

Swastik Majumder

Curriculum Vitae

Department of Physics
The Ohio State University
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Education

- 2025 – Present **Ph.D. in Physics**, *The Ohio State University*, Columbus, Ohio
2020 – 2025 **B.S.–M.S. in Physics**, *Indian Institute of Science Education and Research Kolkata*, Kolkata, India

Research Interests

- Thermal and dense quantum field theory, with particular interest in perturbative descriptions of hot and dense matter, scale separation, resummation, and the thermodynamics of relativistic gauge theories.
- Statistical mechanics of interacting many-body systems, including equilibrium and nonequilibrium phenomena, transport, condensation, disorder, and emergent collective behavior.

Publications

- 2026 **Majumder, S.** and Barma, M., *Stochastic systems with Bose-Hubbard interactions: Effects of bias on particles on a random comb.* *Physical Review E. Journal* | arXiv:2601.09962.
- 2026 **Majumder, S.** and Barma, M., *Stochastic systems with Bose-Hubbard interactions: Effects of bias on particles on a one-dimensional lattice.* *Physical Review E. Journal* | arXiv:2508.03344.
- 2024 **Majumder, S.** and Sasakura, N., *Three cases of complex eigenvalue/vector distributions of symmetric order-three random tensors.* *Progress of Theoretical and Experimental Physics* **2024**, 093A01. *Journal* | arXiv:2408.01030.

Research Experience

- May 2026 – Present **Graduate Research Associate**, *The Ohio State University*, Columbus, Ohio
Member of the Center for Cosmology and AstroParticle Physics (CCAPP). Working with Dr. Tyler Gorda on perturbative thermal and dense quantum field theory, with emphasis on scale separation, resummation, and the thermodynamics of relativistic gauge theories at finite temperature and chemical potential.
- May 2024 – June 2025 **Visiting Research Student**, *Tata Institute of Fundamental Research*, Hyderabad, Hyderabad, India
Worked with Prof. Mustansir Barma on stochastic interacting-particle systems, transport, condensation, and the effects of disorder and complex network geometry.
- May 2023 – May 2024 **Visiting Research Student**, *Yukawa Institute for Theoretical Physics*, Kyoto University, Kyoto, Japan
Worked with Dr. Naoki Sasakura on random tensor models and the eigenvalue and eigenvector distributions of higher-order symmetric random tensors.

Teaching Experience

- Spring 2026 **Graduate Teaching Associate**, *The Ohio State University*, Columbus, Ohio
Physics 1251: Electricity and Magnetism, Waves, Optics, and Modern Physics.
- Autumn 2025 **Graduate Teaching Associate**, *The Ohio State University*, Columbus, Ohio
Physics 1251: Electricity and Magnetism, Waves, Optics, and Modern Physics.
- Spring 2025 **Teaching Assistant**, *Indian Institute of Science Education and Research Kolkata*, Kolkata, India
Statistical Mechanics.
- Spring 2025 **Teaching Assistant**, *Indian Institute of Science Education and Research Kolkata*, Kolkata, India
Statistical Mechanics; Probability and Statistics II.
- Autumn 2024 **Teaching Assistant**, *Indian Institute of Science Education and Research Kolkata*, Kolkata, India
Condensed Matter Physics.
- Spring 2024 **Teaching Assistant**, *Indian Institute of Science Education and Research Kolkata*, Kolkata, India
Statistical Mechanics.

Awards and Honors

- 2026 Nominated for The Graduate Associate Teaching Award (GATA) at The Ohio State University.
- 2021 **Silver Medalist**, University Physics Competition. Results.
- 2021 **Finalist**, International Astronomy and Astrophysics Competition.