

Rakshit Jain

CONTACT INFORMATION

Department of Applied and Engineering
Physics
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RESEARCH INTERESTS

My research interests lie in experimental condensed matter physics, focusing on quantum materials including altermagnets, topological insulators and two-dimensional magnetism

EDUCATION

[Cornell University](#), Ithaca, USA

August 2018 – Present

Doctoral Candidate, Department of [Applied and Engineering Physics](#)
M.S. in Applied Physics (2020)
Advisor: [Prof. Daniel C. Ralph](#)

[Indian Institute of Technology Bombay](#), Mumbai, India *July 2014 – May 2018*

Bachelor of Technology in Engineering Physics with honors, Department of [Physics](#)
Advisors: Prof. Vishvendra Poonia, Prof. Dinesh Kabra

- **Minor Degree:** Department of [Electrical Engineering](#)

SELECTED AWARDS AND FELLOWSHIPS

- **APS Topical Group on Magnetism (GMAG) Outstanding Dissertation Award 2024** (Awarded to two candidates among the magnetism APS community).
- **Kavli Graduate Fellowship** by Kavli Institute for Nano-Scale Science at Cornell
- **APS Division of Materials Physics Ovshinsky Award** to attend APS March Meeting 2024
- **DAAD WISE fellowship** for a summer traineeship in Germany
- **INSPIRE fellowship** by the Government of India to pursue studies in basic sciences.

PUBLICATIONS : FIRST OR CO-FIRST AUTHORS

- **Rakshit Jain**, Matthew Roddy, Vishakha Gupta, Benjamin Huang, Hasan M. Sayeed, Husain F. Alnaser, Amit Vashist, Kenji Watanabe, Takashi Taniguchi, Vikram V. Deshpande, Taylor D. Sparks and Daniel C. Ralph *A quantized anomalous Hall effect above 4.2 K in stacked topological insulator/magnet bilayers*; [Submitted to Science](#)
- **Rakshit Jain**, Max Stanley, Arnab Bose, Anthony R. Richardella, Xiyue S. Zhang, Timothy Pillsbury, David A. Muller, Nitin Samarth, and Daniel C. Ralph *Thermal Generation of spin currents in topological insulator Bi_2Se_3* ; [Science Advances](#) [doi:10.1126/sciadv.adi4540](#) 2023
- Vishakha Gupta*, **Rakshit Jain***, Yafei Ren, Xiyue S. Zhang, Husain F. Alnaser, Amit Vashist, Vikram V. Deshpande, David A. Muller, Di Xiao, Taylor D. Sparks, and Daniel C. Ralph; *Gate-tunable anomalous Hall effect in a 3D topological*

insulator/2D magnet van der Waals heterostructure; [Nano Letters 2022, 22, 17, 7166–7172](#)

- Arnab Bose*, **Rakshit Jain***, Jackson J. Bauer, Caroline A Ross, Robert A Buhrman, Daniel C. Ralph; *Origins of transverse voltages generated by applied thermal gradients and applied electric fields in ferrimagnetic-insulator/heavy-metal bilayers*; [Phys. Rev. B 105, L100408 2022](#)
- Arnab Bose*, Nathaniel J. Schreiber*, **Rakshit Jain***, Ding-Fu Shao, Hari P. Nair, Jiaxin Sun, Xiyue S. Zhang, David A. Muller, Evgeny Y. Tsymbal, Darrell G. Schlom, Daniel C. Ralph; *Tilted spin current generated by collinear antiferromagnet RuO₂*; [Nature Electronics 5, 267–274 \(2022\)](#)
- **Rakshit Jain**, VS Poonia, K Saha, D Saha, S Ganguly; *The avian compass can be sensitive even without sustained electron spin coherence* . [Proceedings A Royal Society 2020.0778](#)

