Wencan Jin

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Department of Physics
Auburn University
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Auburn, AL 36849

Education

Columbia University, New York, NY — Aug. 2011 – Jan. 2017
Degree: Ph.D. in Applied Physics
Thesis: Electronic Structure and Surface Physics of Two-dimensional Material MoS_2
Supervisor: Richard M. Osgood, Jr.

Renmin University of China, Beijing, China — Sept. 2007 – Jul. 2011
Degree: B.S. in Physics

Employment

Auburn University, Auburn, AL
Thomas & Jean Walter Associate Professor in Department of Physics — Oct. 2025 – present
Joint Assistant Professor in Department of Electrical & Computer Engineering — May. 2022 – Sept. 2025
Assistant Professor in Department of Physics — Aug. 2019 – Sept. 2025

University of Michigan, Ann Arbor, MI — Feb. 2017 – Jul. 2019
Postdoctoral Researcher in Department of Physics
Supervisor: Liuyan Zhao

Research Interests

- **Research topics**: Discovering and understanding novel phases of matter emerging from the interplay between lattice, charge, orbital, and spin degrees of freedom in the low-dimensional quantum materials
- **Material systems**: Two-dimensional van der Waals materials (MoS_2, CrI_3, $Fe_{5-x}GeTe_2$), ferroic materials (ferro-axial order), molecular beam epitaxy grown oxide thin films ($La_{1-x}Sr_xMnO_3$, $SrTiO_3$, h-$LuFeO_3$)
- **Experimental techniques**: Lab-based optical spectroscopy (SHG, pump-probe spectroscopy, Raman scattering), synchrotron-based photoemission spectroscopy (ARPES, LEEM, XPEEM), and Physical Property Measurement System (VSM, FMR)

Research Grants

Total Value: $2.62 million, As PI: $1.86 million

- *CAREER: Chiral Phenomena of Excited States in Spintronics*, **National Science Foundation, Directorate for Mathematical and Physical Sciences**, Grant No. DMR-2339615, 02/01/2024–01/31/2029, PI: Wencan Jin, $738,118
- *Studying magnetoelectric coupling in van der Waals/oxide thin film heterostructures*, **Department of Defense, Air Force Office of Scientific Research**, Grant No. FA9550-23-1-0499, 08/01/2023–07/31/2027, PI: Wencan Jin, Co-PI: Ryan Comes, $598,311
- *In situ studies of charge transfer phenomena in complex oxide heterostructures*, **Department of Energy, Office of Basic Energy Sciences**, Grant No. DE-SC0023478, 10/01/2022–09/30/2026, PI: Ryan Comes, Co-PI: Wencan Jin, $749,730

- *Probing novel phases of matter in van der Waals magnet $Fe_{5-x}GeTe_2$*, **National Science Foundation, Electronic and Photonic Materials**, Grant No. DMR-2129879, 08/15/2021–07/31/2025, PI: Wencan Jin, $523,200
- *Probing novel quantum phases in van der Waals magnet $Fe_{5-x}GeTe_2$*, **Research Support Program, Office of the Vice President for Research & Economic Development, Auburn University**, 07/01/2021–07/01/2023, PI: Wencan Jin, Co-PI: Masoud Mahjouri Samani, $25,000

Publications (Google Scholar)

∗ denotes equal contribution.
† denotes corresponding author.

