Government Autonomous College, Rourkela

Faculty Profile

Name	DR SHUBHAJYOTI MOHAPATRA	
Designation	Assistant Professor	
Department	Physics	
Address (Office)	Department of Physics, Govt. Auto College, Rourkela	
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Qualifications

Degree	Institution	Year	Subject Details
Bsc (Physics)	Ravenshaw University, Odisha	2009	Physics (Hons.)
Msc (Physics)	Utkal University, Odisha	2012	Solid State Physics (Specialisation)
Ph.D	Indian Institute of Technology Kanpur	2021	Theoretical Condensed Matter Physics
PostDoc	Saha Institute of Nuclear Physics, Kolkata, India	2022-2023	Theoretical Condensed Matter Physics

Areas of Interest/ Specialization

Condensed matter theory, strongly correlated magnetic systems, quantum antiferromagnetism, spin-orbit coupling, collective magnetic excitations, multi-orbital models, electronic band structure, Spin models, linear spin wave theory, Topological magnon and transport properties calculations.

Teaching/Research Experience

Organization/Institution	Designation	Duration	Role
Govt. Auto. College, Rourkela	Asst. Professor	March, 2023 – present	Course Instructor and Co-instructor
Dept. of Physics, IIT Kanpur	Research Scholar	Aug, 2013– Mar, 2018	Teaching Assistant

Course Taught

UG Courses – Introduction to Electrodynamics**,** Electromagnetic theory, Waves and Optics, Introduction to Classical Mechanics, Thermodynamics, UG Physics Lab

PG Courses - Thermal and Statistical Physics, Introduction to astrophysics, Electrodynamics, Computer programming, M.Sc. Physics Lab

International Collaboration/Consultancy

1. Prof. Jeroen` van den Brink, IFW Dresden, Germany.
2. Prof. Sashi Satpathy, Dept. of Physics and astronomy, University of Missouri, United States.
3. Prof. Tapan Chatterjee, Institute Laue-langevin, Grenoble, France.
4. Prof. Carsten Timm, Faculty of Physics, TU Dresden, Germany.

Publications

Research Papers:

1) S. Ghosh, N. Raghuvanshi, **S. Mohapatra**, A. Kumar, and A. Singh, *Multi-Orbital Quantum Antiferromagnetism in Iron Pnictides — Effective Spin Couplings and Quantum Corrections to Sublattice Magnetization*, **J. Phys.: Condens. Matter 28, 366002 (2016)**.

2) A. Singh, **S. Mohapatra**, T. Ziman, and T. Chatterji, *Spin Waves in the AF State of the $t - t'$ Hubbard Model on the FCC Lattice: Competing Interactions, Frustration, and Instabilities*, **J. Appl. Phys. 121, 073903 (2017)**.

3) **S. Mohapatra**, J. van den Brink, and A. Singh, *Magnetic Excitations in a Three-Orbital Model for the Strongly Spin-Orbit Coupled Iridates: Effect of Mixing between the J = 1/2 and 3/2 Sectors*, **Phys. Rev. B 95, 094435 (2017)**.

4) **S. Mohapatra**, C. Bhandari, S. Satpathy, and A. Singh, *Effects of the Structural Distortion on the Electronic Band Structure of $NaOsO_3$ Studied Within Density Functional Theory and a Three-Orbital Model*, **Phys. Rev. B 97 155154 (2018)**.

5) A. Singh, **S. Mohapatra**, C. Bhandari, and S. Satpathy, Spin-Orbit Coupling Induced Magnetic Anisotropy and Large Spin Wave Gap in $NaOsO_3$, **J. Phys. Commun. 2 115016 (2018)**.

6) **S. Mohapatra** and A. Singh, *Spin Waves and Stability of Zigzag Order in the Hubbard Model with Spin-Dependent Hopping Terms - Application to the Honeycomb Lattice Compounds Na_2IrO_3 and $\alpha - RuCl_3$*, **J. Magn. Magn. Mater 479, 229 (2019)**.

7) **S. Mohapatra**, S. Aditya, R. Mukherjee, and A. Singh, *Octahedral Tilting Induced Isospin Reorientation Transition in Iridate Heterostructures*, **Phys. Rev. B: Rapid Communications 100, 140409(R) (2019)**.

8) **S. Mohapatra** and A. Singh, *Correlated Motion of Particle-Hole Excitations Across the Renormalized Spin–Orbit Gap in Sr_2IrO_4*, **J. Magn. Magn. Mater 512, 166997 (2020)**.

9) **S. Mohapatra** and A. Singh, *Magnetic Reorientation Transition in a Three Orbital Model for Ca_2RuO_4 — Interplay of Spin–Orbit Coupling, Tetragonal Distortion, and Coulomb Interactions*, **J. Phys.: Condens. Matter 32, 485805 (2020)**.

