

SHEETAL JAIN

Final Year Undergraduate Student
Department of Physics, IIT-Bombay

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RESEARCH INTERESTS

Experimental Condensed Matter Physics, Plasma Physics, Optics and Spectroscopy

EDUCATION

Indian Institute of Technology, Bombay	CPI 9.69/10	July 2014-present
<i>B.Tech.(Hons.) in Engineering Physics and Minor in Aerospace Engineering</i>		
Lilavatibai Podar Sr. Sec. School - ISC	12 th Std. Percentage 97.4%	July 2012-April 2014
Hiranandani Foundation School, Powai	10 th Std. Percentage 95.6%	June 2002-April 2012

SCHOLASTIC ACHIEVEMENTS

- Department Rank 2 in Engineering Physics, **Top 1%** in Indian Institute of Technology (IIT) - Bombay
- All India rank 165** in JEE-Mains and **548** in JEE-Advanced out of 1.3 million enrollments [2014]
- Qualified for **Indian National Physics Olympiad (INPhO)**, **Top 1% in India** in National Standard Examination for Physics (NSEP) [2014]
- Qualified for **Indian National Astronomy Olympiad (INAO)**, **Top 1% in India** in National Standard Examination for Astronomy (NSEA) [2014]
- Qualified for **Indian National Mathematics Olympiad (INMO)**, **Regional Topper** in pre-Regional Mathematics Olympiad and Regional Mathematics Olympiad, out of 22,000 participants [2013]
- Recipient of the **Kishore Vaigyanik Protsahan Yojana (KVPY)** fellowship awarded by the Government of India to students with research aptitude (National Rank 274) [2013]
- Qualified for **Indian National Junior Science Olympiad (INJSO)**, **Top 1% in India** in National Standard Examination for Junior Science (NSEJS) [2012]
- Awarded **Gold Medal and Certificate of Merit** for being the **State Topper** in **Homi Bhabha Science Talent Search Examination** [2011]

EXPERIENCE

Quantum Matter and Devices Laboratory, Purdue University, Indiana May-July 2017
Guide : Prof. Yong Chen, Department of Physics, Purdue University

- Studied **Quantum Spin Hall Effect** to understand its implications on materials used in the laboratory
- Mastered art of ex-foliation of materials with 2D crystal structure, particularly **Topological Insulators**
- Identified the optical properties of these materials using **Raman spectroscopy** of the ex-foliated flakes
- Conducted **magnetization** measurement experiments on **magnetically doped** topological insulators
- Observed **ferromagnetism** and **hysteresis** in a 'breakthrough' material; results awaiting publication

Plasma Physics Laboratory, University of Tokyo, Kashiwa June-July 2016
Guide : Assoc. Prof. Masaki Nishiura, Department of Advanced Energy, UTokyo

- Performed experiments at the laboratory which is working to build a **Controlled Fusion Reactor**; Controlled Nuclear Fusion has the potential to provide almost limitless amounts of safe and clean energy
- Participated in an experimental run of **Ring Trap-1 (RT-1)**, a device used to study plasma properties
- Developed and calibrated a **Pockels system**, used to measure Electric field at high temperatures
- Programmed and tested a **Field Programmable Gate Array (FPGA)** board, for automating triggers
- Observed that an **instrument was not performing** per specifications; analyzed and reported the same, which was appreciated and communicated to the manufacturer

Bachelor's Honours Project | Undergraduate Thesis

July 2017-present

Guide : Prof. Raghunath Chelakkot, Department of Physics, IIT-Bombay

- Working on local **Control Mechanism** modelling in the locomotion of multi-legged living organisms

Tata Institute of Fundamental Research (TIFR), Mumbai

June-July 2015

Guide : Dr. Bhaswati Mookerjee, Department of Astronomy & Astrophysics, TIFR

- Worked on **DUSTY**, a code developed by the **University of Kentucky**
- Built **Python** programs to analyze output of DUSTY and map it to **actual observed spectra** from Stars
- Adjusted logic** and parameters till the programs gave results that were close to observations

Institute Technical Summer Project (ITSP), IIT-Bombay

May-June 2015

Team Leader, ITSP, Student Technical Activities Body (STAB)

Cymatics - Visual effects of sound

- Built a **Ruben's tube**, an apparatus for demonstrating acoustic standing waves in a flame tube
- Developed a **Chladni Plate**, used to observe nodal patterns associated with sound vibrations

Optics Laboratory, IIT-Bombay

July 2017-present

Guide : Prof. Dinesh Kabra, Department of Physics, IIT-Bombay

- Building different kinds of **Photo-detectors** to conduct high precision measurements in experiments

WORKSHOPS

Vijyoshi, KVPY Winter Camp

Dec 2013

Indian Institute of Science (IISc), Bengaluru

- Camp organized for KVPY fellows, encouraging them to take up **Research** Careers in **Basic Sciences**

INSPIRE Science Camp

Sept 2012

- Students with **Top 1%** performance in Class X - Board Exams invited for the Camp
- Offered full **Scholarship** by the Department of Science and Technology, Government of India

TECHNICAL STRENGTHS

Programming Languages

Java, C++, Python, MATLAB, Mathematica

Software

L^AT_EX, Xilinx ISE & Vivado, Quartus Prime, VMware, Tera Term

Cygwin, Microsoft Office, AutoCAD, Adobe Premiere & Photoshop

TEACHING

Teaching Assistant, IIT-Bombay

July 2015-present

Student Support Services & Undergraduate Academic Council

- Entrusted with teaching and guiding over **250 students** through tutorials and help sessions
- Responsible for taking tutorials on **Quantum Physics**, **Special Relativity** and **Thermal Physics**

POSITIONS OF RESPONSIBILITY

Department Academic Mentor

April 2016-present

Department Academic Mentorship Program (DAMP), Department of Physics, IIT-Bombay

- Selected to be a part of **Student Mentorship Program** (SMP) team, based on balanced academic performance, extracurricular activities coupled with good communication skills and mentoring aptitude

Class Representative, Engineering Physics (2014 batch), IIT-B

July 2014-present

- Mediator** between students, faculty and teaching assistants in the Department

Co-ordinator, Informals, Mood Indigo (Annual cultural festival of IIT-B)

July-Dec 2015

- Led a **team** of 20 volunteers which organized an event attended by a famous television personality

EXTRA-CURRICULAR ACTIVITIES

- Member of **Gold Medal** winning team in Tech Treasure Hunt in 2017
- Member of National Sports Organisation (NSO) **Basketball Team** in first year at IIT-Bombay