

Seminar

High-Frequency Magnetoresistance in Metallic and Insulating Oxides

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Colossal magnetoresistance (CMR) discovered nearly three decades ago in the family Mn-perovskites (hole-doped LaMnO_3) triggered a flurry of activities. However, majority of available reports deal with magnetoresistance measured using a direct current or low-frequency current ($f < 1$ kHz). While ac impedance in the frequency range 100 Hz to a few MHz range is often used to study dielectric relaxation and magnetocapacitance effect in insulating oxides, ac impedance in metallic oxides had been seldom reported. Recent experimental work on the ac magnetoimpedance in the frequency range from ~ 1 kHz to 3 GHz done in our lab has revealed colossal magnetoresistance at low fields (~ 40 - 90% for $H \leq 1$ kOe at room temperature), and transition from a negative to a positive magnetoresistance with increasing frequency. Interestingly, high-frequency magnetoimpedance shows imprints of magnetic resonances (ESR or FMR) depending on the composition and temperature. I will present results derived from hole-doped RMnO_3 , double perovskites ($\text{Sr}_2\text{FeMoO}_6$, $\text{La}_2\text{NiMnO}_6$), insulating garnets (YIG) and also in a paramagnetic semiconductor DPPH. The electrical detection of magnetic resonance observed in our work will be compared to other high-frequency methods being explored in recent years for spintronic applications.

Friday, Dec 8th 2023

4:00 PM (Tea / Coffee 3.45 PM)

Seminar Hall, TIFR-H