Soumya Kanti Saha

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Education

2016 – 2017 **ICSE, Bishop Morrow School, Krishnanagar, West Bengal, India** (97.4%).

2017 – 2019 **AISSCE, Satish Chandra Memorial School, Chakdaha, West Bengal, India** (95%).

2019 – 2024 **BS-MS Physical Sciences, IISER Kolkata** (CGPA: 9.31).

Academic Awards and Scholarships

2019 – 2024 **INSPIRE Scholarship for Higher Education** , Department of Science & Technology India.

2023 (May–Aug) **Globalink Research Award**, MITACS Canada.

Projects (Coursework)

Autumn, 2021 **Analyzing motion of a bead and charged particle using Lagrangian and Hamiltonian Formalisms**, Classical Mechanics.

Autumn, 2022 **Simulations of Ant trail formation via directed pheromone formation**, Biophysics.

Analytical Study of a two-species system exhbiting bistability in mutualism and competition, Non-Linear Dynamics .

Projects (Outside Coursework)

Summer , 2022 **Applying Distance-dependent tight binding model in Twisted bilayer superlattices**. We calculated the band structures of bilayer sheets (graphene and MoS_2) undergoing twists, using a distance-dependent tight binding model approach. We explored electronic transport properties and presence of flatbands in such systems, *(Supervised by Prof. Bheemalingam Chittari, IISER Kolkata)*.

Summer, 2023 **Application of Lambert W function in Asymmetric propagation in metamaterial waveguides**. We used a gradient-index waveguide model to numerically explore the phenomenon of asymmetric electromagnetic wave propagation. We observed that the solutions can be viewed as intersections of Lambert W Sheets in a 3d parameter space of the model, *(Supervised by Prof. Sree Ram Valluri, University of Western Ontario)*.

Summer, 2024 **Critical Behavior of Non-reciprocal Interactions in Hyperuniform structures**. We are exploring the effects of Non-reciprocal interactions in the Hyperuniform region of the Ashkin-Teller Model. We aim to show that the non-reciprocal kernel acts as a local noise and doesn't alter the critical behavior of the original model. *(Supervised by Prof. PK Mohanty, IISER Kolkata)*.

Thesis

Master's Thesis, 2023–2024

Analyzing Critical Behavior of Motility induced phase separation in Active Lattice Models. We used a minimal model of persistent run and tumble particles in a 2D square lattice and observed that the system exhibits a Motility-Induced Phase Separation transition. We also observe that the resulting phase transition shows a re-entrant behavior. We then identify the critical behavior associated with the transition, *(Supervised by Prof. P. K. Mohanty, IISER Kolkata*).

Research Publications

Journal Articles

1. S. K. Saha, A. Banerjee, and P. K. Mohanty, "Site-percolation transition of run-and-tumble particles," *arXiv:*2406.11726, 2024.

Teaching Assistantships

Spring 2023 — **Electronics and Electrical Lab**, (for 3rd year undergrads).

Autumn 2023 — **Data Structures and Algorithms**, (for 3rd year undergrads).

Spring 2024 — **Statistical Mechanics**, (for 3rd year undergrads).

Skills

Languages — Strong reading, writing and speaking competencies for English, Hindi and Bengali.

Coding — Python, C, C++, Java, Julia, Mathematica, LaTeX

References

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