Himanshu Sahu

Curriculum Vitæ

We have art in order not to die of the truth. – Nietzsche

Personal Information

Nome e Cognome	Himanshu Sahu
Gender	Male
Date of Birth	22-07-2002
Address	Perimeter Institute, 31 Caroline Street North, Waterloo, ON, N2L 2Y5, Canada.
Nationality	Indian

Google Scholar • iNSPIRE-HEP • ORCiD • Linkedin • Github

Experience

09/2024-04/2025	**Teaching Assistant**, University of Waterloo, Waterloo, Ontario, Canada
07/2024-09/2024	**Junior Research Fellow**, Department of Instrumentation and Applied Physics, Indian Institute of Science, Bangalore, India
03/2024-08/2024	**Extern**, IBM Quantum, IBM Research Lab, Bangalore, India

Education

2024–Present	**PhD in Quantum Information**, Perimeter Institute for Theoretical Physics and Institute for Quantum Computing, University of Waterloo, Waterloo, Ontario, Canada • PI PhD Residency Fellow • Supervisor: Sisi Zhou
2021–2024	**Masters (Research) in Physics**, Indian Institute of Science, Bangalore, India • CGPA : 9.10/10 (max. typically $\sim$ 9.4)
2018–2021	**Bachelor in Physics**, Banaras Hindu University, Varanasi, India. • CGPA : 9.15/10 • Passed in First Division with Distinction

Master thesis

Title	Quantum walk based simulations & algorithms
Supervisor	Prof. Subroto Mukerjee & Prof. CM Chandrashekar
Description	This dissertation details our research on a wide range of ideas from quantum computing – quantum simulation, quantum algorithms, and quantum complexity which are brought together under the umbrella of quantum walks.

Research activity

Brief description I am a physicist broadly interested in the ideas at the intersection between condensed matter theory, quantum computing, and information theory.

Research Interests

Main interests Quantum metrology, Quantum error correction, Quantum information, Quantum computation, Quantum simulation, , Quantum algorithms, Quantum many-body physics, Open quantum systems, Quantum chaos.

Publications

Peer-reviewed journals

[1] K.V. Sharma, **H. Sahu** & S. Mukerjee, Quantum chaos in $\mathcal{PT}$-symmetric Quantum Kicked Rotor, (2023). SciPost Phys. 19, 120 (2025)

[2] **H. Sahu** & F. Iemini, Information scrambling and entanglement dynamics in Floquet time crystals, (2025). Phys. Rev. B 111, 104302 (2025)

[3] **H. Sahu**, Information scrambling in quantum walks: Discrete-time formulation of Krylov complexity, (2024). Phys. Rev. A 110, 052405 (2024)

[4] A. Bhattacharya, P.P. Nath & **H. Sahu**, Speed limits to the growth of Krylov complexity in open quantum systems, (2024). Phys. Rev. D 109, L121902 (2024) Letter
All authors contributed equally to this work.

[5] A. Bhattacharya, P.P. Nath & **H. Sahu**, Krylov complexity for non-local spin chains. Phys. Rev. D 109, 066010 (2024)
All authors contributed equally to this work.

[6] A. Bhattacharya, **H. Sahu**, A. Zahed, and K. Sen, Complexity for one-dimensional Discrete Time Quantum Walk Circuits. Phys. Rev. A 109, 022223 (2024)

[7] **H. Sahu** & K. Sen, Quantum-walk search in motion. Scientific Reports 14, 2815 (2024)

[8] **H. Sahu** & C.M. Chandrashekar, Open system approach to Neutrino oscillations in a quantum walk framework. Quantum Information Processing 23, 7 (2024)

[9] A. Bhattacharya, P. Nandy, P.P. Nath & **H. Sahu**, On Krylov complexity in open systems: an approach via bi-Lanczos algorithm. Journal of High Energy Physics 2023, 66 (2023)
All authors contributed equally to this work.

[10] A. Bhattacharya, P. Nandy, P.P. Nath & **H. Sahu**, Operator growth and Krylov construction in dissipative open quantum systems. Journal of High Energy Physics 2022, 81 (2022)
All authors contributed equally to this work.