Manuscripts in preparation

49. Colloquium: Ferro-axial orders, a novel phase of matter comes into view
Z. Zeng, A. Cavalleri, P. G. Radaelli, S. Hayami, S-W. Cheong, K. Burch, L. Zhao, and W.Jin†
Reviews of Modern Physics **(Invited review article to be submitted)**
48. Second Harmonic Generation Spectroscopy of Hidden Phases
L. Zhao, D. H. Torchinsky, J. W. Harter, A. de la Torre, D. Hsieh, and W.Jin
Encyclopedia of Modern Optics **(Book chapter to be submitted)**
47. A unified picture of carrier-tunable lattice vibration in ionic-liquid-gated MoS_2 devices
M. Kandil, E. Liu, Z. Ye, G. Ye, K. Wu, S. B. Bayne, A. J. Stollenwerk, C. H. Lui, R. He, and W.Jin†
Applied Physics Letters **(Under Review)**
46. $Co_2SeO_3Cl_2$: Studies of emerging magnetoelectric coupling in a polar, buckled Honeycomb material
F. O. Adeyemi, X. Huai, M. Kandil, P. Karki, W. Jin, and T. T. Tran
arXiv:2603.13568 **(Under Review)**
45. Optical field poling across the order-disorder transtion in a quantum ferroelectric metal
M. Kandil, Y. Tomioka, Y. Ren, R. Comes, I. H. Inoune, and W.Jin†
Physical Review Letters **(Under Review)**
44. Metallic overlayer engineering of structural and magnetic properties of van der Waals magnet CrSBr
P. Karki, G. Ye, A. Hager, Z. Zhao, H. Mustafa, C. Nnokwe, A. Alaspa, H. L. Ferreira, C. Cunningham, E. Ahmetasevi, J. Kowalski, K. Wu, P. M. Shand, T. E. Kidd, L. Zhao, S. B. Bayne, B. Lv, A. J. Stollenwerk, L. Liang, R. He, and W.Jin†
2D Materials **(Under Review)**
43. Substrate-induced charge transfer and optical quenching in monolayer TMDCs
S. Jaiswal, C. Tang, X. Wang, M. Kuroda, W. Jin, M. Mahjouri-Samani
ACS Applied Nano Materials **(Under Review)**
42. Multimode magnon-phonon cavity driven by symmetry-locked strain fields
C. Tang, Y. Zhu, D. Sasaki, J. Wu, Y. Xiong, H. Goyal, M. Mahjouri-Samani, M. Adams, X. Meng, B. Matthews, L. Wang, Y. Du, J.-M. Hu, Y. Takamura, W. Zhang, and W.Jin†
arXiv:2510.06464, Nature Communications **(Under Review)**

Peer-reviewed journals

41. Quantum engineering of Landau levels using isotopes in graphene-like graphite
P. Karki, G. Ye, Z. Ye, H. Mustafa, D. Evans, J. H. Edgar, S. B. Bayne, R. He, and W.Jin†
Advanced Quantum Technologies 9:e00920 (2026)
40. A pump-probe strobe light magneto-optic spectroscopy
S. Zhou, Y. Zhu, C. Tang, R. Sun, J. Wu, Y. Xiong, I. E. Russell, Y. Li, D. Sun, F. Tsui, B. Yang, V. Novosad, J.-M. Hu, W.Jin†, and Wei Zhang
Physical Review Applied 24, 054061 (2025)

39. Dilute magnetic impurity-induced effective phonon magnetic moment in Fe-doped monolayer MoS_2
H. Mustafa, G. Ye, C. Nnokwe, M. Fang, M. Kandil, A. Al-Mahboob, K. Wu, A. J. Stollenwerk, T. E. Kidd, P. M. Shand, J. T. Sadowski, E.-H. Yang, Y. Zhou, R. He, W.Jin†
2D Materials 12, 041002 (2025)

38. Origin of large effective phonon magnetic moments in monolayer MoS_2
H. Mustafa, C. Nnokwe, G. Ye, M. Fang, S. Chaudhary, J.-A. Yan, K. Wu, C. J. Cunningham, C. M. Hemesath, A. J. Stollenwerk, P. M. Shand, E.-H. Yang, G. A. Fiete, R. He, W.Jin†
ACS Nano 19, 11241–11248 (2025)

37. Proximity-induced antisymmetric humps in Hall resistivity in Fe-doped monolayer WSe_2
M. Fang, S. Chen, C. Tang, Z. Tang, M.-Y. Choi, J. H. Jang, H. S. Chung, M. Narayana Nair, W.Jin†, and E.H.Yang†
Applied Physics Letters 126, 103101 (2025)

