Dr. Manjari Garg

Department of Physics, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand-247667, India
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EMPLOYMENT

September 2024 – Till date :	Assistant Professor Grade – I, Department of Physics, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, India
June 2024 – September 2024 :	Assistant Professor Grade – I, School of Nano–Science & Technology, Indian Institute of Technology Kharagpur, Kharagpur, West Bengal, India
November 2021 – May 2024 :	Postdoctoral Researcher (CNRS), Nanoelectronics Group, Service de Physique de l'Etat Condensé (SPEC), Commissariat à l'énergie atomique (CEA-CNRS), Paris – Saclay, France Topic: Quantum transport of heat in Quantum Hall states and fractional Quantum Hall states in Graphene and twisted bilayer-Graphene
June 2019 – September 2021:	CV Raman Postdoctoral Research Fellow, Department of Instrumentation and Applied Physics, Indian Institute of Science, Bengaluru, Karnataka, India Topic: Study of electrical and thermoelectric transport in variable-angle Twisted bilayer-Graphene structures in in-plane and cross-plane directions
January 2019 – June 2019:	Research Associate, Indian Institute of Technology Delhi, New Delhi, India
August 2012 – December 2012:	Project Assistant, National Physical Laboratory Delhi, India Topic: Research and Development in thin film solar cells
October 2011 – March 2012:	Project Assistant, National Physical Laboratory Delhi, India Topic: Development of high density graphite and copper reinforced graphite for multistage depressed collector of electron tubes

EDUCATION

Indian Institute of Technology Delhi, New Delhi, India
Ph.D., Department of Physics, August 2019
Dissertation: Investigations on the Improvement in GaN-based HEMTs and Ultraviolet Photodetectors using Organic Molecular Surface Modification
Supervisor: Prof. Rajendra Singh

Indian Institute of Technology Delhi, New Delhi, India
M. Sc., Department of Physics, June 2011
Dissertation: Microwave Processing and Characterization of Double Perovskites
Supervisor: Prof. Subhash C. Kashyap

University of Delhi, New Delhi, India
B. Sc. (Hons.), Department of Physics, June 2009

RESEARCH INTERESTS

- Quantum Hall Effect and fractional Quantum Hall Effect in 2D materials
- Quantum transport in 2-Dimensional materials and heterostructures
- Twistronics
- Engineering novel device structures using low-dimensional materials and 2D/3D heterojunctions
- Straintronics, Piezotronics

PUBLICATIONS

Google Scholar

2024

- **Manjari Garg***, O. Maillet*, L. A. Cohen*, N. L. Samuelson*, D. Ferraro, M. Sassetti, K. Watanabe, T. Taniguchi, P. Roche, P. Roulleau, A. F. Young, and F.D. Parmentier, "*Enhanced shot noise in graphene quantum point contacts with electrostatic reconstruction*" Manuscript under preparation
  (*Equal Contribution)
- R. Delagrange*, **Manjari Garg***, G. Le Breton, A. Zhang, Q. Dong, Y. Jin, K. Watanabe, T. Taniguchi, P. Roulleau, O. Maillet, P. Roche, and F.D. Parmentier, "*Vanishing bulk heat flow in the ν = 0 quantum Hall ferromagnet in monolayer graphene*", Just Accepted in **Nature Physics**
  (*Equal Contribution)
- B. Ghawri*, P. S. Mahapatra*, **Manjari Garg***, S. Mandal, A. Jayaraman, K. Watanabe, T. Taniguchi, M. Jain, U. Chandni, and A. Ghosh, "*Non-Boltzmann thermoelectric transport in minimally twisted bilayer graphene*", **Physical Review B**, 109, 045436, 2024.
  (*Equal Contribution)

2022

- G. Le Breton, R. Delagrange, Y. Hong, **Manjari Garg**, K. Watanabe, T. Taniguchi, R. Ribeiro-Palau, P. Roulleau, P. Roche, and F.D. Parmentier, "*Heat equilibration of integer and fractional quantum Hall edge modes in graphene*", **Physical Review Letters**, 129, 116803, 2022.
- P. S. Mahapatra, **Manjari Garg**, B. Ghawri, A. Jayaraman, K. Watanabe, T. Taniguchi, A. Ghosh, and U. Chandni, "*Quantum Hall Interferometry in Triangular Domains of Marginally Twisted Bilayer Graphene*", **Nano Letters**, 22, 14, 5708, 2022.
- B. Ghawri*, P. S. Mahapatra*, **Manjari Garg***, S. Mandal, S. Bhowmik, A. Jayaraman, R. Soni, K. Watanabe, T. Taniguchi, H. R. Krishnamurthy, M. Jain, S. Banerjee, U. Chandni, and Arindam Ghosh, "*Breakdown of Semiclassical Description of Thermoelectricity in Near-Magic Angle Twisted Bilayer Graphene*", **Nature Communications**, 13:1522, 1, 2022.
  (*Equal Contribution)

