

CURRICULAM VITAE

Dr. Bramhachari Khamari
OES-I
Assistant Professor in Physics
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I RESEARCH INTEREST

- Topological phases of material (Topological insulator, Weyl Semimetal)
- Electronic and Optical Properties of material
- Exciton physics in 2D materials
- Exciton Solar cell materials based on heterostructures of 2D materials

II RESEARCH GRANT UNDER MRIP-2023

Selected for Extra-mural Research funding under Mukhyamantri Research Innovation Project (MRIP)-2023-Physics.

Sanction of Research Project: To enhance the power conversion efficiency of exciton solar cell through heterostructure of Janus transition metal dichalcogenides: A first principles based study

Funding Agency: Odisha State Higher education Council (OSHEC), Govt. of Odisha

III TEACHING EXPERIENCE

- From Feb 23 2023 to present : BSc Hons Courses-Mathematical Physics, Statistical Mechanics, Classical Dynamics, Waves and Optics, Analog System and applications, Nuclear Physics
- During PhD. period, handled Physics Lab session of Btech students.

IV ACADEMIC QUALIFICATIONS

- ✓ **From February 2023 to present** Assistant Prof in Physics Govt College Koraput.
- ✓ **From September 2019 to January 2021.** Post Doctoral Fellow at Department of Physics Indian Institute of Technology (IIT) Kanpur,
Area of research: Study of optical properties of excitonic material based on first principle
Mentor- Prof. Amit Agarwal, Department of Physics, IIT Kanpur
- ✓ **From 01 may 2021 to 30 April 2022** JRF Position under DAE sponsored Project
Project title- Surface properties of Weyl Semimetals
Name of PI- Dr. Arijit Kundu, Department of Physics, IIT Kanpur
- ✓ **From 2012 – 2019** Ph.D. from Department of Physics, Indian Institute of Technology (IIT) Madras, India.
Area of research : Condensed matter theory computational
Thesis Title: Band Topology of Bi based Perovskite Oxide.
Supervisor: Dr. B.R.K Nanda, Department of physics, IIT Madras

- ✓ **From 2010 – 2012:** Master of Science (M.Sc.) in Physics, School of Physics, Hyderabad Central University, India, (First class, 70 percentage).

Subjects studied: Mathematical methods of physics, Classical mechanics, Electromagnetic theory, Quantum mechanics, Magnetism, Semiconductor physics

- ✓ Bachelor of Science (B.Sc.) in Physics (Hons), Sambalpur University, Odisha, India (First class, 72 percentage) (2010).

Subjects studied- Physics, Mathematics, Chemistry

V Skills and Expertises:

- **PROGRAMMING SKILL:**FORTRAN and PYTHON

VI TECHNIQAL/METHODOLOGY EXPERTISE

- Density Functional Theory (DFT) calculations using WIEN2k code (FP-LAPW,Full potential formalism) and Quantum espresso code (Pseudopotential formalism)
- Development of Tight-Binding Model Hamiltonians (Slater-Koster and Wannier formalisms).
- Ab-initio Molecular Dynamics, Phonon and Transport Studies (using ALAMODE)
- Charge carrier dynamics and Excited state properties using Yambo code
- Calculation of quasi particle band structure using GW formalism
- Optical absorption and excitonic properties by solving Bethe-Salpeter equation
- Non-linear response using time dependent Bethe-Salpeter equation

VII PUBLICATIONS

1. Bramhachari Khamari, Ravi Kashikar, and B. R. K. Nanda, Topologically invariant double dirac states in bismuth-based perovskites: Consequence of ambivalent charge states and covalent bonding, *Phys. Rev. B* **97**, 045149 (2018).
2. Ravi Kashikar, Bramhachari Khamari, and B. R. K. Nanda, Second-neighbor electron hopping and pressure induced topological quantum phase transition in insulating cubic perovskites, *Phys. Rev. Materials* **2**, 124204 (2018).
3. Bramhachari Khamari and B R K Nanda, Shifting of fermi level and realization of topological insulating phase in the oxyfluoride BaBiO₂f, *Materials Research Express* **6**, 066309 (2019).
4. Santu K. Bera, Megha Shrivastava, Khamari Bramhachari, Hanyu Zhang, Ajay K. Poonia, Dipendranath Mandal, E. M. Miller, Matthew C. Beard, Amit Agarwal, and K. V. Adarsh, Atomlike interaction and optically tunable giant band-gap renormalization in large-area atomically thin mos₂, *Phys. Rev. B* **104**, L201404 (2021).
5. Bahadur Singh K V Adarshand Amit Agarwal Pushpendra Yadav, Bramhachari Khamari, Fluence dependent dynamics of excitons in monolayer mosi₂z₄ (z = pnictogen), *J. Phys. Condens. Matter* **35**, 235701 (2023).

VIII FELLOWSHIP

- Qualify Graduate Aptitude Test in Engineering(GATE) held in February 2012 in Physics.

IX Conferences/Workshops

- Bramhachari Khamari and B. R. K Nanda, “Topologically invariant states of Bi based Perovskites”, Presented as poster at International Conference of Young Researchers on Advanced Materials (IUMRS ICYRAM), held at IISc Bangalore, India, Dec11-15 (2016).
- DST-SERB school on “Topology and Condensed Matter Physics “, Ramakrishna Mission Vivekananda University, 23 rd Nov to 2 th Dec 2015, Belur Math Howrah.
- International workshop on “Evolution of Electronic structure Theory and Experimental Realization”, 11-15 September, 2018, SRM IST IITM, Chennai, Tamilnadu, India