## Sudin Ganguly


**Personal Information**

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**Current Affiliation**

Assistant Professor
Department of Physics, University of Science & Technology Meghalaya, India

**Research Interests**

**Theoretical Quantum Condensed Matter**
Quantum transport in nanoscale systems, Graphene and other topological materials, 2D materials, thermoelectric phenomena, ac driven transport, transport in hybrid junctions (e.g. superconductor-metal junctions etc.), fractal network, spin-valve systems, NEGF formalism
Topoelectrical circuits, non-Hermitian physics, antiferromagnetic spintronics

**Education**

**Ph.D.** Physics Indian Institute of Technology Guwahati 2018

- Thesis Title: *Quantum conductance in spin-orbit coupled devices: A focus on transport in Graphene*
- Advisor: Prof. Saurabh Basu

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|---|---|---|---|
| **M.Phill.** | Physics | Ramakrishna Mission Vivekandanda University | 2012 |
| **M.Sc.** | Physics | West Bengal State University | 2010 |
| **B.Sc.** | Physics (H) | Vidyasagar Evening College (CU) | 2008 |
| **H.S** | Science | WBCHSE | 2003 |
| **Madhyamik** | | WBBSE | 2001 |

**Achievements**

- Qualified National Eligibility Test (NET-LS) 2014
- Qualified Graduate Aptitude Test in Engineering (GATE) 2012
- Qualified Joint Entrance Screening Test (JEST) 2011

**Experience**

**Assistant Professor**
Department of Physics, University of Science & Technology Meghalaya, 2/12/2021 - Till Date.

**Visiting Research Fellow**
Indian Statistical Institute Kolkata, 13/1/2020 - 30/11/2021.

**Visiting Faculty**
Indian Institute of Information Technology Bhagalpur, 7/1/2019 - 31/12/2019.

**Guest Lecturer**
Vidyasagar Evening College, (2010 - 11, 2011 - 12).

**Associate Warden**, Boys' Hostel-1, IIIT Bhagalpur

**Faculty In-Charge** of Common Activity Centre, IIIT Bhagalpur

**Faculty In-Charge** of Sports, IIIT Bhagalpur

**Teaching Assistanship:** General Physics Laboratory, Numerical methods and computer programming, Indian Institute of Technology Guwahati

## Refereed Journal Publications

1. **S Ganguly** and SK Maiti, "*Persistent current in a non-Hermitian Hatano-Nelson ring: Disorder-induced amplification*", Physical Review B **111**, 195418 (2025).
2. I Baruah, A Patowary, **S Ganguly**, "*Probing the influence of hopping dimerization on persistent currents in cylindrical multi-channel systems*", European Physical Journal B **98**, 39 (2025).
3. **S Ganguly**, C Ihuoma Osuala, T Choudhary, R K Biswas, **S Ganguly**, and S K Maiti, "*Thermoelectricity in Irradiated Bilayer Graphene Flakes*", Journal of Physical Chemistry C **129**, 3392 (2025).
4. **S Ganguly**, S Chattopadhyay, K Mondal, S K Maiti, "*Critical analysis of multiple reentrant localization in an antiferromagnetic helix with transverse electric field: Hopping dimerization-free scenario*", SciPost Phys. Core **8**, 012 (2025).
5. **S Ganguly**, K Mondal, SK Maiti, "*Thermoelectric response in zigzag chains: Impact of irradiation-induced conformational changes*", Journal of Applied Physics **136**, 014301 (2024).
6. **S Ganguly**, S Sarkar, K Mondal, SK Maiti, "*Phenomenon of multiple reentrant localization in a double-stranded helix with transverse electric field*", Scientific Reports **14** (1), 3059 (2024).
7. K Mondal, **S Ganguly**, SK Maiti, "*Thermoelectric phenomena in an antiferromagnetic helix: Role of electric field*", Physical Review B **108**, 195401 (2023).
8. **S Ganguly**, SK Maiti, "*Electrical analogue of one-dimensional and quasi-one-dimensional Aubry–André–Harper lattices*", Scientific Reports **13** (1), 13633 (2023).
9. S Roy, **S Ganguly**, SK Maiti, "*Interplay between hopping dimerization and quasi-periodicity on flux-driven circular current in an incommensurate Su–Schrieffer–Heeger ring*", Scientific Reports **13** (1), 4093 (2023).
10. D Halder, **S Ganguly**, S Basu, "*Properties of the non-Hermitian SSH model: role of symmetry*", Journal of Physics: Condensed Matter **35** (10), 105901 (2022).
11. **Sudin Ganguly**, Souvik Roy, and Santanu K. Maiti, "*Transport characteristics of a $\mathcal{PT}$-symmetric non-Hermitian system: effect of environmental interaction*", The European Physical Journal Plus **137**, 780 (2022).
12. Kalol Mondal, **Sudin Ganguly**, and Santanu K. Maiti, "*Efficient current rectification in driven acenes*", Physical Chemistry Chemical Physics **24** (46), 28436 (2022).
13. **Sudin Ganguly**, and Santanu K. Maiti, "*Strain-induced thermoelectricity in pentacene*", Physical Chemistry Chemical Physics 24 (38), 23679-23689 (2022).
14. Kalol Mondal, **Sudin Ganguly**, and Santanu K. Maiti, "*Spin-dependent transport in a driven non-collinear antiferromagnetic fractal network*", Journal of Physics: Condensed Matter **34**, 295802 (2022).
15. Joydeep Majhi, **Sudin Ganguly**, and Santanu K. Maiti, "*Enhanced current rectification in graphene nanoribbons: effects of geometries and orientations of nanopores*", Nanotechnology **33**, 255704 (2022).

