Curriculum Vitae

Avinash Rustagi

Postdoctoral Research Assistant
School of Electrical and Computer Engineering
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Professional Employment

July 2018 - Present: Postdoctoral Research Assistant, School of Electrical and Computer Engineering, Purdue University.

Sep 2016 - July 2018: Postdoctoral Research Scholar, Department of Physics, North Carolina State University.

May 2016 - Aug 2016: OPS Research Assistant, Department of Physics, University of Florida.

Education

- Ph.D. in Physics, University of Florida (2016).
- M.Sc. in Physics, Indian Institute of Technology, Kanpur, (2010).
- B.Sc. in Physics, St. Stephens College, Delhi, (2008).

Research Interests

- Quantum information processing with magnons, Quantum sensing of novel phases.
- Spintronics, van der Waal Magnonics.
- Many body theory: Correlations in electron-hole systems, Ultrafast carrier and lattice dynamics, Non-equilibrium Bethe-Salpeter equation.
- Electronic structure calculations: Density Functional Theory.
- Optical and Transport Properties: Magneto-optics, Semiclassical Transport, Terahertz generation, Coherent Phonons.

Publications

20. A. B. Solanki, S. Bogdanov, **A. Rustagi**, N. Dilley, T. Shen, P. Debashish, Z.Chen, J. Appenzellar, Y. Chen, V. Shalaev, and P. Upadhyaya "Electrical switching of spin-magnon interaction at room temperature" **In preparation (2019)**
19. Mohammad Mushfiqur Rahman, **Avinash Rustagi**, Yaroslav Tserkovnyak, and Pramey Upadhyaya "Electrical excitation of magnons in antiferromagnetically coupled domain wall waveguides" **In preparation (2019)**
18. **Avinash Rustagi**, Shivam Kajale, and Pramey Upadhyaya "Coherently driving quantum spins via electrically induced non-linear magnetization precessions: a pathway towards high Q-factors" **In preparation (2019)**
17. **Avinash Rustagi**, Abhishek Solanki, Yaroslav Tserkovnyak, and Pramey Upadhyaya "Coupled spin-charge dynamics in magnetic van der Waal heterostructures" **In preparation (2019)**

16. Terry Y.T. Hung, **A. Rustagi**, S. Zhang, P. Upadhyaya, and Z. Chen "Experimental observation of coupled valley and spin Hall effect in p-doped WSe_2 devices" **arXiv 1908.01396 (2019)**
15. Y. Jiang, Z. Lu, J. Gigliotti, **A. Rustagi**, L. Chen, C. Berger, W. A. de Heer, C. J. Stanton, D. Smirnov, and Z. Jiang. "Valley and Zeeman Splittings in Multilayer Epitaxial Graphene Revealed by Circular Polarization Resolved Magneto-infrared Spectroscopy" **Nano Letters 2019, 19, 10, 7043-7049**
14. J. Kaiser, **A. Rustagi**, K. Y. Camsari, J. Z. Sun, S. Datta, and P. Upadhyaya "Ultrafast Fluctuations in Low-Barrier Magnets" **arXiv 1902.03312 (2019) [Accepted Phys. Rev. Applied]**
13. **Avinash Rustagi**, and Alexander F. Kemper "Coherent Excitonic Quantum Beats in Time-Resolved Photoemission Measurements" **Phys. Rev. B 99, 125303 (2019)**
12. A. W. Bataller, R. Younts, **Avinash Rustagi**, Y. Yu, H. Ardekani, A. F. Kemper, L. Cao, and K. Gundogdu "Dense Electron-Hole Plasma Formation and Ultra-Long Charge Lifetime in Monolayer MoS_2 via Material Tuning"**Nano Letters 2019, 19, 1104-1111**
11. O. Abdurazakov, D. Nevola, **A. Rustagi**, J. K. Freericks, D. B. Dougherty, and A. F. Kemper "Non-equilibrium Electron Dynamics in Pump-Probe Spectroscopy: Role of excited phonon populations" **Phys. Rev. B 98, 245110 (2018)**
10. **Avinash Rustagi**, and Alexander F. Kemper "Photoemission signature of excitons". **Phys. Rev. B 97, 235310 (2018)**
9. **Avinash Rustagi**, and Alexander F. Kemper " Theoretical phase diagram for the room temperature Electron-Hole Liquid in photo-excited quasi-2D monolayer MoS_2." **Nano Letters 2018 18 (1), 455-459**
8. Kunie Ishioka, **Avinash Rustagi**, Andreas Beyer, Wolfgang Stolz, Kerstin Volz, Ulrich Hoefer, Hrvoje Petek, and Christopher J. Stanton " Sub-picosecond acoustic pulses generated at buried GaP/Si interfaces." **Appl. Phys. Lett. 111, 062105(2017)**
7. Kevin L. Pollock, Hoang Q. Doan, **Avinash Rustagi**, Christopher J. Stanton, and Tanja Cuk "Detecting the Photoexcited Carrier Distribution Across GaAs/Transition Metal Oxide Interfaces by Coherent Longitudinal Acoustic Phonons."**J. Phys. Chem. Lett., 2017, 8, pp 922928 (2017)**
6. Kunie Ishioka, **Avinash Rustagi**, Ulrich Hofer, Hrvoje Petek, Christopher J. Stanton "Intrinsic coherent acoustic phonons in the indirect band gap semiconductors Si and GaP." **Phys. Rev. B 95, 035205 (2017)**.
5. **A. Rustagi** and C. J. Stanton "Terahertz radiation from accelerating charge carriers in graphene under ultrafast photoexcitation." **Phys. Rev. B 94, 195207 (2016)**.
4. K. Ishioka, K. Brixius, A. Beyer, **A. Rustagi**, C. J. Stanton, W. Stolz, K. Volz, U. Hofer and H. Petek "Coherent phonon spectroscopy characterization of electronic bands at buried semiconductor heterointerfaces." **Appl. Phys. Lett. 108, 051607 (2016)**.
3. K. Ishioka, K. Brixius, U. Höfer, **A. Rustagi** , E. Thatcher, C. J. Stanton and H. Petek "Dynamically Coupled Plasmon-Phonon Modes in GaP; an Indirect-Gap, Polar Semiconductor." **Phys. Rev. B 92, 205203 (2015)**.
2. **A. Rustagi** and C. J. Stanton "Hot-electron noise properties of graphene-like systems." **Phys. Rev. B 90, 245424 (2014)**.

