Dr. Shivani Rani

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OBJECTIVE

The world of science has always fascinated and excited me where I am seeking for an opportunity to work in a focused way to learn and contribute to the scientific community.

ACEDEMIC RECORD

Degree	Board/University	Year of Passing	Subjects	Percentage of Marks
Ph.D.	IIT Patna	May-2023	Computational condensed matter physics	
M.Sc.	CCSU, Meerut	2016	Physics	81
B.Sc.	CCSU, Meerut	2014	Physics, Chemistry, Math	72.5
Intermediate of Science	P.S.E.B	2009	Physics, Chemistry, Math	74.4
Matriculation	P.S.E.B	2007	Math, Science, English, Social Science, Punjabi, Sanskrit	79.2

THESIS TITLE:

Two-dimensional nanocrystals for nanosensing, spintronics and energy harvesting

TEACHING EXPERIENCE

1. General Physics lab of 1st year B.tech. students, Department of Physics, IIT Patna, Patna (2018-2021).
2. Co-Guide three 2st year M.Sc. students in their M.Sc. project, Department of Physics, IIT Patna (2019- 2022).

HONORS AND AWARD

- Awarded with the "**Best Poster Award**" in the ICEAM-2021 at Noida. The title of the work was "Strain dependent optical response of 2D-CrOCl".
- **3rd rank** in Master of Science (Physics) Examination, 2016 in CCS University, Meerut (India),
- **1st rank** in Master of Science(Physics) Examination, 2016 in Meerut College, Meerut.
- Qualify **CSIR-JRF** exam in Physical Science, december-2016.
- Qualify **GATE** exam in Physics, 2017.

POSITION OF RESPONSIBILITY

- Member of American Physical Society (2021- current).

SOFTWARE & SKILL

- Quantum espresso, Quantum Atomistic Tool Kit, VASP, ShengBTE, Phonopy, Phono3py

PUBLICATIONS

1) **S. Rani**, S.J. Ray, "Detection of gas molecules using C_3N island based single electron transistor", **Carbon** 144, (2019): 235 -240.
2) **S. Rani** , S. J. Ray, "Two dimensional C_3N based sub-10 nanometer Biosensor", **Phys. Chem. Chem. Phys.** 22, (2020): 11452-11459.
3) **S. Rani**, Akhil Nair, M. Venkata Kamalakar and Soumya Jyoti Ray, "Spin-selective response tunability in two-dimensional nanomagnets", **Journal of Physics: Condensed Matter** 32, (2020): 415301.
4) S. Mishra, **S. Rani,** S. J. Ray, "Single electron transistor based nanosensor for DNA and RNA detection", **Journal of Applied Physics** 128, (2020): 194302.
5) A. K. Nair, **S. Rani,** M. Venkata Kamalakar and S. J. Ray, "Bi-stimuli assisted engineering and control of magnetic phase in monolayer CrOCl", **Phys. Chem. Chem. Phys.** 22, (2020): 12806-12813.
6) **S. Rani**, S.J. Ray, "DNA/RNA detection using graphene and hexagonal boron nitride based nanosensor", **Carbon** 173, (2021): 493-500.
7) S. Kar, **S. Rani,** S. J. Ray, "Stimuli assisted electronic, magnetic and optical phase control in CrOBr monolayer", **Physica E: Low-dimensional Systems and Nanostructures** 143, (2022): 115332.
8) **S. Rani**, N Gupta, R. Ahuja, S. J. Ray, "Ultra low lattice thermal conductivity and thermoelectric performance of a twisted Gr/hBN heterostructure using strain engineering", **Physical Review Applied** (under review).
9) P. Kumari, S. Majumder, **S. Rani**, AK Nair, K Kumari, M Venkata Kamalakar, S. J Ray, "High efficiency spin filtering in magnetic phosphorene", **Phy. Chem. Chem. Phys.** 22, (2020): 5893-5901.
10) K. Vishwakarma, **S. Rani,** S. Chahal, Chia-Yen Lu, S. J Ray, Chan-Shan Yang, and P. Kumar, "Quantum Coupled Borophene based Heterolayers for excitonic and molecular sensing applications", **Phy. Chem. Chem. Phys.** 24, (2022): 12816-12826.

