

Integrated PhD in Physical Science (Materials)

2nd Semester lab

2024 Batch, Practical Schedule

JMP 216 (006) Laboratory II

SL. NO	DATE	18 Students
1	JAN 8,9,10	ML 1
2	JAN 15,16,17	ML 2
3	JAN 22,23,24	ML 3
4	JAN 29,30,31	ML 4
5	FEB 5,6,7	ML5
6	FEB 12,13,14	ML6
7	FEB 19,20,21	Ph 7
8	FEB 26,27,28	Ph 8
9	MAR 4,5,6	Ph 9
10	MAR 11,12,13	Ph 10
11	MAR 18,19,20	Ph 11
12	MAR 25,26,27	Ph 12
13	APR 1,2,3	Ph 13
14	APR 8,10	Ph 14

Lab Timings: 02:00 – 05:00 pm

Materials Lab

Prof A. SUNDARESAN

- 1.(a) Indexing of XRD powder pattern of NaCl and KCl.
(b) Rietveld analysis of CeO₂ and BaTiO₃.
2. Structural characterization, thickness measurement, and Hall measurement of rare earth nitride thin film
3. Single crystal growth of organic-inorganic hybrid (Diamniopropane) MnCl₄ and characterization (structure, phase transition, and UV-PL)
4. A study of phase transitions using DSC: Heat Capacity Approach
5. Investigation of the temperature dependence of g value in transition metal and rare earth oxides using EPR: Spin-orbit coupling
6. Magnetic properties of MnO and Dy₂O₃.

Physics Lab

7. Electro-optic effect experiment:

The aim of the experiment is to use the Pockel-cell apparatus to study the birefringence with respect to applied voltage in an electro optic crystal (Lithium Niobate (LiNbO₃)).

8. Photodiode, Photo resistor, Light emitting diode:

Electrical characteristics of photodiode, photo resistor and LED are found out. Noise equivalent power of photodiode is determined with a help of analog lock-in amplifier.

Prof. Ranjan Datta

9. Faraday rotation of light polarization.

10. Surface tension and wetting experiments

- a. Determine critical surface tension of various solid surfaces
- b. The effect of surface roughness on contact angle
- c. Effect of surfactants on surface tension
- d. Hydrophilic vs. Hydrophobic surfaces using surface treatment
- e. Electrowetting of surfaces

11. Temperature dependant properties in materials

- a. Using pt-100 RTD for studying superconducting YB2CU307.
- b. Mirage effect

12. Measurement of Dielectric Constant of various systems

- a. Highlight Dielectric response as a complex quantity
- b. Frequency Response of the dielectric constant

13. Contact Printing using PDMS

Dr Rajesh Ganapathy

14. Bubble raft experiment

- a. Form a bubble raft and image dislocations
- b. Quantify Burgers vector for dislocations.

COORDINATORS:

- 1) Prof. Ranjan Datta
- 2) Prof. Shobhana Narasimhan