Indian Institute of Technology Delhi

School of Interdisciplinary Research (SIRe)

SIRe Project Number

2025-01-41

(will be assigned by SIRe)

Project Proposal for Ph.D.

Project Details (The research problem must clearly indicate the need for an interdisciplinary approach)	
Project Title	High-Frequency Magnetoelectric Antenna by Acoustic Excitation for Advanced Communication Systems
Project Summary (Minimum 500 and maximum 2000 characters)	Magnetoelectric (ME) antennas hold the potential for significantly advancing miniaturization in radio frequency devices due to their compact size. However, critical hurdles still remain in ME antennas including low radiation efficiency and narrow bandwidth, which prevent them from seeing widespread use. This project aims to develop microfabricated magnetoelectric antenna with piezoelectric/ferromagnetic multilayered structures where the device geometry will be optimized using detailed theoretical modelling. The design guidelines and fabrication processes will be optimized and new geometries/mechanisms will be explored. The far-field radiation performance and near-field polarization of the ME antenna will be characterized.

Ph.D. Supervisors
(Supervisor 1 and Supervisor 2 cannot be from the same department of IITD)

Role	Name of Faculty	Academic Unit in IITD/Institute/University	Email ID (Official)
Supervisor 1	Prof. Dhiman Mallick	Department of Electrical Engineering	dhiman@ee.iitd.ac.in
Supervisor 2	Prof. Samaresh Das	Centre for Advanced Research in Electronics	samareshdas@care.iitd.ac.in

Project requirements (Student qualifications, experience required, etc)
***The candidate will be shortlisted based on common shortlisting criteria decided by ScRC (SIRe)**

Candidate should have the qualification of MSc. in Physics, Applied Physics or Electronics OR B.Tech/M.Tech in Electronics, Physics, Materials Engineering, Nanotechnology or related areas. Students qualified CSIR/UGC JRF are strongly encouraged to apply. Candidates with any prior knowledge on materials synthesis or magnetic/electrical characterizations will be given preference although not mandatory.

Source of fellowship/funding and project number
(CSIR/UGC/DBT/ICMR/ICAR/NEET-PG/DST-INSPIRE/IRD/FITT Project details, if any)

Student with his own fellowship.

Role of Faculty Members involved:	
Supervisor-1	In the proposed project two faculty members (Prof. Mallick and Prof. Das) have few overlap areas of research, and have broad complementary expertise. For example, both the faculties have experience in device characterizations. Prof. Mallick's experience and expertise is in thin film deposition, microfabrication, electrical characterization, high frequency characterization as well as in device modelling etc.
Supervisor-2	Prof. Das will provide support in terms of device fabrication, characterization as well as in material synthesis. The student assigned for this project will have access to both EE and CARE departmental facilities and various central facilities of IITD.