16. Suvendu Chakraborty, **Sudin Ganguly**, and Santanu K. Maiti, "*Thermoelectric properties of a diamond ribbon subjected to a transverse magnetic field*", Europhysics Letters **136**, 37003 (2021).

17. Kallol Mondal, **Sudin Ganguly**, and Santanu K. Maiti, "*Possible route to efficient thermoelectric applications in a driven fractal network*", Scientific Reports **11**, 17049 (2021).

18. **Sudin Ganguly** and Santanu K. Maiti, "*Selective spin transmission through a driven quantum system: A new prescription*", Journal of Applied Physics **129**, 123902 (2021).

19. **Sudin Ganguly** and Santanu K. Maiti, "*Favorable thermoelectric performance in a Rashba spin-orbit coupled ac-driven graphene nanoribbon*", Carbon **172**, 302 (2021).

20. **Sudin Ganguly** and Santanu K. Maiti, "*A new prescription to achieve a high degree of spin polarization in a spin-orbit coupled quantum ring: Efficient engineering by irradiation*", Journal of Physics: Condensed Matter **33**, 145305 (2021).

21. **Sudin Ganguly** and Santanu K. Maiti, "*Electronic transport through a driven quantum wire: possible tuning of junction current, circular current and induced local magnetic field*", Journal of Physics: Condensed Matter **33**, 045301 (2020).

22. **Sudin Ganguly** and Santanu K. Maiti, "*An ordered-disordered separated graphene nanoribbon: high thermoelectric performance*" , Journal of Physics D: Applied Physics **54**, 025301 (2020).

23. **Sudin Ganguly** and Santanu K. Maiti, "*Thermoelectricity in graphene nanoribbons: Structural effects of nanopores*", Superlattices and Microstructures **136**, 106264 (2019).

24. **Sudin Ganguly** and Santanu K. Maiti, "*Unconventional charge and spin-dependent transport properties of a graphene nanoribbon with line-disorder*", Europhysics Letters **124(5)**, 57003 (2018).

25. **Sudin Ganguly** and Santanu K. Maiti, "*Controlled engineering of spin-polarized transport properties in a zigzag graphene nanojunction*", Europhysics Letters **124(1)**, 17005 (2018).

26. **Sudin Ganguly**, Saurabh basu, and Santanu K. Maiti, "*Interface sensitivity on spin transport through a three-terminal graphene nanoribbon*", Superlattices and Microstructures **120**, 650 (2018).

27. Priyanka Sinha, **Sudin Ganguly**, and Saurabh Basu, "*Analytic and numeric computation of edge states and conductivity of a Kane-Mele nanoribbon*", Physica E: Low-dimensional Systems and Nanostructures **103**, 314 (2018).

28. **Sudin Ganguly** and Saurabh Basu, "*Magnetic adatoms in two and four terminal graphene nanoribbons: A comparison between their spin polarized transport*", Physica E: Low-dimensional Systems and Nanostructures **98**, 174 (2018).

29. **Sudin Ganguly** and Saurabh Basu, "*Adatoms in graphene nanoribbons: spintronic properties and the quantum spin Hall phase*", Materials Research Express **4**, 11 (2017).

30. **Sudin Ganguly** and Saurabh Basu, "*Conductance properties of six terminal graphene nanoribbons in presence of a magnetic field: Integer quantum Hall effect revisited*", Journal of Electromagnetic Waves and Applications **31**, 18 (2017) (Special Issue: The Current Trends of Graphene Technology).