11) S. Sachin, **S. Rani,** P. Kumari, S. Kar, S. J Ray, "Twist-engineered tunability in vertical $MoS_2/MoSe_2$ heterostructure", **Applied Physics A** 129, (2023): 46.
12) S. Sachin, P. Kumari, N. Gupta, **S. Rani**, S. Kar, S. J Ray, "Van der Waals twistronics in a MoS_2/WS_2 heterostructure", **Computational Condensed Matter** 35, (2023): e00797.
13) **S. Rani,** P. Kumari, S.J. Ray, "Strain dependent optical response of 2D-CrOCl", **Journal of Material research**(under review).
14) **S. Rani,** S.J. Ray, "Detection of CO using Graphene island single electron transistor", **Nanomaterials and energy** 8, (2019): 135-138.
15) **S. Rani**, S. J. Ray, "Sensing using C_3N nanoribbon", **AIP Conference Proceedings** 2265, (2020): 030706.
16) S. Kar, **S. Rani**, A. K. Nair, M. V. Kamalakar, S.J Ray, "Graphene and hexagonal boron nitride based nano-electronic biosensor", 5th IEEE international conference on emerging electronics (ICEE) (2020): 1-4.
17) S. Kar, **S. Rani**, A. K. Nair, M. V. Kamalakar, S.J Ray, "Tunning and control of the magnetic properties of a 2D nanomagnet", 5th IEEE international conference on emerging electronics (ICEE) (2020): 1-4.
18) **S. Rani,** S.J Ray, "Twist dependent spin resolved conductance in Graphene – hBN van der Waals heterostructure", **Bulletin of the American Physical Society 2022**, T00.239 (2022).
19) **S. Rani**, and S. J. Ray, "Ultralow lattice thermal conductivity of Gr/h-BN heterostructure using controlled twist engineering", Bulletin of the American Physical Society (2023).
20) S. Sahoo, S. Sachin, **S. Rani**, P. Kumari, S. Kar, and S. J. Ray, "Van der Waals twistronics in a MoS2/WS2 heterostructure", **Bulletin of the American Physical Society** (2023).
21) N. Gupta, S. Kumar, **S. Rani**, S. J. Ray, and P. Kumari, "Ultralow thermal conductivity and thermoelectric performance of two-dimensional KCuX (X= S, Se) materials for energy harvesting", **Bulletin of the American Physical Society** (2023).

SEMINAR/WORKSHOP

1. **S. Rani**, S. J. Ray, " Sensing of Inorganic Gas Molecules Using MoS_2 Based Single Electron Transistor " **Materials & Technology for energy conversion and storage (M-TECS 2018), BARC, Mumbai, Maharashtra.**
2. **S. Rani**, S. J. Ray " Detection of CO using Graphene island single electron transistor" **4th International Conference NANOCON 018 - Nanotechnology: Applications, Advances and Innovations, BVDU, Pune, Maharashtra.**
3. **S. Rani**, S. J. Ray, " Investigation of the behavior of SO_2 adsorbed C_3N Island Single Electron Transistor" **63rd DAE Solid State Physics Symposium 2018, Hisar, Haryana.**
4. **S. Rani**, S. J. Ray, "Sensing of inorganic gas molecules using C_3N island single electron transistor" **Workshop and symposium on advanced simulation method: DFT, MD and Beyond, IIT Delhi 2019, Delhi.**
5. **S. Rani**, S. J. Ray, "Sensing using C_3N nanoribbon" **64rd DAE Solid State Physics Symposium 2019, Jodhpur IIT Jodhpur, 2019, Jodhpur, Rajasthan**.
6. **S. Rani**, A. K. Nair, S. J. Ray, "Strain tunable critical temperature enhancement in two dimensional CrOCl " **2nd Indian Materials Conclave and 31st AGM, 2020, Kolkata, West bengal.**
7. **S. Rani**, A. K. Nair, S. J. Ray, "Spin-Selective Response Tunability In Two-Dimensional Nanomagnets" **Research Scholar Day'20, IIT Patna, 2020, Patna, Bihar.**
8. **S. Rani**, S. J. Ray, Advances in functional materials [AFM-2020], **KIIT, Bhubaneswar.**
9. **S. Rani**, S. J. Ray, "Graphene and hexagonal boron nitride based nanoelectronic biosensor, "**5th International Conference on Emerging Electronics ICEE-2020, IIT Delhi.**

10. **S. Rani**, S. J. Ray, **Evolution of Electronic Structure Theory and Experimental Realization (EESTER 2020), IIT Madras**.
11. **S. Rani** , , S. J. Ray, 8th Computational Chemistry workshop (CCW) using Gaussian held at 24th -28th May 2021,
12. **S. Rani**, P. Kumari, S. J. Ray, "Strain dependent optical response of 2D CrOCl, " **International Conference on Energy & Advanced Materials (ICEAM-2021), JIIT Noida, October-2021**
13. **S. Rani**, S. Sachin, S. J. Ray, "Electronic and optical response of MoS_2/WS_2 heterostructure", **ACMS 2022.**
14. **S. Rani,** S. J. Ray, "Twist dependent spin resolved conductance in Graphene—hBN van der Waals heterostructures", **American Physical Society 2023**.

Date: 13.05.2023 **Shivani Rani**

Place: Patna, India **Signature of the candidate**