



Project Proposal for Ph.D.

(will be assigned by SIRe)

Project Details

Project Title	Magnetic and superconducting properties of new ternary chalcogenides
Project Summary (Minimum 500 and maximum 2000 characters)	Superconductivity and magnetism are among the most extensively studied broad areas in condensed matter in which intense activity continues in the leading laboratories around the world to explore new materials and /or new phenomena. We have on-going efforts in our laboratory in the pursuit of new superconductors and magnetic materials and have consistently obtained new results which have been valued by the peers in physics and materials community. Our expertise is in designing and stabilizing complex materials not only oxides but chalcogenides, pnictides and intermetallics. We plan to design new superconducting and magnetic materials and to investigate their properties especially which advance our understanding of the mechanism of superconductivity. We plan to employ a number of such as, X-ray diffraction (powder & single crystal), low temperature electrical and magnetic measurements . In some cases neutron diffraction, μSR studies to understand the dynamics of magnetic transition and time reversal symmetry breaking, and NMR and Mossbauer studies maybe used to further characterize the superconductivity and magnetism in the normal-state. Further, Density Functional Theory based first-principles simulations will be carried out to correlate the experimental properties and understand the underlying mechanisms.

PhD Supervisors

Role	Faculty	Academic Unit in IITD/Institute/University	Email ID (Official)
Supervisor 1	Prof. Ashok K Ganguli	Chemistry	ashok@chemistry.iitd.ac.in
Supervisor 2	Prof. Brajesh K Mani	Physics	bkmani@physics.iitd.ac.in

Project requirements (Student qualifications, experience required, etc)

- M.Sc in Chemistry, Physics, Materials Science
- M.Tech in Chemistry, Physics, Solid state Physics, Materials Science
- Maths studied at B.Sc level

Source of fellowship/funding

(CSIR/UGC/DBT/ICMR/ICAR/NEET-PG/DST-INSPIRE/IRD/FITT Project details, if any)

Candidate with his/her own fellowship

Role of Faculty Members involved:

Ashok K Ganguli: Design and supervision of experimental work related to materials synthesis, characterization and properties, writing manuscripts and correcting thesis.

B K Mani: Supervision on theoretical studies, DFT simulations, writing manuscripts and correcting thesis.