

Condensed matter theory

(computational and/or machine learning)

The Department of Physics at the Indian Institute of Technology-Madras is looking for an Assistant Professor in the field of Condensed Matter Theory. The applicant should have a proven research track record in the field of Computational Condensed Matter Physics. We are particularly interested in candidates who has shown demonstrable experience in combining multiple numerical techniques in studying problems pertaining to Quantum Condensed Matter. Expertise in harnessing the state of the art numerical techniques in conjunction with elements of Machine Learning will be an added advantage.

The Department has very strong and active research groups that work both in the field of Theoretical and Experimental Condensed Matter. It has also a very vibrant group that works in allied areas such as Quantum Information and Quantum Computation. It is expected that the prospective hire will bring in expertise that will complement the research efforts of some of these groups. The successful candidate will also be required to teach courses at both the undergraduate and graduate level here at IIT Madras.

Interested candidates should contact

Dr. Ranjit Nanda (nandab@iitm.ac.in) and

Dr. Rajesh Narayanan (rnarayanan@iitm.ac.in)

Gravitation and Cosmology

(Gravitational waves, Cosmology, and Gravitational quantum physics)

The Department of Physics at IIT Madras is looking for an exceptional candidate at the level of Assistant Professor in the area of Gravitation and Cosmology. Candidates working in the areas of gravitational waves, cosmology and gravitational quantum physics, are encouraged to apply. Ideally, the Department is keen on hiring a person with analytical as well as computational expertise in their area of research. Candidates with research programs that can potentially connect to observations and experiments, and highlights a strong background in current trends in the above areas, are preferred.

We are seeking a candidate to complement the existing expertise in the Department. The candidate should have demonstrated originality, productivity and independence in research in gravitational waves, cosmology, and gravitational quantum physics, and is expected to establish an independent research program. The successful candidate will be expected to teach courses at the undergraduate and master's levels in the Department. The candidate will also be welcome to join the newly instituted Centre for Excellence in Strings, Gravitation and Cosmology.

Interested candidates should contact:

[Dr. L. Sriramkumar \(sriram@physics.iitm.ac.in\)](mailto:sriram@physics.iitm.ac.in)

[Dr. Dawood Kothawala \(dawood@iitm.ac.in\)](mailto:dawood@iitm.ac.in)

[Dr. Chandra Kant Mishra \(ckm@iitm.ac.in\)](mailto:ckm@iitm.ac.in)

Quantum optics - theory

We are interested in hiring a theoretical physicist with specialization in Quantum Optics. We expect the candidate to work in areas which are of experimental relevance. In particular, we require candidates trained in areas such as cavity QED, optomechanics, light and atom interferometry, coherent control techniques and coherence and decoherence due to matter-radiation interaction.

Teaching duties will include a masters level elective course titled 'Coherent and Quantum Optics' apart from the usual courses that are generally required to be taught at the undergraduate and Masters level by any faculty member.

Interested candidates should contact:

Prof. S. Lakshmi Bala (slbala@physics.iitm.ac.in)

Quantum optics/lasers – experiment

The Physics department of IIT Madras is looking for an Assistant Professor with background in experimental quantum photonics, photon-matter interactions & very good understanding of quantum optics and information. The candidate should have original research in the fundamental aspect and applications of quantum optics. The candidate must also demonstrate his/her ability to coordinate a research group, with collaboration within the institute and with international groups as well.

The proposed area of the candidate may include one or more of the following:

- Advanced quantum photonics devices,
- Solid-state photon-emitter interfaces,
- Photonic quantum simulators
- Single-photon detectors and sources,
- Opto-mechanical systems,
- Quantum metrology and
- Cavity quantum electrodynamics.

Experience in any hybrid quantum systems may be desirable. The candidate will have access to the existing optics infrastructure, including cw and pulsed photon sources in visible and near IR region at IIT Madras. The successful candidate is expected to teach undergraduate and graduate courses in the department.

