

Advertisement for Admission to Ph.D. Program (2020-2021) in Discipline of Physics

Submission Deadline: 25th October 2020

Online Interviews for shortlisted candidates: 30th & 31st October 2020

For **Eligibility Qualifications, Directions and Application Process** see the following pages

Invitation of admission to the Ph.D. Program in the following research areas:

A. Condensed Matter Physics (Experimental)

Prof. Krushna R. Mavani
Dr. Preeti A. Bhoje
Dr. Sudeshna Chattopadhyay
Dr. Rajesh Kumar
Dr. Pankaj R. Sagdeo
Dr. Somaditya Sen

B. Condensed Matter Physics (Theory and Computation)

Dr. Sudip Chakrabarty
Dr. Srimanta Pakhira

C. High Energy Physics (Experimental)

Dr. Raghunath Sahoo
Dr. Ankhi Roy

D. High Energy Physics and Particle physics (Theory)

Prof. Subhendu Rakshit
Dr. Dipankar Das
Dr. Manavendra Mahato
Dr. Debajyoti Sarakar

E. Nonlinear Dynamics and Complex Systems (Networks, Statistical physics, Nonlinear Dynamics, Computational Biology)

Prof. Sarika Jalan

BRIEF AREAS OF RESEARCH OF INDIVIDUAL FACULTY MEMBERS are provided below (details can be found from personal webpages):

A. CONDENSED MATTER PHYSICS (EXPERIMENTAL)

[PROF. KRUSHNA R. MAVANI;](#)

Website: <http://iiti.ac.in/people/~krushna/> , **Email:** krushna@iiti.ac.in

Experimental Condensed Matter Physics: Terahertz spectroscopy of solid materials, Pulsed Laser Deposited nanostructures, thin films and multilayers, Functional oxides, Strongly correlated electron systems, Structure-property relations, Magnetism.

[DR. PREETI A. BHOBE;](#)

Website: <http://iiti.ac.in/people/~pbhobe/index.html> , **Email:** pbhobe@iiti.ac.in

Experimental Condensed Matter Physics: Study of crystal and electronic structure of Half-metallic Heusler alloys, Materials for Spintronics, Thermoelectric Chalcogenides and Nanostructure properties, Complex magnetic ground state, X-ray Absorption Fine Structure (XAFS)

[DR. SUDESHNA CHATTOPADHYAY;](#)

Website: <http://iiti.ac.in/people/~sudeshna/> . **Email:** sudeshna@iiti.ac.in

Experimental Condensed Matter Physics: Study of Surface and Interfaces –nanomaterials, thin-films, structure property relationship - optical properties, photocatalytic activity, application in solar cell; Soft matter physics; Atomic Layer Deposition (ALD), Nanotechnology in Biomedical applications and environmental remediation; Electrical Energy Storage- batteries and supercapacitors – Li and Al ion batteries.

[DR. RAJESH KUMAR;](#)

Website: <https://sites.google.com/view/madlabrkr/>, **Email:** rajeshkumar@iiti.ac.in

Experimental Condensed Matter Physics: Device physics; Experimental Solid State Physics; Organic and Inorganic Semiconductors; Nanostructures.

[DR. PANKAJ R. SAGDEO;](#)

Website: <http://iiti.ac.in/people/~prs/> , **Email:** prs@iiti.ac.in

Experimental and Theoretical Condensed Matter Physics: Structural, optical, phononic and electronic properties of transition metal oxides, X-ray scattering using synchrotron radiation, Physics of semiconductor devices and solar cell, Physics at nano-scales/ nano-science and nano-technology, Perovskite oxides with magneto-resistance, ferroelectric and multi-ferroic properties, Density functional theory, Instrumentation development.

[DR. SOMADITYA SEN;](#)

Website: <https://sites.google.com/iiti.ac.in/smart-group-somaditya-sen/>, **Email:** sens@iiti.ac.in

Synthesis, structure/phonon experiment-theory-correlated physical properties of simple and complex oxides (Titanates, Manganites, Vanadates, Cuprates, Nickelates): Optoelectronic and electrical/dielectric/ferroelectric/sensing/ electrochemical and magnetic properties. Nano, Thin films, Bulk materials; Magnetic materials, Multiferroics, Magneto-dielectrics, Optoelectronic, Semiconducting materials, Light/Gas Sensors; Application of oxide materials in Dielectric Resonator antennas and Biological applications; Oxide thin-film and nanomaterials devices.

B. CONDENSED MATTER PHYSICS (THEORY AND COMPUTATION)

DR. SUDIP CHAKRABARTY Email: (sudip@iiti.ac.in)

Website: <https://sudiphys.wixsite.com/ceslab-sudip>

Computational Condensed Matter Physics; Materials Theory and Simulation; Development of Codes relevant to Density Functional Theory (DFT) and Energy Materials Modelling; Rashba-Dresselhaus Physics; Defect Thermodynamics; Computational High Pressure Physics; Topological Insulator and Topological Superconductor; Hybrid Perovskites and 2D Materials for Solar Cell and Photocatalytic Applications; Materials for Quantum Computing; Meta-Materials

DR. SRIMANTA PAKHIRA Email: (spakhira@iiti.ac.in)

Website: <https://spakhirafsu.wixsite.com/acmslab>

Condensed Matter Theory, Computational Materials Physics and Materials Science, Condensed Matter Nanoscience, Electronic Structure Theory, Density Functional Theory and Molecular Dynamics (MD) Simulations, Semiconductor Physics, Magnetism, Physics of Novel Solar Cells and Perovskite, Renewable Energy Technology. Porous Materials and Their Applications in Gas Storage, Separation, Adsorption and Drug Delivery in Metal-Organic Frameworks and Covalent Organic Frameworks. Alkali-ion Battery, Novel Batteries Technology, Renewable Energy Materials, Carbon Capture, Graphene, Bilayer Graphene, Mexene, Electrocatalysts, Photocatalysts, Novel 2D Materials, H₂ & O₂ Evolutions, and Alkane Cracking in Oil Refining Technology.

