TIFR Centre for Interdisciplinary Sciences
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Seminar

Artificial quantum materials with correlated electrons

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Complex Oxide Heterostructures (consisting of two or more chemically, electronically and structurally dissimilar materials) exhibit a plethora of fascinating collective phenomena, which are "hidden" or unattainable in the constituent bulk materials. While the strong interplay among spin, charge, orbital, lattice degrees of freedom facilitate interesting many-body quantum phenomena, the additional broken symmetries and frustrated couplings at the interface of artificial heterostructures may give rise to new electronic, magnetic and topological states.

In this talk, I will demonstrate the success in manipulating electronic and magnetic properties by growing various transition metal oxide superlattices with unit cell precision by laser MBE. The results of synchrotron diffraction, x-ray absorption spectroscopy, resonant x-ray scattering to elucidate the response of underlying lattice, spin, orbital and charge degrees of freedom combined with strain and quantum confinement will be also presented. Additionally, I will briefly discuss how the deterministic control over atomic layering may open another exciting pathway towards next generation quantum materials for Mott electronics and energy applications.

Monday, Apr 25th 2016

4:00 PM (Tea/Coffee at 3:45 PM)

Seminar Hall, TCIS