Interested candidates should contact:

Dr. Vaibhav Madhok (madhok@physics.iitm.ac.in) and

Dr. Prem B Bisht (bisht@iitm.ac.in)

High-energy physics phenomenology/lattice theory

The Physics department of IIT Madras is looking for an Assistant Professor with expertise in either “high-energy physics phenomenology” or “high-energy physics lattice theory”. Candidates should have demonstrated originality and productivity in one of these fields including collider phenomenology, astroparticle/cosmo-particle physics, dark matter phenomenology, effective field theories, QCD matter and non-perturbative understanding of consistent extensions of the standard model. At present the department does not have any faculty working primarily in these areas and the successful applicant will be expected to establish a group.

The department has active groups working in experimental high-energy physics, particularly flavour physics, Higgs physics, searches for beyond-the-standard-model physics, heavy-ion collisions and neutrino physics. We also have an active string-theory and quantum field theory group whose research interests include fundamental understanding of non-perturbative quantum field theory with applications to the phenomenology of QCD matter, especially the quark-gluon plasma. Complementarity to these existing areas would be a desirable, though not essential, asset for prospective candidates. The successful candidate will also have to teach undergraduate and graduate courses in the department.

Interested candidates should contact

Dr. Ayan Mukopadhyay (ayan@iitm.ac.in) and

Dr. Jim Libby (libby@iitm.ac.in)

Dynamical systems

The Physics department at IIT Madras is looking for an exceptional candidate at the Assistant Professor level in the broad area of "dynamical systems". This may include (but is not restricted to) the theory of dynamical systems, chaos and non-linear dynamics, computational dynamics, data and time series analysis, PDEs, geometric flows and analysis, dynamics of networks, ergodic theory, stochastic and random dynamics, asymptotic analysis, as well as applications of these in the physics of complex systems in areas such as (but not limited to) climate science, turbulence, biological processes and pattern formation. The candidate will be expected to develop an independent research program in dynamical systems, interact with and complement existing research activities in the department (and outside), contribute to the teaching of the department at both the undergraduate and graduate level, show academic leadership at national and international level, participate in departmental activities and tasks, including writing grant proposals and mentoring and supervising doctoral students.

Interested candidates should contact:

[Dr. Vaibhav Madhok \(madhok@physics.iitm.ac.in\)](mailto:madhok@physics.iitm.ac.in)

[Dr. Arul Lakshminarayan \(arul@physics.iitm.ac.in\)](mailto:arul@physics.iitm.ac.in)

Experimental Atomic and Molecular Physics

We are looking for a strong candidate as Assistant Professor with expertise in state-of-the-art atomic and molecular physics experiments, preferably, but not essentially, related to molecular processes with astrophysical interest.

The Atomic and Molecular Physics group (AMP) at IIT Madras studies the formation of anions and cations, their stability, and their interactions with photons in the interstellar medium using photoelectron spectroscopy and Ion trap. The candidate's proposed research plan should be complementary to the existing work at our AMP group. We expect the candidate to have expertise in building atomic and molecular physics experimental setups.

The successful candidate will have to teach undergraduate and graduate courses in the department.

Interested candidates should contact:

Dr. G. Aravind (garavind@iitm.ac.in)

Energy Materials

The Physics Department at IIT Madras is planning to recruit at the Assistant Professor level with expertise in the broad area of “Energy Materials”. Candidates with proven technical expertise in materials for energy storage and energy conversion are encouraged to apply. Candidates should have demonstrated original and high-quality research in one or more of the following fields including but not limited to battery materials for energy storage, supercapacitors for storage and release of pulsed power, fuel cells for efficient direct conversion of chemical to electrical energy, photovoltaics and photocatalysis for solar energy harvesting, and thermoelectric materials. The successful applicant will have an outstanding record of independent research in materials physics, and will be expected to develop a vigorous, high quality and externally funded research programme both at national and international level.

The department has active groups working in experimental condensed matter physics relevant for energy applications, particularly, photovoltaics and photocatalysis, Li-ion batteries, quantum dot sensitized solar cells, nanomaterials for energy applications. At present the department has few faculties working on topics related to these areas. We also have an active DST IITM Solar Energy Harnessing Centre. The successful applicant will compliment these research topics with emphasis on the research in physics of materials and expected to establish an Energy Research group. Candidate must also demonstrate a firm commitment to teaching physics courses at both undergraduate and postgraduate levels within the Department of Physics and is expected to develop courses within the general area of Energy Materials and Energy Research for interdisciplinary courses.

Interested candidates should contact

Dr. Sudakar Chandran (csudakar@iitm.ac.in)