C. HIGH ENERGY PHYSICS (EXPERIMENTAL):

DR. ANKHI ROY Email: (ankhi@iiti.ac.in)

Website: <http://iiti.ac.in/people/~ankhi/>

High Energy Physics Experiment-Heavy Flavor Hadrons, Heavy Ion Collision (Experiment: ALICE@LHC, CBM@FAIR), Machine Learning.

DR. RAGHUNATH SAHOO Email: (raghunath@iiti.ac.in)

Website: <http://iiti.ac.in/people/~raghunath/index.html>

High-Energy Physics Experiment (ALICE Experiment @ CERN, Switzerland and CBM Experiment @ GSI, Germany) Phenomenology of Quark-Gluon Plasma, Exploration of QCD Phase Diagram, GRAPES-3 (Gamma Ray Astronomy PeV Energies)

D. HIGH ENERGY PHYSICS AND PARTICLE PHYSICS (THEORY):

PROF. SUBHENDU RAKSHIT Email: rakshit@iiti.ac.in

Website: <https://sites.google.com/iiti.ac.in/srakshit/home?authuser=1>

Theoretical High Energy Physics: Dark matter, Higgs physics, neutrino physics, and generally physics beyond the standard model.

DR. MANAVENDRA MAHATO Email: manav@iiti.ac.in

Website: <http://iiti.ac.in/people/~manav/>

Theoretical High Energy Physics: Gravity and String theory

DR. DIPANKAR DAS Email: d.das@iiti.ac.in

Website: <http://people.iiti.ac.in/~d.das/>

Theoretical Particle Physics, Physics beyond the Standard Model, Higgs Physics, Neutrino Physics.

DR. DEBAJYOTI SARKAR Email: dsarkar@iiti.ac.in

Website: <http://people.iiti.ac.in/~dsarkar/>

String theory. AdS/CFT duality and its applications in strongly coupled Quantum (Conformal) Field Theory and Quantum Information. Topics in Gravitational and Black Hole Physics.

E. NON-LINEAR DYNAMICS AND COMPLEX SYSTEMS:

PROF. SARIKA JALAN Email: sarika@iiti.ac.in

Website: <http://iiti.ac.in/people/~sarika/>

Synchronization, spatially extended systems, Pattern formation, Social networks, Disease and information spreading. Spectral graph theory, Game theory, Optimized evolution, Extreme events, time evolving networks, Computational biology

Minimum Educational Qualifications (MEQs) and Qualifying Examination (QE) for applicants:

- Masters' degree (M.Sc. and M.Tech.) in Physics, Optoelectronics, Solid State Physics, Nanotechnology/Nano-sciences, Applied Physics, Electronics, Material Science/Engg., Electrical Engg., Radio Physics and Mathematics (with first division as defined by the awarding Institute/University)
- A valid UGC-JRF/ CSIR-JRF, DST Inspire or Equivalent Fellowship
or
A valid GATE in Physics qualification for admission in a PhD program only in Theoretical High Energy Physics

Applicants must follow the guidelines:

1. **Before applying**, the applicant **must visit** the faculty profiles of the Discipline of Physics at <http://physics.iiti.ac.in/faculty.html>
2. The applicant must understand the research interest of individual faculty members of the discipline before appearing the interview according to his/her preference.
3. At the time of the application, the applicant should have a very clear idea of the subject of research that he/she wants to pursue and should be able to convince the interview committee about the same.
4. The application procedure is given at the end of this document.
5. Descriptions on admission categories, eligibility, etc. can be found on the main page: <http://academic.iiti.ac.in/phdadvt.php> which needs to be read and understood in detail.
6. If selected, the shortlisted applicant will be informed by email.

APPLICATION PROCEDURE:

1. Candidates must apply ONLINE through the IIT Indore website. This will generate a unique application number for each applicant. The last date for online application is 25th October 2020.
2. Application fee should be paid through State Bank Collect only. This will generate a payment code number that will be required while initiating the filling of online application forms.
3. Online interview will be scheduled within one week of the deadline of accepting applications.
4. The shortlisted applicants will be intimated by email ONLY. Hence, please state your email id carefully. Please check your SPAM folder regularly, just in case you are expecting to be shortlisted, and do not receive an email from us.
5. The Shortlisted candidates should arrange for at least TWO recommendation letters to be submitted to us online via the Google form link. A separate email for the same will be sent by us in this regard to the short-listed candidates.
6. The shortlisted candidates should send a handwritten 'Statement of Purpose', describing the details of your interest in research and joining Ph.D. in Physics at IIT Indore.
8. The decision of the institute in all matters will be final.