31. **Sudin Ganguly and Saurabh Basu**, "*Spin Hall conductance in a Y-shaped junction device in presence of tunable spin-orbit coupling*", Physica E: Low-dimensional Systems and Nanostructures **90**, 131 (2017).

32. **Sudin Ganguly** and Saurabh Basu, "*Interplay of Rashba spin orbit coupling and disorder in the conductance properties of a four terminal junction device*", The European Physical Journal B **89**, 103 (2016).

33. **Sudin Ganguly** and Saurabh Basu, "*Anisotropic quantum transport in two dimension – hints of emergence of a metallic behaviour*", The European Physical Journal B **88**, 96 (2015).

PROCEEDINGS

1. D Thakuria, R Deka, and **S Ganguly**, "*Exploring interface sensitivity in pentacene: Waveguide analysis of circular current and induced magnetic field*", Journal of Physics: Conference Series **2919** (1), 012009 (2024).

2. **Sudin Ganguly** and Santanu K. Maiti, "*High figure of merit in an ac driven graphene nanoribbon*", Journal of Physics: Conference Series **1579** (1), 01200 (2020).

3. **Sudin Ganguly** and Santanu K. Maiti, "*A comparative study of spin polarization between square and triangular antidots in graphene nanoribbon*", AIP conference proceedings **2072**(1), 020006 (2019).

4. **Sudin Ganguly** and Saurabh Basu, "*Spin Hall conductance in Y-shaped junction devices*", Journal of Physics: Conference Series **807**, 082003 (2017).

5. **Sudin Ganguly** and Saurabh Basu, "*Spin dependent disorder in a junction device with spin orbit couplings*", Journal of Physics: Conference Series **759**, 012028 (2016).

6. Priyadarshini Kapri, **Sudin Ganguly** and Saurabh Basu, "*Tunneling conductance through normal metal-superconductor junctions: effects of Rashba spin orbit coupling and magnetic field*", Journal of Physics: Conference Series **759**, 012031 (2016).

CONFERENCES ATTENDED

- Presented **poster** at "6th International Conference on Nanoscience and Nanotechnology", organised by Dept. of Physics, SRMIST, India February 2021.
- **Oral presentation** (popular talk) at "WBSU Physics Alumni Seminar 2020", Dept. of Physics, West Bengal State University, Kolkata, India, August 2020.
- **Best Oral presentation** at "National conference on frontiers in Modern Physics", Dept. of Physics, Adamas University, Kolkata, February, 2020.
- **Oral presentation** at "National conference on frontiers in Modern Physics", Dept. of Physics, Adamas University, Kolkata, August, 2018.
- **Oral presentation** at "International conference on condensed matter physics", PAMU, ISI Kolkata, Indian, November 2017.
- Presented **poster** at "Research Conclave'17", IIT Guwahati, Assam, India, March 2017.
- **Oral presentation** at "Xth Biennial National Conference of Physics Academy of North East (PANE 2016)", St. Anthony's College, Shillong, November 2016.
- Presented **poster** at "Condensed Matter Days 2015", Dept. of Physics, Visva-Bharati, West Bengal, India, August 2015.
- Presented **poster** at "XXVII IUPAP Conference on Computational Physics: CCP2015", IIT Guwahati, Assam, India, December 2015,.

PG DISSERTATION SUPERVISED

1. Doli Thakuria and Raktimjyoti Deka, Title of the Dissertation: *Circular current in bias driven quantum ring: Effect of lead-ring interface*, Duration: 2 Semester (2023-24).

2. Ipshita Baruah and Anushka Patowary, Title of the Dissertation: *Persistent currents in mesoscopic rings: Role of topology and correlated disorder*, Duration: 2 Semester (2023-24).

3. Suraj Roy, Pinky Rani Basumatary, and Abdul Khaleque, Title of the Dissertation: *Study of localization phenomenon in Su-Shrieffer-Heeger Model in presence of quasiperiodic disorder: Emergence of Reentrant localization*, Duration: 1 Semester (2023).

4. Millo Konya, Jumngam Doyom, and Usham Harish Kumar Singha, Title of the Dissertation: *Interplay of Hopping Dimerization and Quasiperiodic disorder on localization behavior in 1D chain*, Duration: 1 Semester (2023).

5. Sengsra A Sangma and Hafiza Khandakar, Title of the Dissertation: *Study of localization phenomena in a quasi-periodic 1D chain: Aubry-Andre-Harper model*, Duration: 1 Semester (2022).