Tathagata Karmakar

Andrew N. Jordan ⬀ group

+1 585-967-8496
tkarmaka@ur.rochester.edu
www.pas.rochester.edu/~tathagata/

Expertise

Quantum optics, quantum measurement, analytical/numerical modelling and optimization.
Programming languages: Python (5+ yrs), Mathematica (5+ yrs), Fortran, C.

Education

- Ph.D., Department of Physics and Astronomy, University of Rochester   *2018–present*
- BS Physics CPI: 9.9/10, Indian Institute of Technology, Kanpur   *2014–2018*

Academic Affiliations

- Affiliated student researcher, Chapman University   *Fall 2021–present*
- Graduate student, University of Rochester   *Fall 2018–present*
- Summer research assistant,
  Center for Computational Astrophysics (CCA), Simons Foundation   *May – July, 2017*

Awards & Achievements

- Okubo prize (one of the two graduate students awarded for best performance on the most recent preliminary assessment), Department of Physics and Astronomy, University of Rochester, 2020.
- Robert L. and Mary L. Sproull fellow (officially the most prestigious fellowship awarded to incoming Ph.D. students by the University of Rochester), 2018–20.
- S.N. Bose scholar (by Winstep forward, SERB DST Govt. of India and IUSSTF), 2017.
- Academic Excellence Award, dean's office, IIT Kanpur 2014–15 and 2015–16.
- All India rank: 15, KVPY (SB) 2013, granted fellowship 2014–18.

Publications

[1] **T. Karmakar**, É. Jussiau, S. K. Manikandan, and A. N. Jordan, "Cyclic superconducting quantum refrigerators using guided fluxon propagation", 10.48550/ARXIV. 2212.00277 (2022).

[2] **T. Karmakar**, P. Lewalle, and A. N. Jordan, "Stochastic path-integral analysis of the continuously monitored quantum harmonic oscillator", PRX Quantum **3**, 010327 (2022).

[3] **T. Karmakar**, S. Genel, and R. S. Somerville, "The relationship between galaxy and halo sizes in the Illustris and IllustrisTNG simulations", Monthly Notices of the Royal Astronomical Society, stad178 (2023).

[4] **T. Karmakar** and T. Sarkar, "Distinguishing Between Kerr and Rotating JNW Space-Times via Frame Dragging and Tidal Effects", General Relativity and Gravitation **50**, 85 (2018).

Work in Progress

- **Superoscillation and superresolution imaging (experimental collaboration).**
- **Tomography of a continuously monitored qubit coupled to a resonator.**

Peer-reviewer/Referee

Phys. Rev. A, Annals of Physics, npj Quantum Information, Applied Physics Letters.

Research Proposal Submission

Department of Energy, National Science Foundation (both under evaluation).

Presentations

- *Stochastic path integral analysis of a harmonic oscillator undergoing simultaneous continuous position and momentum measurements* ⌕ , Quantum Thermodynamics Conference, June 30, 2022.
- *Tomography of a Continuously Monitored Qubit*, APS March Meeting 2022.
- *A discussion on 36 entangled officers of Euler* ⌕ , Institute for Quantum Studies, Chapman University, March 08, 2022.
- *Stochastic path integral analysis of a harmonic oscillator undergoing simultaneous continuous position and momentum measurements* ⌕ , Institute for Quantum Studies, Chapman University, September 13, 2021.
- *Optical Field Quadrature Measurements: Introduction to Homodyne and Heterodyne Detections*, with Dr. Philippe Lewalle, University of Rochester, January 18, 2021.

Summer Schools

- Solstice of Foundations summer school (in person), Quantum Center, ETH Zürich, 2022.
- Quantum thermodynamics summer school (online), Quantum Center, ETH Zürich, 2021.

Teaching and Mentorship Experiences

- **PASSAGE mentorship program, University of Rochester (2020-2021):** Mentored a newly admitted Ph.D. student and ensured their smooth transition to graduate school.
- **Teaching assistant, 20th Century Physics (Spring 2019):** Administered workshops for 50+ freshmen students, introduced them to quantum physics, designed problems.
- **Teaching assistant, Gravitation & General Relativity (Fall 2018)**: Graded assignments and conducted office hours for 20+ senior/junior undergraduates.

Selected Coursework

University of Rochester:

Quantum optics I and II	Statistics and data analysis
Condensed matter physics I and II	

Coursera: Machine learning by Andrew Ng

Indian Institute of Technology, Kanpur:

Graph theory	Computational methods in engineering
Computational physics	Optics