OTHER PUBLICATIONS

- Xiaoxi Huang*, Xianzhe Chen*, John Mangeri*, Hongrui Zhang, Lucas Caretta, Sandhya Susarla , **Rakshit Jain**, Christoph Klewe, Tianye Wang, Isaac Harris, Hao Pan, Jia Yin, Peter Meisenheimer, Pádraic Shafer, Zi Qiu, Davi Rodrigues, Olle Heinonen, Dilip Vasudevan, Jorge Íñiguez, Sayeef Salahuddin, Lane Martin, Daniel Ralph, Albert Fert, Zhi Yao, Ramamoorthy Ramesh; *Manipulating chiral-spin transport with ferroelectric polarization*. [Nature Materials 23, 898–904 \(2024\)](#)
- Arnab Bose, Jocienne N. Nelson, Xiyue S. Zhang, P. Jadaoun, **Rakshit Jain**, D. Schlom, D. C. Ralph, D. Muller, K. M. Shen and R. A. Buhrman; *Effect of Anisotropic Strain on the high spin Hall conductivity of epitaxial IrO₂ thin films* . [ACS Appl. Mater. Interfaces 2020, 12, 49, 55411–55416](#)

* denotes equal contribution

INVITED TALKS

- Spin Physics in topological insulators and spin split antiferromagnets; Special condensed matter seminar; **MIT**; *May 2024*
- Tilted spin current generated in collinear antiferromagnet ruthenium dioxide; **APS March Meeting**; *March 2024*
- Spin Physics in topological insulators and spin split antiferromagnets; **APS March Meeting**; *March 2024 (APS GMAG Dissertation Award Talk)*
- Gate-tunable anomalous Hall effect in a 3D topological insulator/2D magnet van der Waals heterostructure; **Magnetism and Magnetic Materials**; *November 2023*
- Gate-tunable anomalous Hall effect in a 3D topological insulator/2D magnet van der Waals heterostructure; **Material Innovators in Quantum Materials, Columbia University**; *June 2023*
- Gate-tunable anomalous Hall effect in a 3D topological insulator/2D magnet van der Waals heterostructure; **INTERMAG**; *May 2023 (Cornell University Conference Travel Grant)*
- Spin orbit torques in heavy metals and topological materials; **IEEE EDS Guest Seminar, IIT Roorkee**; *Jan 2020*

CONTRIBUTED TALKS	<ul style="list-style-type: none"> • Changes in magnetic properties of a 2D magnet in proximity to a 3D topological insulator APS March Meeting; <i>March 2023, (APS GMAG Travel Award)</i> • Gate-tunable anomalous Hall effect in a 3D topological insulator/2D magnet van der Waals heterostructure; Magnetism and Magnetic Materials; <i>November 2022</i> • Origins of transverse voltages generated by applied thermal gradients and applied electric fields in ferrimagnetic-insulator/heavy-metal bilayers; Spin Caloritronics XI; <i>May 2022</i> • Origins of transverse voltages generated by applied thermal gradients and applied electric fields in ferrimagnetic-insulator/heavy-metal bilayers; APS March Meeting; <i>March 2022 (Cornell University Conference Travel Grant)</i> • Spin Nernst effect in a topological insulator ; APS March Meeting; <i>March 2021</i>
POSTER PRESENTATIONS	<ul style="list-style-type: none"> • Tilted spin current generated by collinear antiferromagnet RuO₂; Semiconductor research Corporation Annual Meeting, University of Notre Dame; <i>August 2022</i> • Gate-tunable anomalous Hall effect in a 3D topological insulator/2D magnet van der Waals heterostructure ; Quantum Science Summer School, University of California Santa Barbara; <i>July 2022</i>
SERVICE	<ul style="list-style-type: none"> • Session Chair, Magnetism and Magnetic Materials <i>Nov 2023</i> • Referee: Physical Review Letters, Physical Review B
OUTREACH SERVICE	<ul style="list-style-type: none"> • Lab Tour Guide, APS Conference for Undergraduate Women in Physics <i>Jan 2023</i> • CNF Ambassador, Cornell Nanofabrication Facility (CNF) <i>Jan 2020 -</i> • Expanding your Horizons, Committee Chair, Workshops <i>2020</i> • Outreach Volunteer, Cornell center for materials research (CCMR) <i>November 2018- Present</i> • Volunteer, Science center, Family science night <i>September-December 2019</i>
TEACHING EXPERIENCE	<ul style="list-style-type: none"> • Teaching Assistant, Interfacing digital domain with the analog world <i>Spring 2018, Fall 2018</i> • Teaching Assistant, PH108: Electricity and Magnetism <i>Summer 2016, January 2018 - May 2018(at IIT Bombay)</i>