DIBYAJYOTI SAHU

Indian Institute of Science Education and Research, Bhopal
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OBJECTIVE

Ph.D. candidate in theoretical condensed matter physics seeking a postdoctoral position in topological systems, non-Hermitian and open quantum dynamics, and nonequilibrium quantum matter using analytical and numerical approaches.

EDUCATION

1. **Indian Institute of Science Education and Research (IISER), Bhopal**
   Ph.D. in Physics. *August 07, 2020 - Present*
   Department of Physics Overall CPI : 8.86/10
2. **Utkal University, Odisha**
   M.Sc. in Physics *August 2018 - April 2020*
   Department of physics Overall CPI: 8.65/10
3. **Ispat Autonomous college, Odisha**
   B.Sc. in Physics *August 2015 - April 2018*
   Sambalpur University Overall CPI: 7.47/10

RESEARCH EXPERIENCE

Ph.D. Student in Theoretical Condensed Matter Physics
IISER Bhopal
Theoretical Condensed Matter Lab
Group led by Dr. Suhas Gangadharaiah *Group page*

Description:

- **Topological Superconductivity and Majorana Physics** – Investigated the emergence, transport, and manipulation of Majorana bound states in engineered topological superconductors. Distinguished genuine zero-bias peaks from trivial Andreev bound states, studied dynamical transport in piano-key architectures under noise, and analyzed braiding and gate fidelities to identify thresholds relevant for fault-tolerant operation.
- **Nonequilibrium Transport and Correlation Dynamics** – Studied transport and correlation spreading in strongly correlated and quasi-periodic lattice models. Identified superdiffusive dynamics near criticality, domain-wall propagation in metallic regimes, and subdiffusive behavior in open, driven systems with boundary coupling.
- **Optimal Control and Noise-Resilient Quantum Dynamics** – Developed optimal diabatic driving protocols in interacting spin systems, using the transverse-field Ising model as a testbed. Designed excitation-suppressing, noise-tolerant protocols and quantified trade-offs between control speed, robustness, and classical noise effects.
- **Open and Non-Hermitian Quantum Systems (ongoing)** – Currently investigating non-Hermitian lattice models with asymmetric hopping and complex potentials, focusing on localization–delocalization transitions, mobility edges, and the non-Hermitian skin effect. Analyzing dynamical and transport signatures to understand how effective non-Hermitian descriptions capture dissipation and environmental coupling in open quantum many-body systems.

PUBLICATIONS

- **Effect of topological length on bound state signatures in a topological nanowire**
  Dibyajyoti Sahu, Vipin Khade and Suhas Gangadharaiah
  DOI: 10.1103/PhysRevB.108.205426, 27-11-2023
- **Transport phenomena and correlation dynamics of a one-dimensional effective Hamiltonian equivalent to the hexagonal Harper model**
  Santanu Dhara, **Dibyajyoti Sahu**, Manvendra Singh and Suhas Gangadharaiah
  DOI: 10.1103/PhysRevB.109.134204, 19-04-2024
- **Transport of Majorana bound states in the presence of telegraph noise**
  Dibyajyoti Sahu and Suhas Gangadharaiah
  DOI: 10.1103/lr2b-nmrk, 24-06-2025
- **Suppressing excitations using quantum-Brachistochrone and nearest-neighbour interactions**
  S John Sharon Sandeep, **Dibyajyoti Sahu** and Suhas Gangadharaiah, DOI: arXiv:2510.21382 (2025)

TEACHING EXPERIENCE

I was teaching assistant of these courses

- Physics through computational thinking
- Quantum Mechanics
- Advanced Condensed Matter
- Electrodynamics and Special Theory of Relativity

SKILLS

Programming Skills	Matlab, Mathematica, Python
Libraries	Numpy, Matplotlib, Scipy, Qiskit, KWANT
Techniques	Exact Diagonalization, NEGF formalism, Open Quantum system, Thermalization

ACHIEVEMENTS/AWARDS

- Secured 227rd rank in Joint CSIR UGC NET December 2019
- Secured 247rd rank in GATE 2020

CONFERENCES AND PRESENTATIONS

- **Poster:** PRL Conference on Condensed Matter Physics (CCMP 2022), Physical Research Laboratory (PRL), Ahmedabad
- **Poster:** Annual Conference on Quantum Condensed Matter (QMAT 2023), National Institute of Science Education and Research (NISER), Bhubaneswar
- **Talk:** Young Investigators Meet on Quantum Condensed Matter Theory, IISER Bhopal (2023)
- **Poster:** Advanced School and Conference on Quantum Matter (ICTP 2025), Abdus Salam International Centre for Theoretical Physics