



**DEPARTMENT OF PHYSICS
INDIAN INSTITUTE OF TECHNOLOGY KANPUR**

PHYSICS COLLOQUIUM

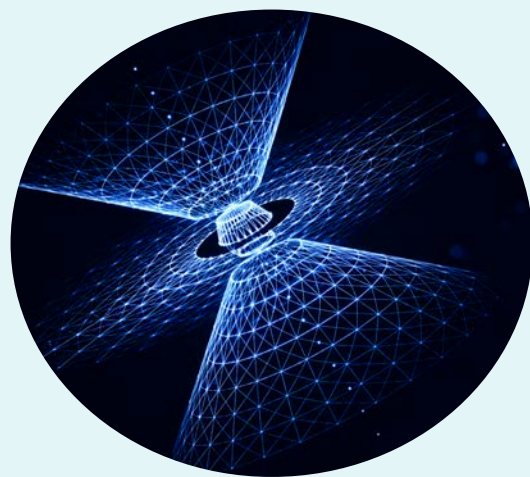
Spin-Orbitronics Devices

ABSTRACT

Charge currents are well understood and form the basis of today's electronic devices. Spin currents are being explored as the basis for the emerging field of spintronics. Coupling the flows of charge, spin, and orbital currents opens the door to yet another emerging field in electronics called "spin-orbitronics," offering a pathway to smaller, faster, and far more energy-efficient devices.

In this talk, I will begin by introducing spin-torque ferromagnetic resonance (ST-FMR) as a powerful technique for quantifying charge-to-spin conversion in thin-film heterostructures. I will then discuss strategies to enhance this conversion efficiency, including engineering hetero-interfaces, tailoring spin-orbit coupling through ion implantation, and harnessing crystal-field effects. I will extend the discussion to how orbital currents can be utilized to improve the efficiency of spin-based devices, highlighting how the interplay of charge, spin, and orbital transport is reshaping the design of next-generation spin-orbitronic devices.

All are Cordially Invited



SPEAKER



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FB 382 (Prof. Amal Kumar
Raychaudhuri Seminar Room)



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