Pre-prints under review

[1] J.V. Pamidimukkala, **H. Sahu**, A. Kannan, J. Ananthanarayanan, K. Dasgupta, and S. Senapati, Accelerating De Novo Genome Assembly via Quantum-Assisted Graph Optimization with Bitstring Recovery. arXiv:2602.00156 [quant-ph]

[2] **H. Sahu**, Q. Xu, and S. Zhou, Achieving the Heisenberg limit using fault-tolerant quantum error correction. arXiv:2601.05457 [quant-ph]

[3] **H. Sahu**, A. Bhattacharya, and P.P. Nath, Quantum complexity and localization in random quantum circuits, (2024). arXiv:2409.03656 [quant-ph]

Bibliometric parameters

Indices h-index 6 total citations 341, iNSPIRE-HEP
h-index 6 total citations 346, Google-Scholar (updated: Feb 2026)

Conferences, Seminars, and Schools

Contributed talks & seminars

Oct 2025 **Achieving the Heisenberg limit using fault-tolerant quantum error correction** (Link)
Graduate Student Conference, Perimeter Institute for Theoretical Physics, Waterloo, ON, Canada

Nov 2023 Quantum Information Scrambling in non-local systems
CHEP In-House Symposium, Centre for High Energy Physics, Indian Institute of Science, Bangalore, India

Posters

Aug 2025 Achieving the Heisenberg limit using fault-tolerant quantum error correction
Seeking Quantum Advantage, University of Oxford, England

Dec 2023 Simulating Neutrino Oscillations Using Quantum-walk
Quantum Information Processing and Applications, Harish-Chandra Research Institute, Prayagraj, India

Nov 2023 Quantum Information Scrambling in Dissipative Open Quantum Systems
Emerging Topics in Quantum Technology, Indian Institute of Technology, Palakkad, India

Oct 2023 Operator Complexity in Open Quantum System
Condensed Matter meets Quantum Information, International Centre for Theoretical Sciences (ICTS), Bengaluru, India

Sep 2023 Neutrino oscillations in discrete-time quantum walk framework
Student Conference in Optics and Photonics, Physical Research Laboratory, Ahmedabad, India

Jul 2023 Exploring Operator Growth and Krylov Complexity in Dissipative Open Quantum Systems
It from Qubit, Perimeter Institute for Theoretical Physics, Waterloo, Ontario, Canada

Teaching Activity

Teaching Assistant

Winter 2025 PHYS 777-MP-Core - Mathematical Physics
PSI course at Perimeter Institute of Theoretical Physics

Fall 2024 NE 216 - Advanced Calculus and Numerical Methods 1
Undergraduate course at University of Waterloo

Spring 2023 UP 204 - Intermediate Thermal Physics
Undergraduate course at Indian Institute of Science

Honors, Awards & Scholarships

2024-Present PI Residency Graduate Scholarship
Perimeter Institute for Theoretical Physics

2024-Present International Doctoral Student Award & Graduate Research Studentship
University of Waterloo

2023 Semi-Finalist, Rhodes Scholarship

2018-2021 INSPIRE Scholarship Awardee (SHE Program)
Department of Science and Technology, Government of India.

Other skills

Computer skills

OS Windows, Linux, HPC

Languages Python, Processing3, JavaScript, CSS, HTML

Software Mathematica, LaTeX, Matlab, Microsoft office, Origin, ...

Basic libraries Numpy, Scipy, Sympy, Joblib, p5.js, ...

Physics libraries Qiskit, QuSpin, QuTip, Stim, Open Fermion, ...

Linguistic skills

English Fluent : TOEFL iBT Score - 99/120 (L:28-R:25-W:25-S:21)

Hindi Mother tongue

Community contributions

2025-Present Reviewer for scientific journals
• Nature communication (1 as a early researcher)

2020-Present Contributor on Physics Stack Exchange
• Top 2% overall • 11K+ Reputation • ∼ 396K people reached