Richa Mudgal

Email- richamudgal.mud@gmail.com
phz198035@physics.iitd.ac.in
Contact no.- +91-9756996798

Spin Dynamic Lab,
Department of Physics
Indian Institute of Technology Delhi
Hauz Khas-110016
New Delhi, India

Objective

To have an opportunity of working in a reputed institute and expand my research skills.

Education

Ph. D. pursuing, Department of Physics 2019-till date
Indian Institute of Technology Delhi, New Delhi

M. Tech., Solid State Material, Department of Physics (9.0 CGPA) (2017-2019)
Indian Institute of Technology Delhi, New Delhi

M. Sc., Physics (65.9%) (2015-2017)
Mahatma Jyotiba Phule Rohilkhand University, Bareilly

B. Sc., Physics & Mathematics (65.4%) (2012-2015)
Mahatma Jyotiba Phule Rohilkhand University, Bareilly

Higher Secondary, Non-Medical (72.8%) (2011-2012)
Uttar Pradesh Board

Matriculate, Science (63.33%) (2009-2010)
Uttar Pradesh Board

Research Interest:

- My research work is based on Determination and Enhancement of Spin-Orbit Torque in 2D Non-Magnet/Ferromagnet Heterostructure.

Research Experience

- Carried out research project in masters entitled **'Field Emission Enhancement from CNTs using Metal Coating'.** A detailed experimental as well as theoretical study using MATLAB was done and found a corelation between the two.

Technical Experience

- Experienced user of various deposition technique: Pulsed Laser Deposition (from Excel Instruments), Sputtering (AJA Orion 8, from AJA INTERNATIONAL, Inc.), E-Beam Evaporation (ATS 500 from HHV Co. Pvt. Ltd.), Chemical Vapor Deposition
- Expertise in using fabrication tools: Laser writer (LW- 405 from Microtech), Mask Aligner System (from ABM Inc.), Reactive Ion Etching (Nextral NE 110)
- Hands om experience of using Atomic Force Microscopy (Igor 3D from Asylum Research) and Raman Spectroscopy (from Renishaw)
- Operational incharge of Pulsed Laser Deposition (from Excel Instruments), Atomic Force Microscopy (Igor 3D from Asylum Research) and Raman Spectroscopy (from Renishaw) at Department of Physics, IIT Delhi.
- Micromagnetic Simulation using mumax^3
- Computer languages known: MATLAB

Achievements

- Best Poster Award in Joint European Magnetic Symposia 2022
- Qualified for Junior Research Fellowship award CSIR, Dec-2017 (All India Rank-17)
- Qualified for Junior Research Fellowship award UGC, Dec-2018 (All India Rank-114)
- Qualified Graduate Aptitude Test in Enginnering-2017
- Qualified Graduate Aptitude Test in Engineering -2018
- Qualified Bhabha Atomic Research Centre entrance exam-2018
- Qualified Bhabha Atomic Research Centre entrance exam-2019
- Batch topper of M. Sc. (Physics)

Schools/Courses attended

- Spintronics and magnetism on 2D materials (MSE-800) by EPFL, Switzerland (Earned credit-2)
- Theoretical Micromagnetic, School of Sciences & Engineering/Department of Mathematics and Applied Mathematics, University of Crete, Greece

Publication:

Journal

Richa Mudgal, Alka Jakhar, Pankhuri Gupta, Ram Singh Yadav, Bubunu Biswal, Pratik Sahu,Himanshu Bangar, Akash Kumar, Niru Chowdhury, Biswarup Satpati, Birabar Ranjit Kumar Nanda,Sashi Satpathy, Samaresh Das, and Pranaba Kishor Muduli "Magnetic-Proximity-Induced Efficient Charge-to-Spin Conversion in Large-Area $PtSe_2/Ni_{80}Fe_{20}$ Heterostructures" **Nano Letter** (2023), doi.org/10.1021/acs.nanolett.3c04060

Richa Mudgal, Sheetal Dewan, Samaresh Das, P.K. Muduli "Evidence of orbital-torque in two--dimensional GeSe-based heterostructure" **Submitted**

Richa Mudgal, Samaresh Das, and P. K. Muduli "Interfacial control of out-of-plane spin polarization in $Al/Ni_{80}Fe_{20}/AlO_x$" **Ready for Submission**

Preetam Singh, **Richa Mudgal**, Aditya Singh "Emerging 2D Materials for Printing and Coating" Coating Materials: Computational Aspects, Applications and Challenges **Springer**, 253–277 (2023).

