Aritra Mazumder

Research Interest I am a physics graduate student at University of Colorado Boulder. I am working on instrumentation for a Nano-Scanning SQUID setup, which will be used for vortex dynamics study in superconductors along with thermal and magnetic imaging. I have been fabricating devices to study novel physics such as possibility of triplet paired superconductivity and Chirality Induced Spin Selectivity(CISS).

Education

Integrated BS-MS (2014-2019): Indian Institute of Science Education and Research Kolkata. Major: Physics;
Minor: Physics, Math and Earth Science
Graduation Year: 2019
PhD (ongoing): University of Colorado Boulder, Physics (2019 -)

SKILLS

- Programming languages known: Python, LabVIEW, Arduino, COMSOL.
- Mathematics and graphing programs: Origin, Mathematica, MATLAB.
- Experienced with AutoCAD designing and machine shop fabrication.
- Cryogenic instrumentation.
- Clean room trained with experience in operating SEM-FIB, thin film deposition systems, AFM surface profiling, optical lithography

Research Experience

- Simulation of sand pile model and its analysis to verify Zipf's law, simulation of Conway's game of life and its application to biology, simulation of flocking pattern of birds in flight using python under the guidance of Prof. Rangeet Bhattacharya, Professor, IISER Kolkata. (software/program/language: python, origin, gnuplot)
- Helped design the experimental setup for four probe at high pressure and automation of data taking using LabVIEW and Keithley 2400 under the guidance of Prof. Goutam Dev Mukherjee, Professor, IISER Kolkata and Research Scholar Mr. Pinku Saha
- Worked on high pressure spectroscopy of topological insulators and dichroic crystals to study phase change using Raman spectrometer during Summer2017 under the guidance of Prof. Goutam Dev Mukherjee, Professor, IISER Kolkata.
- Studied of variation in pressure in DAC chamber with distance from center using Ruby as pressure calibrant during Summer-2017 under the guidance of Prof. Goutam Dev Mukherjee, Professor, IISER Kolkata and Research Scholar Pinku Saha
- Worked with thin film superconductors of NbN and studied the variation of critical temperature and transition with reduction in thickness, effect of substrate and growth parameters under the guidance of Prof. Pratap Raychaudhuri, Professor, TIFR Mumbai and Research Scholar Mr. Surajit Dutta, Summer 2018.
- MS Thesis: Development of Cryogenic Optical setup for low temperature Raman and PL Measurements. This project deals with the setup development, calibration using a known sample such as Sulfur and Silicon. Using this setup we have studied the low temperature Raman spectra of Rare Earth Oxide systems. This spectra has shown the expected anharmonic temperature evolution

of Raman mode at high temperatures but we see deviation from expected behaviour arising from different phonon couplings below Curie Temperature. This work was done under the guidance of Prof. Goutam Dev Mukherjee.

- Working on computational simulation(COMSOL) to study high pressure thermal conductivity of Iron inside Diamond Anvil Cell (DAC).
- Development of Scanning SQUID setup: Work includes fabricating the home built scanning head and vibration isolation system. I am also working on a home made 3 axis vector coils to be made compatible with the scanning stage.
- Fabrication of mesoscopic devices using SEM-FIB to study spin-triplet superconductivity and Chirality Induced Spin Selectivity.

Publication

- Saha, Pinku, Aritra Mazumder, and Goutam Dev Mukherjee. "Thermal conductivity of dense hcp iron: Direct measurements using laser heated diamond anvil cell." Geoscience Frontiers 11.5 (2020): 1755-1761.
- Samanta, Debabrata, Aritra Mazumder, Sonu Pratap Chaudhary, Bishnupada Ghosh, Pinku Saha, Sayan Bhattacharyya, and Goutam Dev Mukherjee. "Phonon anharmonicity and soft-phonon mediated structural phase transition in $Cs_3Bi_2Br_9$." arXiv preprint arXiv:2302.00226 (2023).
- Saha, Pinku, Bishnupada Ghosh, Aritra Mazumder, Konstantin Glazyrin, and Goutam Dev Mukherjee. "Pressure induced lattice expansion and phonon softening in layered ReS2." Journal of Applied Physics 128, no. 8 (2020).
- Saha, Pinku, Bishnupada Ghosh, Aritra Mazumder, and Goutam Dev Mukherjee. "High pressure anomalies in exfoliated MoSe2: Resonance Raman and X-ray diffraction studies." Materials Research Express 7, no. 2 (2020): 025902.