

Applications are invited for the Doctor of Philosophy (PhD) program in Physics

Minimum Eligibility criteria:

- Masters degree with at least 60% (55% for reserved category) aggregate marks in any field of Physical Sciences . **OR** 4-year BS with 75% (70% for reserved category) aggregate marks with Physics as one of the subjects. **OR** Final year MS / BS who are yet to obtain their degree may also apply, however, they must complete the MSc/MS/BS degree at the time of admission with the requisite aggregate marks.
- Selection of the candidates will be as per the Gol norms. Candidates belonging to the respective reserved category need to submit relevant certificates and documents.

We have two selection Channels:

1. **Self Funded** (Apart from satisfying minimal eligibility criteria, the candidates must have their own PhD fellowships, such as, UGC/CSIR-JRF/RGNF/INSPIRE*) INSPIRE or any other equivalent fellowships. Candidates with INSPIRE FELLOWSHIP should only apply if they have the "Provisional Offer of Research Studentship under INSPIRE Fellowship".
2. **Institute Funded** (Apart from satisfying minimal eligibility criteria, the candidates with valid rank in one of the national level exams: GATE/JAM/JEST/NET-LS.) The selected candidates will have fellowship from IISER-Kolkata for 5 years.

Available PhD positions under Board Research Areas as listed:

Channel-1: Self Funded

Theory/Computational:

A. [Condensed Matter Physics] [Offering: Prof. Amit Ghoshal]

- A1. Study of static and dynamic correlations across melting in two dimensional systems with long-range interacting particles, both in the presence and absence of impurities
- A2. Disordered quantum systems and non-equilibrium dynamics in them

B. [StatPhys/Biophys/NLD] [Offering: Prof. Arindam Kundagrami]

Theoretical polymer physics

C. [Condensed Matter Physics] [Offering: Dr. Bheemalingam Chittari]

Topological properties of graphene and Other 2D materials by tight binding and density functional theory

D. [Gravitational Physics and Astrophysics] [Offering: Prof. Golam M Hossain]

Quantum fields in curved spacetime and relativistic astrophysics of compact stars

E. [Gravitational Physics and Astrophysics] [Offering: Prof. Koushik Dutta]

Early Universe Cosmology, Cosmo-particle and Astro-particle Physics

F. [StatPhys/Biophys/NLD] [Offering: Prof. Pradeep Kumar Mohanty]

F1. Nonequilibrium Phases Transitions and F2. Hyperuniform states of matter

G. [Theoretical Condensed Matter/Quantum] [Offering: Prof. Rangeet Bhattacharyya]

Quantum dynamics of open quantum systems

H. [High Energy Physics] [Offering: Prof. Ritesh K. Singh]

High Energy Physics

I. [StatPhys/Biophys/NLD] [Offering: Prof. Rumi De]

To develop theoretical and computational models to understand the collective dynamics of active, out-of-equilibrium systems by using tools from statistical physics, nonlinear dynamics, and soft condensed matter physics

J. [Condensed Matter physics] [Offering: Prof. Satyabrata Raj]

Electronic, Optical, and Magnetic structure of 2D and 3D-strongly correlated systems by Density Functional Theory (DFT) approach.

K. [Condensed Matter physics/Quantum Matter] [Offering: Prof. Sourin Das]

Quantum Machine Learning, Quantum Information & Quantum Matter.

L. [Condensed matter and statistical mechanics] [Offering: Dr. Subhasis Sinha]

Ultracold quantum gases, Non equilibrium quantum systems, Quantum Chaos

M. [Gravitational Physics and Astrophysics] [Offering: Dr. Sudip Kumar Garain]

General relativistic fluid dynamics simulations around compact objects



PhD Admission Open - Autumn 2025

Channel-1: Self Funded

Experimental:

A. [Optics/Spectroscopy] [Offering: Prof. Ayan Banerjee]

A1. Device and bio-sensor development using optical tweezers: Generating novel mesoscopic architectures using microbubbles generated by thermo-optical tweezers based on directed self-assembly, developing devices for chemical and bio-sensing, and studying the science of self assembly.

A2. Optical tweezers for trapping particles in air: Developing 3d optical tweezers for trapping absorbing microparticles and uncovering the physics behind the trapping and observed dynamics.

B. [Condensed Matter Physics] [Offering: Prof. Bhavtosh Bansa]

Spatio-temporal studies of solid state phase transitions

C. [Condensed Matter Physics/Quantum Information] [Offering: Prof. Chiranjib Mitra]

C1. Quantum Information Processing using NV centres in diamond

C2. Topological Insulators, Majorana Fermions and Weyl Semi-metals

D. [Optics/Spectroscopy] [Offering: Prof. Dhananjay Nandi]

Study of molecular dynamics using state-of-the-art experiments and cutting edge technologies.

E. [Condensed Matter Physics] [Offering: Prof. Goutam Dev Mukherjee]

Quantum materials at extreme conditions of pressure and temperature

F. [Condensed Matter Physics] [Offering: Dr. Kamaraju Natarajan]

F1. Terahertz Spectroscopy and Pump Probe Spectroscopy of quantum materials and their heterostructures.

F2. Using picosecond strain pulses and microscopic pump-probe techniques to investigate quantum materials.

F3. Time resolved fundamental and higher (second, third) Harmonic spectroscopy of 2D quantum materials.

G. [Condensed Matter Physics] [Offering: Dr. Partha Mitra]

Spintronics experiment

H. [Condensed Matter Physics] [Offering: Prof. Satyabrata Raj]

H1. Electronic and Magnetic structure of strongly correlated systems by synchrotron based Photoemission Spectroscopy (Both AI- and AR-PES)

H2. Electronic, Optical, Magnetic, and Transport properties of novel Nanomaterials.

Channel-2: Institute Funded

Experimental:

A. [Condensed matter physics] [Offering: Prof. Satyabrata Raj]

A1. Electronic and Magnetic structure of strongly correlated systems by synchrotron based Photoemission Spectroscopy (Both Angle-resolved and Angle-integrated)

A2. Electronic, Optical, Magnetic, and Transport properties of novel Nanomaterials.

Theory/Computational:

A. [Gravitational Physics and Astrophysics] [Offering: Prof. Golam M Hossain]

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