

Condensed Matter Physics (CMP) Laboratory

Condensed Matter Physics is a branch of physics which perhaps is the most intimately connected to our day to day life. It presents opportunities for highly advanced research leading to a wide range of technological applications both in civil and defence sectors. Accordingly, the CMP laboratory and experiments therein have been designed and set up in a manner that the students are able to appreciate and comprehend the theoretical concepts of condensed matter physics through hands-on experience.

Through these experiments the students can develop a very good understanding of fundamental principles of condensed matter physics which can explain a hugely wide range of functional properties including electronic and optical properties shown by materials at various length scales starting from atomic to bulk. Further, the experiments have been chosen and designed in such a way that students can apply the knowledge gain toward applied aspects of design and development of electronic devices such as solar cells, thermoelectric devices, etc. In the process, the students are exposed to the rigours of a number of sequential steps starting from materials selection, design, synthesis of materials and component assembling leading to realization of laboratory model of a working device. In the entire process of this experiential learning, the students will also be using a range of advanced equipment for synthesis as well characterization of materials and devices. A list of experiments being currently offered in the CMP laboratory includes:

S. No.	Name of Experiment
1	Hall effect with temperature
2	Electrical Conductivity Measurements using four probe resistivity with temperature
3	Vibrational spectroscopy (Raman)
4	Phonon Dispersion curve
5	Band gap measurements
6	Photoluminescence Spectroscopy studies of Materials
7	Solar cell characterization

8	Studies on Thermoelectric properties of materials
9	Thermoelectric Device Characterization
10	ESR Spectroscopy
11	Magnetic Susceptibility Measurements
12	Study of Thermoluminescence of F-centres in Alkali Halide crystals

