

Statement of Purpose

From the starting day of working in the semiconductor lab during my M.Tech, I am more curious to learn new things which connect science with technology by designing devices with high purity Two-Dimensional (2D) material layers. Day by day, I am more attracted or fascinated with learning the physics of the growth of 2D materials and the fabrication of quantum devices. The growth of 2D materials always gives me challenges to learn their fundamentals and the impact of each factor concerning others. This field always inspires me to think beyond the box and pushes my limit to think atomically. This field of growing novel quantum materials for quantum optical device application is an emerging field and will contribute to futuristics generation devices. The challenges that come during the initial period of development always strengthen my interest in this field.

I am always curious to learn the depth of any phenomena happening in nature from my childhood. These steps took me in the field of science from my secondary education and put me close to physics to learn the fundamental of nature from the smallest thing started from quarks to a bigger galaxy which covers and relate all the things analogous to nature and materials science help me to understand the science and technology together which connect through to quantum devices. Ph.D. is the bridge to learn, research and continue to work in the desired field, new characterization techniques which always fascinate to search, learn or synthesize novel materials and to contribute in the field of 2D materials.

My Area of Interest is 2D materials. I have been fascinated by this field to grow high purity monolayer to multilayer according to the requirement of quantum devices. I like to work in this field and want to expertise my skill in the field of 2D materials. Also, I learned about the growth mechanism of 2D material as Transition Metal Dichalcogenides (TMDs) like MoS_2 , MoSe_2 , etc. for large-area application in quantum devices using Chemical Vapor Deposition during my M.Tech in **Indian Institute of Technology(IIT) Kharagpur**, India. I learned the process of transferring thin-film 2D materials to the desired target substrate without much deteriorating the properties of the grown layer for quantum device applications.

I wish to do my higher studies in Physics with the intention to obtain a Ph.D. and later engage in research. Having obtained advice from my professors, seniors, and colleagues about my choice of Universities, I have applied to "**Dual Ph.D. program of IIT Kharagpur with the University of Manchester**" as it is reputed for research facilities and resources. The department website also revealed a very strong faculty involved in extensive research in the area of Physics, especially in the "**Nanoscale Optoelectronic Devices**". This has strengthened my resolve to study in this dual Ph.D. program with **Prof. Sajal Dhara**, **Prof. Vladimir Falko**, and **Prof. Andrey Kretinin**. Thereby I believe that I will have an opportunity to serve and contribute my work in this field of quantum devices based on layered chalcogenides and their heterostructures.

I am pursuing M.Tech (2020-2022) in **Materials Science and Engineering** from the **Indian Institute of Technology (IIT) Kharagpur**, India. My M CGPA is **9.01 (up to 3rd sem.)** on a scale of **10**. I have done my undergraduate, B.Sc(Hons) (2013-2016) in Physics from the University of Delhi (DU) Delhi, India. After I did my graduation M.Sc (2016-2018) specialized in Physics from Kurukshetra University Kurukshetra (KUK) Kurukshetra, India. I am currently working on a project named "**Sn-based hybrid Perovskite Solar Cell**" under the supervision of **Prof. Debabrata Pradhan** and **Prof. Prasana Kumar Sahoo** for my M.Tech thesis in Materials Science Centre at the **Indian Institute of Technology (IIT) Kharagpur, India**. I am working on increasing efficiency and improving stability by optimizing the device and growth parameters. I Learned **UV-Vis spectroscopy**, **XRD (X-ray diffraction)**, **SEM (Scanning electron Microscopy)**, **Optical Microscope (OM)**, **APCVD (Atmospheric Pressure Chemical Vapor deposition)**, **TGA (Thermogravimetric Analysis)**, **EDS (Energy Dispersive Spectroscopy)**. I worked on **MS OFFICE**, **ORIGIN**, **XP'ertHighScore**, **ImageJ**, and learning **Python** language nowadays.

I really like to learn and research in this program and will put my efforts into making it effective work with achieving the required target and contributing good work in that area. I am highly motivated and fascinated to do work on "**Novel Materials for quantum optical devices based on layered chalcogenides and their heterostructures**" under your supervision.

Thank You for your precious time for reading and showing interest in my application.