Sheetal Dewan**,** Prabal Dweep Khanikar, **Richa Mudgal**, Avneet Singh, Pranaba Kishor Muduli, Rajendra Singh, Samaresh Das "Large-Area GeSe Realized Using Pulsed Laser Deposition for Ultralow-Noise and Ultrafast Broadband Phototransistors" **ACS Applied Materials & Interfaces 15**, 27285–27298 (2023)

Himanshu Bangar, Akash Kumar, Niru Chowdhury, **Richa Mudgal**, Pankhuri Gupta, Ram Singh Yadav, Samaresh Das, and Pranaba Kishor Muduli "Large Spin-To-Charge Conversion at the Two-Dimensional Interface of Transition-Metal Dichalcogenides and Permalloy" **ACS Applied Materials & Interfaces 14**, 41598−41604 (2022)

Gulshan Kumar, **Richa Mudgal**, Pankaj Srivastava, Santanu Ghosh "Interplay among electronic structure, micro crystallinity, and conventional Field emission parameters for ultra-thin copper decorated vertically aligned carbon nanotubes" **Submitted**

Conference

Shalini, Dhairya Singh Arya, Nadeem T. Beigh, Sooraj Kumar, **Richa Mudgal**, Pushpapraj Singh, Pranaba K. Muduli, Dhiman Mallick, and Ankur Goswami "Energy Harvesting from Water Droplet

Motion Confined on a Hydrophobic-Hydrophilic Stripped Surfa" Conference preceding **IEEE Mems (**2022), Tokyo, Japan

Conferences and Workshops

[1] **Richa Mudgal,** Alka Jakhar, Pankhuri Gupta, Himanshu, Niru Chowdhury, Samaresh Das, P.K. Muduli "Spin-Orbit Torque in $PtSe_2$/NiFe Heterostructure", XXI International Workshop on The Physics of Semiconductor Devices (IWPSD)2021

[2] **Richa Mudgal,** Alka Jakhar, Pankhuri Gupta, Himanshu, Niru Chowdhury, Samaresh Das, P.K. Muduli "Spin-Orbit Torque in $PtSe_2$/NiFe Heterostructure", I^{st} International Conference on Thin Film and NanoTechnology: Knowledge, Leadership & Commercialization (ICTN:KLC) 2021

[3] **Richa Mudgal,** Alka Jakhar, Pankhuri Gupta, Himanshu, Niru Chowdhury, Samaresh Das, P.K. Muduli "Spin-Orbit Torque in $PtSe_2$/NiFe Heterostructure", Around-the-Clock Around-the-Globe (ATC-ATG) Magnetics Conference, IEEE Magnetics Society 2021

[4] **Richa Mudgal,** Alka Jakhar, Pankhuri Gupta, Himanshu, Niru Chowdhury, Samaresh Das, P.K. Muduli "Spin-Orbit Torque in $PtSe_2$/NiFe Heterostructure", EPFL-ETHZ Summer School 2021 Spintronics and Magnetism in 2D materials

[5] **Richa Mudgal,** Alka Jakhar, Pankhuri Gupta, Himanshu, Niru Chowdhury, Samaresh Das, P.K. Muduli "Determination of Spin-Orbit Torque in $PtSe_2$/NiFe Heterostructure", Joint European Magnetic Symposia 2022, 24-29 July 2022

[6] **Richa Mudgal,** Alka Jakhar, Pankhuri Gupta, Himanshu, Niru Chowdhury, Samaresh Das, P.K. Muduli "Study of Spin Orbit Torque in $PtSe_2$/NiFe/Pt Heterostructure", Magnetism and Magnetic Materials 2022, 31 October-4 November 2022

[7] **Richa Mudgal,** Alka Jakhar, Pankhuri Gupta, Himanshu, Niru Chowdhury, Samaresh Das, P.K. Muduli "Study of Spin Orbit Torque in $PtSe_2$/NiFe/Pt Heterostructure", International Workshop on Semiconductor Quantum Technology, 28 October 2022

[8] **Richa Mudgal,** Alka Jakhar, Pankhuri Gupta, Himanshu, Akash, Niru Chowdhury, Sheetal Dewan, Samaresh Das, Pranaba Kishor Muduli "Spin-Orbit Torque in Selenium-based Chalcogenides", First Indo-Swedish Meeting on Divergent Quantum Materials, Methods and Applications 2023, 2-4 February 2023

[9] **Richa Mudgal,** Alka Jakhar, Pankhuri Gupta, Himanshu, Niru Chowdhury, Samaresh Das, P.K. Muduli "Large Damping Like Torque in $PtSe_2$/NiFe/Pt Heterostructure", International Conference on Advanced Materials: Properties and Applications 2023, 20-24 February 2023

[10] **Richa Mudgal,** Sheetal Dewan, Samaresh Das, P.K. Muduli "Evidence of orbital-torque in two-dimensional GeSe-based heterostructure", Intermag 2023, 15-19 May 2023

References:

Dr. Pranaba Kishor Muduli (Associate Professor, Department of Physics, Indian Institute of Technology Delhi, New Delhi-110016, Contact: 011-2659-1377 (O), muduli@physics.iitd.ac.in)

Dr. Samaresh Das (Associate Professor, The Centre for Applied Research in Electronics, Indian Institute of Technology Delhi, New Delhi-110016, Contact: 011-2659-6036 (O), samaresh.das@gmail.com)

Prof. Pankaj Srivastava (Professor, Department of Physics, Indian Institute of Technology Delhi, New Delhi-110016, Contact: 011-2659-6558 (O), pankajs@physics.iitd.ac.in)

Prof. Santanu Ghosh (Professor, Department of Physics, Indian Institute of Technology Delhi, New Delhi-110016, Contact: 011-2659-1382 (O), sghosh@physics.iitd.ac.in)