2020

- P. Prasad, **Manjari Garg**, and U. Chandni, "*Tailoring the Transfer Characteristics and Hysteresis in MoS2 Transistors Using Substrate Engineering*", **Nanoscale**, 12, 23817, 2020.
- P. S. Mahapatra*, B. Ghawri*, **Manjari Garg**, S. Mandal, K. Watanabe, T. Taniguchi, M. Jain, S. Mukerjee, and Arindam Ghosh, "*Misorientation-Controlled Cross-Plane Thermoelectricity in Twisted Bilayer Graphene*", **Physical Review Letters**, 125, 226802, 2020.
  (* Equal Contribution)
- S. Kaushik, T. R. Naik, A. Alka, **Manjari Garg**, B. R. Tak, M. Ravikanth, V. R. Rao, and R. Singh, "*Surface Modification of AlN Using Organic Molecular Layer for Improved Deep UV Photodetector Performance*", **ACS Applied Electronic Materials**, 2, 3, 739, 2020.

2019

- **Manjari Garg**, A. Kumar, H. Sun, C.-H. Liao, X. Li, and R. Singh, "*Temperature dependent electrical studies on Cu/AlGaN/GaN Schottky barrier diodes with its microstructural characterization*", **Journal of Alloys and Compounds**, 806, 852, 2019.
- B. R. Tak, **Manjari Garg**, S. Dewan, C. G. Torres-Castanedo, K.-H. Li, V. Gupta, X. Li, and R. Singh, "*High-Temperature Photocurrent Mechanism of β-Ga2O3 Based Metal-Semiconductor-Metal Solar-Blind Photodetectors*", **Journal of Applied Physics**, 125, 144501, 2019.
- B. R. Tak, **Manjari Garg**, A. Kumar, V. Gupta, and R. Singh, "*Gamma Irradiation Effect on Performance of β-Ga2O3 Metal-Semiconductor-Metal Solar-Blind Photodetectors for Space Applications*", **ECS Journal of Solid State Science and Technology**, 8, Q3149, 2019.
- **Manjari Garg**, B. R. Tak, V. R. Rao, and R. Singh, "*Enhanced Performance of MSM UV Photodetectors by Molecular Modification of Gallium Nitride Using Porphyrin Organic Molecules*", **IEEE Transactions on Electron Devices**, 66, 2036, 2019.
- **Manjari Garg**, B. R. Tak, V. R. Rao, and R. Singh, "*Giant UV Photoresponse of GaN-based photodetectors by surface modification using Phenol functionalized Porphyrin organic molecules*", **ACS Applied Materials and Interfaces**, 11, 12017, 2019.

2018

- **Manjari Garg**, T. R. Naik, R. Pathak, V. R. Rao, C.-H. Liao, K.-H. Li, H. Sun, X. Li, and R. Singh, "*Effect of surface passivation process for AlGaN/GaN HEMT heterostructures using phenol functionalized-Porphyrin based organic molecules*", **Journal of Applied Physics**, 124, 195702, 2018.
- M. Moun, M. Kumar, **Manjari Garg**, R. Pathak, and R. Singh, "*Understanding of MoS_2/GaN Heterojunction Diode and its Photodetection Properties*", **Scientific Reports**, 8, 11799, 2018.
- C. S. Pathak, **Manjari Garg**, J. P. Singh, and R. Singh, "*Current Transport Properties of Monolayer Graphene/n-Si Schottky Diodes*", **Semiconductor Science and Technology**, 33, 055006, 2018.

- **Manjari Garg**, T. R. Naik, C. S. Pathak, S. Nagarajan, V. Ramgopal Rao, and R. Singh, "*Significant improvement in the electrical characteristics of Schottky barrier diodes on molecularly modified Gallium Nitride surfaces*", **Applied Physics Letters**, 112, 163502, 2018.