1. L. G. Booshehri, C. H. Mielke, D. G. Rickel, S. A. Crooker, Q. Zhang, L. Ren, E. H. Hroz, **A. Rustagi**, C. J. Stanton, Z. Jin, Z. Sun, Z. Yan, J. M. Tour, and J. Kono "Circular polarization dependent cyclotron resonance in large-area graphene in ultrahigh magnetic fields." **Phys. Rev. B 85, 205407 (2012)**.

Honors and Awards

North Carolina State University, Graduate School

- Notable poster - college of science, Postdoctoral Research Symposium 2018

Travel Awards

- 5^{th} International Symposium on Terahertz Nanoscience, Martinique, Dec 2014

Student Awards — University of Florida, Graduate School

- College of Liberal Arts and Sciences (CLAS) Dissertation Fellowship funded by Threadgill Scholarship Program, Spring 2016.
- Certificate of Outstanding Achievement for Academic Excellence, 2010–2014
- Center for Condensed Matter Sciences (CCMS) Summer Fellowship, 2011

Student Awards — Indian Institute of Technology, Kanpur, India, M.Sc.

- General Proficiency Medal for Academic Excellence, 2008–2010
- Academic Excellence Award, 2009-2010

Student Awards — St. Stephens College, Delhi, India, B.Sc.

- University Gold Medal for First Rank in B.Sc. Physics Examinations, 2005–2008
- The Sumitomo Corporation-St. Stephens College Scholarship, 2005-2008

Professional Membership and Services

Member: Americal Physical Society
Peer Reviewer: Physical Review B, Applied Physics Letters, Optics Communications.

Computational Skills

Experience in micromagnetic simulations-mumax and OOMMF. Experience in C++, Python, MATLAB, FORTRAN, Mathematica, and Shell Script. Experience in parallel programming using MPI and OpenMP. Experience in Quantum Espresso for electronic structure calculations.

Teaching Experience

Teaching Assistant Fall 2010–Spring 2011, PHY 2053 Lab, Department of Physics, University of Florida.

Conference talks

- APS March Meeting 2019, Boston, MA - "Coherent Electrical Driving of Quantum Spins via Localized Magnons"
- APS March Meeting 2018, Los Angeles, CA - "Room Temperature EHL in monolayer MoS2"
- 84th annual meeting of SESAPS 2017, Milledgeville, GA - "Photoemission signature of excitons"
- APS March Meeting 2017, New Orleans, LA - "Non-Equilibrium exciton dynamics in model systems"
- APS March Meeting 2016, Baltimore, MD - "Coupled Plasmon Phonon Dynamics in GaP: an indirect gap polar semiconductor"
- 5th International Symposium on Terahertz Nanoscience 2015, Martinique - "THz radiation from accelerating photo-excited carriers in graphene"
- APS March Meeting 2014, Denver, CO - "Terahertz radiation from accelerating carriers in graphene"
- APS March Meeting 2013, Baltimore, MD - "Noise properties of graphene like systems"

References

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