



**S N BOSE NATIONAL CENTRE
FOR BASIC SCIENCES**

Block JD, Sector III, Salt Lake, Kolkata 700 106

DEPARTMENTAL SEMINAR

Condensed Matter and Materials Physics

30th March, 2023

4.00 PM

ONLINE/ FERMION

SPEAKER

**Dr. Rajeswari Roy Chowdhury,
DST INSPIRE Faculty,
Department of Physics, IISER Bhopal**

TITLE OF THE TALK

UNCONVENTIONAL MAGNETO RESISTIVE BEHAVIOUR IN LAYERED MAGNETS

ABSTRACT

Magnetism in two-dimensional (2D) van der Waals (vdW) and or layered magnetic materials has emerged as a new paradigm enunciating new condensed matter phenomena, bearing potential for application in future spintronic and quantum computing devices. Among 2D vdW ferromagnets (FMs), metallic Fe₃GeTe₂ (FGT) is interesting owing to high Curie temperature, uniaxial magnetic anisotropy, existence of unusual magnetic ground state. An understanding of factors responsible for unconventional magnetism and associated magnetoresistive manifestations has remained elusive. In the first part of my talk, I will clarify the underlying physics responsible for nontrivial ground state and demonstrate tuning of emergent properties by substitution at magnetic (Fe) or nonmagnetic (Ge) site in 2D vdW FGT [1, 2].

In the second part of my talk, I will talk about layered antiferromagnets (AFMs), which serve as attractive starting point for the establishment of novel functionalities down to the two-dimensional limit. I will show the anisotropic magnetotransport behavior demonstrated by the spin-ladder compound TaFe_{1.25}Te₃ [3]. Furthermore, angle-dependent longitudinal and transverse magnetoresistance show an unusual anharmonic behaviour. Our results deepen understanding of emergent responses from complicated spin textures and fascinating magnetoresistive responses in layered systems, prospective for topological magnetism and antiferromagnetic spintronics.

References:

- [1] R. Roy Chowdhury et al., Sci. Rep. 11, 14121 (2021)
- [2] R. Roy Chowdhury, et al., Phys. Rev. Mater. 6, 014002 (2022)
- [3] R. Roy Chowdhury et al., Phys. Rev. Mater. 6, 084408 (2022)

HOST FACULTY

Prof. Priya Mahadevan, Senior Professor