10) **S. Mohapatra** and A. Singh, *Pseudo-Spin Rotation Symmetry Breaking by Coulomb Interaction Terms in Spin-Orbit Coupled Systems*, **J. Phys.: Condens. Matter 33, 065802 (2021)**.

11) **S. Mohapatra**, R. Kundu, A. Dubey, D. Dutta, and A. Singh, *Role of Orbital Off-Diagonal Spin and Charge Condensates in a Three Orbital Model for Ca_2RuO_4 —Coulomb Renormalized Spin–Orbit Coupling, Orbital Moment, and Tunable Magnetic Order*, **J. Magn. Magn. Mater 537, 168172 (2021)**.

12) **S. Mohapatra** and A. Singh, *Coupled spin-orbital fluctuations in a three orbital model for 4d and 5d oxides with electron fillings n = 3, 4, 5 — Application to $NaOsO_3$, Ca_2RuO_4 and Sr_2IrO_4*, **J. Phys.: Condens. Matter 33, 345803 (2021)**.

13) **S. Mohapatra**, D. K. Singh, R. Ray, S. Ghosh, and A. Singh, *Spin-Orbit Coupling, Orbitally Entangled Antiferromagnetic Order, and Collective Spin-Orbital Excitations in Sr_2VO_4*, **J. Phys.: Condens. Matter 35, 045801 (2023)**.

14) **S. Mohapatra**, D. K. Singh and A. Singh, Spin-Orbit Coupling and Magnetism in Sr_2CrO_4, **J. Phys.: Condens. Matter, DOI: 10.1088/1361-648X/ace872** (Accepted)

Preprints

1) **S. Mohapatra** and A. Singh, *Magnetic Order and Anisotropic Interactions Induced by Mixing Between the J = 1/2 and 3/2 Sectors in Spin-Orbit Coupled Honeycomb-Lattice Compounds*, **arXiv:1908.09130 (2019)**.

Paper Presented in Seminar/Symposium/Webinar/Workshop/FDP/Orientation/ Refresher/Conference etc [In Detail]

1) Oral presentation in conference on "Young Investigators Meet on Quantum Condensed Matter Theory" held in NISER Bhubaneswar, India from 29 October-1st November 2022.

"*Microscopic Theory of Magnetism and Collective Excitations in Spin-Orbit Coupled Honeycomb Systems: A Three Orbital Model Study*"

2) Oral presentation in conference on "Annual Conference On Quantum Condensed Matter" held in IIT Kanpur, India from September 18 – 22, 2022.

"*Spin-Orbit Coupling, Orbitally Entangled Magnetic Order, and Collective Excitations in Layered Perovskites Sr_2MO_4 (M = Cr, V)*"

Seminar/Symposium/Webinar/Workshop/FDP/Orientation/ Refresher/Conference etc Attended [In Detail]

1) Attended APCTP-IACS-SNBNCBS International workshop on "Computational Methods for Emergent Quantum matter: From Theoretical Concepts to Experimental Realization" held in S N Bose National center for Basic Sciences and Indian Association for the Cultivation of science, Kolkata from November 17 – 25, 2022.

2) Attended International workshop (webinar) on "Emergence and Dynamics in Quantum Matter" held in South Korea from February 2 – 5, 2021.

Memberships of Professional Bodies/Societies

1) Nodal Officer of Govt. Auto College Rourkela for Electoral literacy club.

Other Details (Academic/Research Related)

1) Selected and participated in Vacation Student Programme (VSP-2011), conducted by IUCAA, Pune, India which consisted of a number of lectures on various aspect of Astronomy and Astrophysics, laboratory sessions, demonstrations, tour to optical and radio telescope observatories and a three month project titled: "Dark Matter and Modified Newtonian Dynamics (MOND)"

2) Selected and participated in Jagadis Bose National Science Talent Search (JBNSTS) program conducted by JBNSTS, Kolkata in the year 2006.

Honors and Awards if any

1) Secured All India Rank 140 in the National Eligibility Test (NET-2014) for Lectureship conducted by UGC-CSIR, India.

2) Secured All India Rank 200 in the Joint Entrance Screening Test (JEST-2013) conducted by Saha Institute of Nuclear Physics, Kolkata, India.

3) Secured All India Rank 217 in the Graduate Aptitude Test for Engineering (GATE-2013) conducted by Indian Institute of Technology, Bombay.

4) Recipient of scholarship of merit (INR 48,000 cash award) from Institute of Mathematics, Bhubaneswar, India in the year 2011.