 9.16/10.0

Appointments

National Institute of Standards and Technology, Boulder September, 2023
Postdoctoral Researcher, Quantum Nanophotonics Group

Publications

Preprints

Abhi Saxena, Erfan Abbasgholinejad, Arka Majumdar, Rahul Trivedi.
Boundary scattering tomography of the Bose Hubbard model on general graphs
arXiv:2310.14191 (2023)

Journal Publications

Abhi Saxena, Arnab Manna, Rahul Trivedi, Arka Majumdar.
Realizing tight-binding Hamiltonians using site-controlled coupled cavity arrays
Nature Communications 14, 5260 (2023)

Rui Chen, Virat Tara, Anna-Wirth Singh, **Abhi Saxena**, Johannes E. Fröch, Matthew S. Reynolds, and Arka Majumdar.
A hybrid solution for spatial light modulators with a large space-bandwidth product: opinion
Optical Materials Express 13.8 (2023)

Rui Chen, Zhuoran Fang, Christopher Perez, Forrest Miller, Khushboo Kumari, **Abhi Saxena**, Jiajiu Zheng, Sarah J Geiger, Kenneth E Goodson, Arka Majumdar.
Non-volatile electrically programmable integrated photonics with a 5-bit operation
Nature Communications 14, 3465 (2023)

Johannes E. Fröch, Shane Colburn, Alan Zhan, Zheyi Han, Zhuoran Fang, **Abhi Saxena**, Luocheng Huang, Karl F. Böhringer, and Arka Majumdar.
Dual Band Computational Infrared Spectroscopy via Large Aperture Meta-Optics
ACS Photonics (2022)

Zhuoran Fang, Rui Chen, Jiajiu Zheng, Asir Intisar Khan, Kathryn M Neilson, Sarah J Geiger, Dennis M Callahan, Michael G Moebius, **Abhi Saxena**, Michelle E Chen, Carlos Rios, Juejun Hu, Eric Pop, Arka Majumdar.
Ultra-low-energy programmable non-volatile silicon photonics based on phase-change materials with graphene heaters
Nature Nanotechnology 17 (8), 842-848 (2022)

Abhi Saxena, Yueyang Chen, Zhuoran Fang, Arka Majumdar.
Photonic topological baths for quantum simulation
ACS Photonics 9 (2), 682-687 (2022)

Yueyang Chen, David Sharp, **Abhi Saxena**, Hao Nguyen, Brandi M Cossairt, Arka Majumdar.
Integrated Quantum Nanophotonics with Solution-Processed Materials
Advanced Quantum Technologies 5 (1), 2100078 (2022)

Zhuoran Fang, Jiajiu Zheng, **Abhi Saxena**, James Whitehead, Yueyang Chen, Arka Majumdar.
Non-volatile reconfigurable integrated photonics enabled by broadband low-loss phase change material
Advanced Optical Materials 9 (9), 2002049 (2021)

Yueyang Chen, Shengnan Miao, Tianmeng Wang, Ding Zhong, **Abhi Saxena**, Colin Chow, James Whitehead, Dario Gerace, Xiaodong Xu, Su-Fei Shi, Arka Majumdar.
Metasurface Integrated Monolayer Exciton Polariton
Nano Letters 20, 7, 5292–5300 (2020)

David Rosser, Taylor Fryett, **Abhi Saxena**, Albert Ryou, Arka Majumdar.
High-precision local transfer of van der Waals materials on nanophotonic structures
Optical Materials Express 10 (2), 645-652 (2020)

David Rosser, Taylor Fryett, Albert Ryou, **Abhi Saxena**, Arka Majumdar.
Exciton–phonon interactions in nanocavity-integrated monolayer transition metal dichalcogenides
npj 2D Mater Appl 4, 20 (2020).

Abhi Saxena, Yueyang Chen, Albert Ryou, Carlos G Sevilla, Peipeng Xu, Arka Majumdar.
Improving indistinguishability of single photons from colloidal quantum dots using nanocavities
ACS Photonics 6, 12, 3166–3173 (2019)

Albert Ryou, David Rosser, **Abhi Saxena**, Taylor Fryett, Arka Majumdar.
Strong photon antibunching in weakly nonlinear two-dimensional exciton-polariton
Physical Review B 97 (23), 235307 (2018)

Talks

Boundary Scattering Tomography of Quantum Photonic Lattices
Quantum Interconnects II (QTh4C), Quantum 2.0 2023 June, 2023

Realizing Tight-binding Hamiltonians using Site-controlled Coupled Cavity Arrays
Emerging Topics in Quantum Photonics (FM3E), CLEO: Science and Innovations 2023 May, 2023

Photonic Topological Baths for Quantum Simulation
Quantum Photonics (SF3G), CLEO: Science and Innovations 2022 May, 2022

Work Experience

Teaching Assistant for Fundamentals of Electrical Engineering September, 2018 - June, 2019
Department of Electrical & Computer Engineering, University of Washington, Seattle

- Taught multiple tutorial classes per quarter consisting up to 30 undergraduates.
- Assisted students in their basic Electrical Engineering lab work.

Quantum Networks involving Superconducting Qubits May, 2017 - August, 2017
Institute for Quantum Science and Technology, University of Calgary

- Advisor: Prof. Christoph Simon.
- Work acknowledged in "Towards long-distance quantum networks with superconducting processors and optical links", Quantum Science and Technology (2019).

Honors and Awards

2019-20 CEI Graduate Fellowship, awarded by the Clean Energy Institute, University of Washington.
2014-18 IITD Semester Merit Award awarded four times by virtue of being in the top 7% of the entire class.
2015 Invited as the Prime Minister of India's guest at Republic Day Parade by the MoE India.
2014 All India Rank 40 out of 1.4 million candidates in Joint Entrance Examination Mains (JEE Mains).
2014 AISSC Examination: 12^{th} on the national merit list composed of more than a million students.
2012 Student of the Year award, awarded by the popular Indian national daily newspaper Times of India.
2010 National Talent Search Examination scholar, scored 13^{th} highest marks on the national merit list.

Skills and Courses

Nanofabrication:

Patterning: Electron-beam lithography, Photolithography

Etching: Dry etching (ICP, RIE), Vapor etching, Wet etching

Deposition: Electron beam evaporation, PECVD, ALD, Sputtering

Meteorology: SEM, Profilometry, Thin Film Reflectometry

Assembly: Wire bonding, Wafer Dicing

Optical and Electrical Characterization: Optical fiber & array measurements, Laser programming, Photoluminescence measurements, Single photon measurements, Imaging, Spectroscopy, DAC based multi-electrical control, Oscilloscopes.

Programming Languages: Python, HTML, familiar with MATLAB, Julia.

Computational Toolboxes: QuTip, Pytorch, JAX, ANSYS Lumerical: FDTD Solutions, Mode, HEAT, DEVICE, COMSOL: Multiphysics, MEEP, MIT-MPB.

Courses: Applied Nanophotonics, Quantum Information, Semiconductor Optoelectronics, Quantum Mechanics, Solid State Materials, Introduction to Synthetic Biology.