

Postdoctoral/Research Associate Positions in Condensed Matter Physics Experiment (CMPE) Group at IOP, Bhubaneswar

The Institute of Physics (IOP), Bhubaneswar, invites applications for multiple Postdoctoral/Research Associate positions in the Condensed Matter Physics Experiment (CMPE) Group under the DAE project “Research and development on cutting-edge topics in theoretical and experimental physics” at IOP (UID: NO. RIO 4004). The broad areas of interest are as follows.

1. Investigation of Novel Electronic Phases in Condensed-Matter Systems (Research Topic-1)

The focus is on understanding and tailoring electronic and magnetic properties in solids through the interplay of dimensionality, electronic correlations, spin, orbital and lattice degrees of freedom, topology, symmetry, and geometric phases of quantum wave functions. Some of the systems and phenomena of interest include correlated-electron systems, topological matter, novel and two-dimensional magnetism, quantum transport, spin–orbit-coupling-related phenomena, and emergent phenomena in thin films, and heterostructures, as well as related topics.

Desirable expertise: Candidates with a sound background in one or more of the above research areas and peer-reviewed publications are encouraged to apply.

2. Investigation of Interplay of Ferroelectric Polarization and Memristive Switching for Neuromorphic Computing Applications (Research Topic-2)

This research project focuses on the design, fabrication, and physical mechanism investigation of advanced memristive devices to emulate bio-mimetic synaptic plasticity and neuronal behavior for energy-efficient neuromorphic computing. By exploring novel low-dimensional materials, ferroelectric thin films, and heterostructures, the project aims to optimize ion migration and interfacial electronic properties to achieve highly linear conductance modulation, multi-level memory storage, and robust analog endurance. The selected candidate will drive experimental efforts in device microfabrication, advanced structural and spectroscopic characterization, and high-precision electrical testing to evaluate crossbar-level hardware performance for brain-inspired computing architectures.

Desirable Expertise

- Strong experimental background in memristive devices, resistive random-access memory (RRAM), artificial synapses, or oxide/ferroelectric electronics.
- Direct experience with thin-film deposition techniques (sputtering/PLD) and micro/nanofabrication processes (e.g., photolithography, electron-beam lithography, etching).
- Proficiency in nanoscale material and surface characterization tools (e.g., AFM, conductive-AFM, Raman spectroscopy).
- Expertise in electrical characterization of electronic devices, including DC I - V profiling, ultrafast pulse measurements, and synaptic function emulation (STDP, PPF/PPD).
- Knowledge of device modelling, or neural network simulation is highly desirable.

3. Exploring Advanced Functional Materials/nanomaterials/2D materials: From Fundamentals to Applications (Research Topic-3)

We work in interdisciplinary research areas spanning fundamental and applied condensed-matter physics, tailoring electronic, structural, and magnetic properties of thin films, nanoscale systems, and strongly correlated bulk materials. We also explore advanced functional materials with potential technological applications.

Desirable expertise: Candidates with research experience in any of the following areas are encouraged to apply: Strongly correlated systems, hybrid halide perovskites and their derivatives, ferroelectricity/piezoelectricity, thermoelectrics, or memristive switching.

4. Investigation of ion implanted wide band-gap systems (Research Topic-4)

The project will be related to defect-engineering of wide band-gap systems like diamond and oxide thin films for various applications. As a matter of fact, ion implantation leads to controlled defect engineering in materials, causing changes in physico-chemical properties of materials. Thus, in this project, we plan to study ion implantation induced tailoring of electrical and optical properties of wide band-gap systems and understand the role of defect migration.

Desirable expertise: Candidates having experience in using energetic ion beams and/or growth of thin films are encouraged to apply. The applications should be backed by peer-reviewed publications.

Eligibility

For all the above four research topics, candidates who have submitted their Ph.D. thesis or have completed their Ph.D. may apply. Selected candidates must submit their Ph.D. degree/provisional Ph.D. degree certificate before joining.

Tenure and Fellowship

The initial appointment is for **one year**, with the possibility of extension for a **second year** subject to a performance evaluation in accordance with the rules of the Institute. A further extension into a **third year** may be granted, subject to satisfactory performance, the estimated time needed to complete the project, and the availability of funds. The extension may be granted for the full year or for a shorter period.

The fellowship will be provided as per the prevailing guidelines of IOP, Bhubaneswar in accordance with the Department of Atomic Energy norms: **Rs. 58,000/- per month** right after Ph.D., **Rs. 61,000/-** with one year of post-doctoral experience, and **Rs. 67,000/-** after two years (or more than two years) of postdoctoral experience, along with an **annual contingency grant** of **Rs. 60,000/-**. Campus accommodation will be provided subject to the availability. Candidates residing outside the campus will be eligible for House Rent Allowance (HRA) at the applicable rate, as per the Institute rules.

How to Apply

Interested candidates should email the following to **cmpe@iopb.res.in**

- **Curriculum Vitae**, including the current status of the Ph.D. degree (awarded, thesis submitted, or thesis to be submitted)
- **List of publications**
- **Research statement** (maximum two pages)
- **Cover Letter:** In the cover letter, clearly specify the Research Topic (Research Topic-1, 2, 3, or 4) you are applying for. If you wish to be considered for multiple categories, explicitly mention each one.
- **Email Subject Line:** Format your email subject line as follows: **CMPE Postdoctoral/Research Associate - [Research Topic-Number(s)]**

Applicants should arrange for **at least two letters of recommendation** to be sent directly by the referees to **cmpe@iopb.res.in** by the application deadline.

Application Deadline. October 31, 2026

Selection: Shortlisted candidates will be invited for an interview and/or presentation of their research work.

The selected candidates are expected to contribute actively to the successful execution and completion of the project, alongside other academic duties at IoP as appropriate to the position.

For further information, the candidates may contact Tapobrata Som (tsom@iopb.res.in), Dinesh Topwal (dinesh.topwal@iopb.res.in), Satyaprakash Sahoo (sahoo@iopb.res.in) and Debakanta Samal (dsamal@iopb.res.in).