

AICTE Sponsored Short Term Course

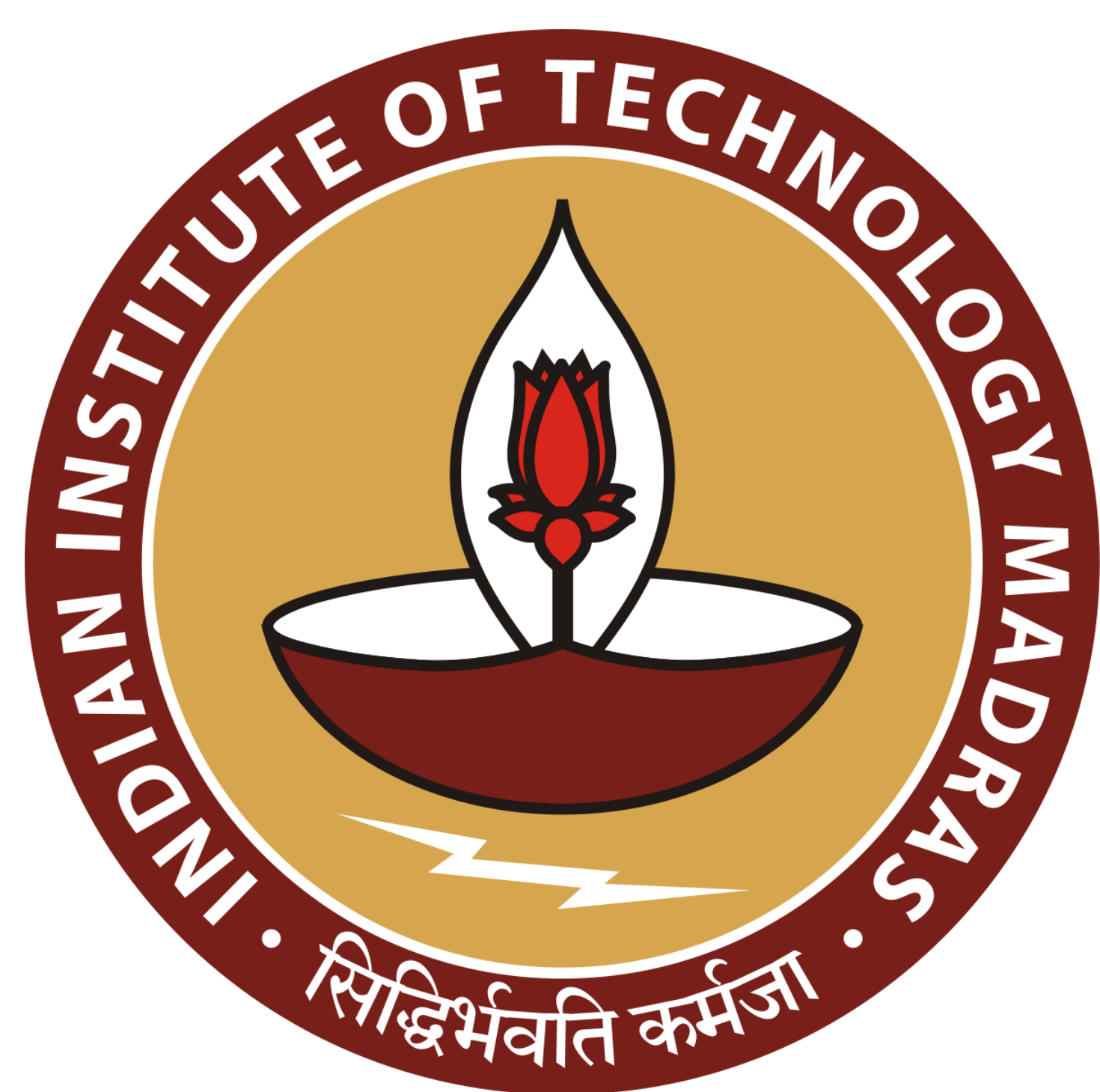
on

Two-dimensional Materials: Physics and Applications

21-26 September 2019

Coordinators

Dr. Pramoda Kumar Nayak
Prof. M. S. Ramachandra Rao
Dr. K. Lakshmi Ganapathi



Organized by
Department of Physics
Indian Institute of Technology Madras,
Chennai - 600036, India.

