Sumukh Vaidya

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Expertise: Laser Systems, Optics, Nanofabrication, Cryogenics, Vacuum systems, Programming, Data Analysis

SUMMARY

- Researcher with **5+ years of academic experience** in leading experimental physics laboratories.
- Author and coauthor on **5 peer reviewed publications**. Google Scholar
- Interdisciplinary and collaborative experience of **optical system design**, vacuum systems, **nanofabrication**, ion implantation, RF circuits and **instrument control for data acquisition**.
- Extensive **data analysis** and **programming experience** in **Python**, **Matlab** and **LabVIEW**.

RESEARCH EXPERIENCE

- **Graduate Research Assistant** *Jan '22-Current*
  Purdue University, Indiana, USA. Advisor: Prof Tongcang Li
  - Quantum sensing research to develop new methods of **sensing magnetic fields** via **laser-based measurements**.
  - Built a **confocal microscopy** setup and integrated it with **RF electronics** for **quantum sensing experiments**.
  - Developed methods for creation of defects in Boron Nitride crystals in a **high-vacuum ion implantation** machine.
  - Built a **Low-Temperature Optical Measurement** setup for performing **cryogenic measurements**.
  - Programming in **Python** and **LabVIEW** to automate laser experiments involving FPGA and other instruments.
  - Coauthored **3 peer reviewed papers** in leading journals including ACS Photonics and Nature Materials.
  - Current: Researching room temperature nuclear spins for potential applications for **quantum communication**, **quantum memories** and **quantum computing**.
- **Master's Thesis Student** *Jul '18-Aug '20*
  Indian Institute of Technology Bombay (IIT Bombay), India. Advisor: Prof Dinesh Kabra
  - **Fabricated next-gen Perovskite Solar cells** in clean room environment using specialized equipment.
  - **Built a setup** for **Fourier imaging** of thin film organic semiconductors to determine photoemitter orientation.
  - Performed **Matlab simulations** of exciton transport in OLEDs.
  - **Built** and deployed the **research group website** using Jekyll. Link

INTERNSHIP EXPERIENCE

- **Visiting Student Researcher** *Dec '17*
  JPARC, Tokai, Japan. Project: Noise reduction for Central Drift Chamber
  - Implemented **algorithms for tracking the trajectories** of cosmic rays entering the drift chamber.
  - This chamber was used for a **large collaborative experiment** to estimate the external noise due to cosmic rays.
- **Visiting Summer Student Researcher** *May '17*
  KEK, Tsukuba, Japan. Project: Characterization of PMTs as Muon Beam Counters
  - Studied Photomultiplier tubes in **simulated experimental conditions** for the Muon g-2/EDM experiment.
  - **Researched the breakdown conditions** of the tubes and estimated typical sensitivities in a custom-built test rig.

EDUCATION

- **PhD, Physics** (*GPA 3.91/4.0*) *Jan '21-Current*
  Purdue University, Indiana, USA. Advisor: Prof Tongcang Li
  - Research Area: Quantum Sensing with 2-D materials.
- **B.Tech+M.Tech, Specialization: Nanoscience** (*CPI 8.32/10.0)* *Jul '15-Aug '20*
  Indian Institute of Technology Bombay (IIT Bombay), India. Advisor: Prof Dinesh Kabra
  - Research: Fabrication of Perovskite Solar cells in clean room environment, Fourier imaging of thin film organic semiconductors, transport modelling in OLEDs.

TECHNICAL SKILLS

- **Programming:** Python, MATLAB, LabView, Arduino, LATEX, C++, Mathematica, Zemax OpticStudio, Comsol Multiphysics, KLayout, Machine Learning, PyTorch, FPGA, git, github, Data Analysis.
- **Experimental:** Laser systems, Optical Measurements, Ion Implantation, Optical system design, Nanofabrication, RF circuits, Instrument Automation, Photolithography, Confocal Microscopy, AFM, SEM, FIB, High Vacuum.