Indian Institute of Science Education and Research Bhopal

Junior Research Fellow at IISER Bhopal

Applications are invited from Indian nationals for the post of "junior Research fellow" in the SERB sponsored project titled "Time-averaged and sub-picosecond time-resolved terahertz spectroscopy to resolve correlated and topological phases in epitaxial engineered heterostructures of 5d metal oxides"
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Project Description:

Summary of Project:

The complex entanglement and delicate balance between the interaction energetics of electron correlations and spin-orbit coupling drive a variety of quantum phases ranging from those of topological origin such as Dirac and Weyl semi-metals, double- and quad-helicoid phases, Axion insulators, etc., to ones dominated by correlations such as ferromagnetic Fermi-liquid metals. Realization of this novel variety of electronic and magnetic phases, potentially interesting both from fundamental and applied aspects, requires the formation of superlattice heterostructures of 5d transition metal oxides such as CaIrO3 and SrIrO3 both of which are predicted to exhibit Weyl and Dirac type of semi-metallic phases in bulk states. The formation of epitaxial engineered superlattice of type [(CaIrO3)n/(SrIrO3)m]x having sharp interfaces results in breaking of structural symmetries and reconstruction of electronic structures at the interface and across the heterostructure by systematically increasing the number of unit cells (n/m = 1-5) in the heterostructure, beyond which bulk-like character manifests. In this project, we propose the formation of a broad range of such heterostructures and understand formation as well as the crossover from the electronic and magnetic phases of the topological origin to the correlation dominated origin. We emphasize that a novel set of emerging static and sub-picosecond time-resolved terahertz (THz) spectroscopic techniques will be implemented to understand the low energy charge/spin dynamics and resolve the role of various competing interactions driving a variety of phases in a single layer and heterostructure thin films of perovskite iridates.

Duration:

Initially for 1 year

Last date of application: 12th Jan, 2022

Essential Qualification:

M. Sc. (Physics)

Candidate who has qualified a National Eligibility Test (UGC and CSIR JRF or LS) OR GATE with a valid rank/score at the time of applying for this post will be eligible for JRF position.

Experience in thin films deposition using pulsed laser deposition and/or Terahertz spectroscopy of complex systems is desirable. Candidates are also expected to have experience in programming such as Lab View, MATLAB, CST studio, *etc*.

Salary:

Junior Research Fellow: Rs. 31,000 p.m. + HRA (16%)

How to Apply:

Submit your CV and relevant documents (certificate of M.Sc. and qualifying exam) through email: dsrana@iiserb.ac.in

For more details and context, see the homepage of Prof. Dhanvir Singh Rana

https://phy.iiserb.ac.in/faculty_profile.php?id=MTA=&lname=ZHNyYW5h

Incomplete applications will not be considered, and no correspondence will be entertained with regard to the application status. All correspondence regarding shortlisting and selection will be only via email.