Theme of the course

Discovery of two-dimensional (2D) materials, the thinnest form of materials to ever occur in nature has the potential to dramatically alter and revolutionize our material world. The class of 2D materials possesses layered structure with strong in-plane chemical bonds and weak out of plane coupling between layers and also known as van der Waals (vdW) materials. These layered structures provide the opportunity to be cleaved into individual freestanding atomic layers. When the thickness of layered material is reduced to single or only few layers, some extraordinary variations occur in their electronic properties due to quantum confinement. These materials with a wide gamut of bandgaps covering a large portion (0.3 eV to 6 eV) of the electromagnetic spectrum are available. High optical activity with excitonic electroluminescence at room temperature and valley specific optical phenomena (valley circular dichroism) are the most appealing virtues of these materials that motivate one to explore them for optoelectronic applications.

Course objectives

1. To provide a comprehensive view and state-of-the-art knowledge about 2D-materials and their heterostructures.
2. To explain the basic physics of these materials.
3. To create an awareness about the practical applications and opportunities.
4. To expose different synthesis procedures, characterization techniques, theoretical simulation in this area.

Course duration and venue

The course is of six days duration from 21st to 26th September 2019. Classes will be held at IIT Madras, Chennai.

Resource faculty

The resource faculty includes experts from IIT Madras and other institutions like IITs, IISc and IISERs across the country.

Eligibility

The course is open to faculty with background in the disciplines of Physics, Chemistry, Biotechnology, Electrical engineering and Mechanical engineering.

Course content

- Physics of 2D materials
- Synthesis of 2D materials (top down and bottom up approach)
- Characterization of 2D materials (optical and electrical analysis)
- 2D heterostructures (In plane and out of plane heterostructures)
- 2D semiconductors for transistors
- Ion transport through 2D nanopores
- 2D materials for flexible electronics
- 2D Materials for optoelectronic devices
- 2D Materials for energy storage device
- 2D Materials for bio functionalization

About the department

The department of physics of IIT Madras is the largest physics department in the country in terms of the number of faculty, students and the programs that it offers (B. Tech., B.S.-M.S., M.Sc., M. Tech., and Ph.D.). With 55 strong faculty spanning the entire gamut of physics disciplines including, but not limited to, gravity and cosmology, high energy physics, quantum physics, condensed matter physics, string theory, optics and photonics, nanoscience, statistical physics, atomic and molecular physics and others. We train students and produce physicists for future of the country.

Sponsorship

Prof./Dr./Mr./Ms./Mrs./.....
..... is an employee of our institute. The applicant will be permitted to attend the short-term course on “Two-dimensional Materials: Physics and Applications” at IIT Madras during September 21-26, 2019, if selected.

.....
(Signature of Sponsoring Authority with date and seal)

Registration fee

There is **no course fee** for applicants from AICTE approved engineering colleges.

Travel

The train fare (ONLY two way 3-Tier AC train fare by the shortest route from your institute to Chennai and back) will be provided to the selected participants as per AICTE guidelines.

Board and lodging

Boarding and lodging facilities will be provided for the selected candidates in Taramani Guest House at IIT Madras.

Important dates

Last date for applications : 21st July 2019

Intimation of selection (through email) :31st July 2019

Confirmation of participation : 10th August 2019

Important links

Center for Continuing Education, IIT Madras

<http://cce.iitm.ac.in>

Department of Physics, IIT Madras

<https://physics.iitm.ac.in/>

Course coordinators profile

Dr. Pramoda Kumar Nayak

<https://physics.iitm.ac.in/pnayak>

Prof. M.S. Ramachandra Rao

<https://physics.iitm.ac.in/msrao>

Dr. K. Lakshmi Ganapathi

<https://physics.iitm.ac.in/klganapathi>

The duly sponsored application form should be posted to:

Dr. Pramoda Kumar Nayak

Department of Physics

IIT Madras, Chennai – 600036

E-mail: pnayak@iitm.ac.in

Phone: +91-44-2257-4840

or

Dr. K. Lakshmi Ganapathi

Department of Physics

IIT Madras, Chennai – 600036

E-mail: klganapathi@iitm.ac.in

Phone: +91-44-2257-4839

Note: Please email us a soft copy of your duly filled application followed by hard copy of the same to the address mentioned above.

Application form

- Name:
- Designation:
- Department:
- Organization:
- Mailing Address:
- Pin code: Phone No.:
- Fax No.: Mobile No.:
- E-mail:
- Highest Academic Qualification :
- Specialization:
- Research Area:
- Purpose of attending this workshop:
- **Experience in years:**
(a) Teaching (b) Industrial/Research
- **Accommodation***
(a) Required (b) Not required

*(*No accommodation for local participants)*

All data provided above are true to the best of my knowledge and belief. Kindly register me for the short-term course on “Two-dimensional Materials: Physics and Applications” to be held at IIT Madras.

Place:

Date:

(Signature of the applicant)