



S N BOSE NATIONAL CENTRE
FOR BASIC SCIENCES

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

DEPARTMENTAL SEMINAR

Condensed Matter and Materials Physics

10th March 2026

11.30 AM

ONLINE / FERMION

SPEAKER



Dr. Shouvik Chatterjee, Reader,
Condensed Matter Physics & Materials Science,
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TITLE OF THE TALK

**Thin-Film Alchemy: Imprinting novel functionalities in quantum materials
by strain engineering**

ABSTRACT

The quest to transform familiar materials with entirely new properties has captivated humanity for millennia. Advances in thin-film engineering now make this vision tangible by enabling atomic-scale control of material properties. In this talk I will show how anisotropic strain in epitaxial thin films of a Kagome antiferromagnet, Mn_3Sn , induces out-of-plane canting of the Mn spins to generate finite scalar spin chirality and strong Berry curvature, producing a large anomalous Hall and Nernst effects at room temperature. This strain-engineered state supports multi-stable, non-volatile, and electrically switchable memory states – features that are absent in bulk Mn_3Sn . I will also describe the realization of a topological Hall effect in these thin film heterostructures emerging out of scalar spin chiral ground state and demonstrate their electrical control.

References:

[1] Debjoty Paul, Shivesh Yadav, Shikhar Kumar Gupta, Bikash Patra, Nilesh Kulkarni, Debashis Mondal, Kaushal Gavankar, Sourav K Sahu, Biswarup Satpati, Bahadur Singh, Owen Benton, Shouvik Chatterjee, Imprinting electrically switchable scalar spin chirality by anisotropic strain in a Kagome antiferromagnet, *Advanced Science*, 12, e02569 (2025)

HOST FACULTY

Prof. Anjan Barman, Senior Professor
