

STATEMENT OF PURPOSE

I have completed M.Tech. (Functional Materials and Nanotechnology) from IIT Madras, and I want to pursue a Ph.D. to move one step toward my aim of a research career in Physics. My motivation for applying to the dual Ph.D. program at the University of Manchester and IIT Kharagpur stems from the rigorous and innovative research environment which it offers in the form of a structured doctoral program. The excellent research conditions and the opportunity to do high-quality collaborative research with a network of research groups are what attracts me to this program.

I believe that 2D materials and their heterostructures have the potential to transform practically all fields of science and technology. I was first significantly exposed to this field of research during my master's thesis, which was in the area of 2D materials. A deep interest in the field of 2D Materials developed through my master's project entitled "Synthesis and Characterization of few-layer Graphene on Nickel by using solid botanical precursor (Camphor)" at Graphene and 2D Systems Laboratory at IIT Madras, under the guidance of Prof. Manu Jaiswal. I worked on the synthesis of few-layer Graphene/Ni via CVD technique and its characterization with various tools, including Raman spectroscopy, Transmission electron microscope. Besides, I have hands-on experience on scanning tunneling microscope (STM), which was used to know the topography of the grown samples. These experimental and research efforts, along with my effective analytical skills, helped me gain substantial knowledge in 2D materials. Effective time management and a drive for exceptional work output enabled me to see the rotation between the subsequent layers generating interesting Moiré patterns and superstructures.

I found my niche in the field and, therefore, took up several courses during my master's including, Science and Technology of solid state, Synthesis and characterization of functional materials, Introduction to Nanoscience, Nanomaterials and Nanotechnology, Physics and Technology of Thin Films, Techniques of characterization of materials and physical measurements and VLSI Technology, among others, to develop a greater theoretical and practical understanding. In addition, I have completed an edX course in Quantum physics. Concurrently, I have gained experience in Laboratory for Synthesis and Characterization of Functional Materials, Laboratory for Physical property measurement, Laser and spectroscopy theory course and laboratory experience, Computer programming and Numerical Analysis during my master's and Hands-on experience with Origin software and LaTeX.

I am interested in a project entitled "Design and Fabrication of 2D Heterostructures towards Coherent in-plane Quantum Light Emission and Optoelectronic Devices" supervised by Dr. Patrick Parkinson and Dr. Prasana Kumar Sahoo. Extending the contributions into 2D heterostructures and understanding their properties will pave the way for noble device fabrication. I am attracted by the cutting-edge research departments and facilities at IIT Kharagpur and the University of Manchester. I am confident that this joint project with interdisciplinary collaborations would be an excellent place for me to enrich my research experience. We can together realize the sustainable development goal through this collaborative project.