Indian Institute of Technology Delhi

School of Interdisciplinary Research (SIRe)

Project Proposal for Ph.D.

SIRe Project Number

2024-02-03

(will be assigned by SIRe)

Project Details	
Project Title	Design and Development of Solid-State Quantum Emitters for Quantum Tech
Project Summary	In the rapidly advancing field of quantum technologies, leveraging non-classical light states is essential for breakthroughs in quantum communication, metrology, and information processing. This project aims to revolutionize quantum photonics by developing highly efficient solid-state quantum photon sources, including single, entangled, and squeezed states. These sources are designed to outperform current technologies, addressing challenges such as brightness and reliable on-demand operation. By harnessing the unique properties of localized excitons, whether through quantum confinement, defects, or strain-mediated effects, the project seeks to achieve near-perfect single-photon purity and indistinguishability. In alignment with India's National Quantum Mission, this initiative has the potential to reshape the quantum landscape and propel advancements in secure communication and quantum networks.

Ph.D. Supervisors

Role	Name of Faculty	Academic Unit in IITD/Institute/University	Email ID (Official)
Supervisor 1	Santanu Manna	Electrical Engineering	mannasan@ee.iitd.ac.in
Supervisor 2	Samaresh Das	CARE	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)**

- MSc/MTech/MS in Physics/Electronics/Optics and photonics/Materials science
- Background in quantum mechanics, solid-state physics, optics, optoelectronics

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

Institute fellowship/ Project fellowship

Role of Faculty Members involved:	
Supervisor-1	Mentoring device design and characterization
Supervisor-2	Mentoring device fabrication