2017

- Ashutosh Kumar, R. Kapoor, **Manjari Garg**, V. Kumar, and R Singh, "*Direct evidence of barrier inhomogeneities at metal/AlGaN/GaN interfaces using nanoscopic electrical characterizations*", **Nanotechnology**, 28, 26LT02, 2017.

2016

- **Manjari Garg**, A. Kumar, S. Nagarajan, M. Sopanen, and R. Singh, "*Investigation of significantly high barrier height in Cu/GaN Schottky diode*", **AIP Advances**, 6, 015206, 2016.

2014

- Saroj Kumari, A. Kumar, A. P. Singh, **Manjari Garg**, P. K. Dutta, S. K. Dhawan and Rakesh B. Mathur, "*Cu–Ni alloy decorated graphite layers for EMI suppression*", **RSC Advances** 4, 23202, 2014.

CONFERENCE PROCEEDINGS

2018

- **Manjari Garg**, B. R. Tak, V. R. Rao, and R. Singh, "*Improvement in self-powered GaN-based symmetric metal-semiconductor-metal ultraviolet photodetectors by using phenol-functionalized porphyrin organic molecules*" **2018 4th IEEE International Conference on Emerging Electronics (ICEE)**, 17-19 Dec. 2018, **DOI:** 10.1109/ICEE44586.2018.8937959.

2016

- **Manjari Garg**, A. Kumar, S. Nagarajan, M. Sopanen, and R. Singh, "*Study of 1/f noise characteristics in Cu/n-GaN Schottky barrier diode*", **AIP Conference Proceedings**, 1731, 120011, 2016.

PATENTS

- Rajendra Singh, **Manjari Garg**, V. Ramgopal Rao, "*Molecularly Modified Gallium Nitride based Ultraviolet Photodetector and a Method of Fabrication Thereof*", Application No. 201811019707, Dated: 25 May 2018 **(Accepted)**.
- Rajendra Singh, **Manjari Garg**, V. Ramgopal Rao, Tejas R. Naik, "*Molecularly Modified AlGaN/GaN HEMT Epitaxial Film Surface and Improvement of Schottky Barrier Diode Thereof*", Application No. 201711041322, Dated: 18 November 2017 **(Accepted)**.

FELLOWSHIPS AND AWARDS

2023	:	Quantum Technologies in Paris Region (QuanTIP)
2019	:	National Post-Doctoral Fellowship (NPDF), DST-SERB
2019	:	CV Raman Post-doctoral Fellowship, Indian Institute of Science, India
2018	:	Best Oral Presentation Award, 4th IEEE International Conference on Emerging Electronics (ICEE-IEEE)
2018	:	Best Presentation Award, Indian Institute of Technology Delhi
2015	:	Best Presentation Award, 60th Department of Atomic Energy-Solid State Physics Symposium (DAE-SSPS)
2015	:	Council of Scientific and Industrial Research (CSIR), Senior Research Fellowship (SRF)
2013	:	Council of Scientific and Industrial Research (CSIR), Junior Research Fellowship (JRF)
2012	:	National Eligibility Test (NET) – CSIR (JRF+LS), All India rank: 16
2009	:	Indian Institute of Technology Joint Admission Test (IIT JAM), All India rank: 105
2009	:	First in the order of merit, Graduation (B. Sc) IIIrd year, University of Delhi, Delhi, India
2008	:	First in the order of merit, Graduation (B. Sc) IInd year, University of Delhi, Delhi, India

RESEARCH SKILLS

- Class 100, Class 1000 – Clean Room experience
- Laboratory Expertise
  - Fabrication techniques:
    - Maskless Photolithography – Intelligent Micro Patterning LLC, SF-100
    - Electron Beam Lithography – Raith Pioneer
    - Reactive Ion Etching – Oxford Instruments – PlasmaLab system 100 ICP 380
    - Nanofabrication techniques

- Characterisation techniques:
  - Hall Effect Measurement system – Ecopia, HMS-5000
  - Semiconductor Characterization System – Keithley, SCS-4200
  - Variable temperature measurements
  - Low temperature and high magnetic field measurements (Liquid He dipping experiments, Measurements using Jains cryogen free closed cycle refrigerator – Model 9TM-CF-2.0K-SV-20 and Leiden Cryogenics Wet dilution refrigerator – MNK 126)
  - Dilution refrigerator (Oxford)
  - Dynamic Signal Analyzer (Noise measurement system) – Stanford Research Systems, SR785
  - DC Probe Station – EverBeing International Corporation, EB6
- Software used: Python, Origin, Labview