36. Strain Effects in $SrHfO_3$ films grown by hybrid molecular beam epitaxy
P. T. Gemperline, A. S Thind, C. Tang, G. E. Sterbinsky, B. Kiefer, W. Jin, R. F. Klie, R. B. Comes
ACS Applied Electronic Materials 7, 983–996 (2024)

35. Exciton-activated effective phonon magnetic moment in monolayer MoS_2
C. Tang, G. Ye, C. Nnokwe, M. Fang, L. Xiang, M. Mahjouri-Samani, D. Smirnov, E.-H. Yang, T. Wang, L. Zhang, R. He, W.Jin†
Physical Review B 109, 155426 (2024) **(Editors' Suggestion)**

34. Epitaxial growth of large-scale 2D $CrTe_2$ films on amorphous silicon wafers with low thermal budget
X. Zhang, Y. Li, Q. Lu, X. Xiang, M. Mahdi, C. Conner, J. Cook, Y. Xiong, J. Inman, C. Tang, W. Jin, C. Liu, E. J. G. Santos, C. Phatak, W. Zhang, N. Gao, G. Bian, P. Li, D. Yu, and S. Long
Advanced Materials 2311591 (2024)

33. Spin dynamics in van der Waals magnetic systems
C. Tang, L. Alahmed, M. Mahdi, Y. Xiong, J. Inman, N. McLaughlin, C. Zollitsch, T. H. Kim, C.R. Du, H. Kurebayashi, E. J. G. Santos, W. Zhang, P. Li, and W.Jin†
Physics Reports 1032, 1-36 (2023)
Invited review article and News at PHYS.ORG (Link)

32. Sky-TCAM: Low-power skyrmion-based ternary content addressable memory
R. Zhang, C. Tang, X. Sun, M. Li, W.Jin†, P. Li, X. Cheng, X. S. Hu
IEEE Transactions on Electron Devices 70, 3517-3522 (2023)

31. Voltage enables ferro-rotational domain switching
W.Jin†
Nature Nanotechnology 18, 840-841 (2023) (News & Views)

30. Engineering metal oxidation using epitaxial strain
S. Nair, Z. Yang, D. Lee, S. Guo, J. T. Sadowski, S. Johnson, A. Saboor, Y. Li, H. Zhou, R. B. Comes, W. Jin, K. A. Mkhoyan, A. Janotti, and B. Jalan
Nature Nanotechnology 18, 1005-1011 (2023)

29. Magnetism and spin dynamics in room-temperature van der Waals magnet Fe_5GeTe_2
L. Alahmed, B. Nepal, J. Macy, K. Wei, W. Zheng, A. Sapkota, A. R. Mazza, M. Brahlek, W.Jin†, C. Mewes, L. Balicas, T. Mewes, and P. Li
2D Materials 8, 045030 (2021)

28. Correlating surface stoichiometry and termination in $SrTiO_3$ films grown by hybrid molecular beam epitaxy
S. Thapa, S. Provence, J. Sadowski, J. Lapano, M. Brahlek, W. Jin, and R. Comes
Journal of Vacuum Science & Technology A 39, 053203 (2021)

27. Structural monoclinicity and its coupling to layered magnetism in few-layer CrI_3
K. Guo, W. Jin*, Z. Ye, G. Ye, H. Xie, B. Yang, H. H. Kim, S. Yan, Y. Fu, S. Tian, H. Lei, A. W. Tsen, K.

Sun, J. Yan, R. He and L. Zhao
ACS Nano 15, 10444-10450 (2021)

26. Second-order nonlinear optical and linear UV-VIS absorption properties of type-II multiferroic candidates $RbFe(AO_4)_2$ (A = Mo, Se, S)
R. Owen, E. Drueke, C. Albunio, A. Kaczmarek, W. Jin, D. Obeysekera, S. -W. Cheong, J. J. Yang, S. Cundiff, and L. Zhao
Physical Review B 103, 054104 (2021)

25. Observation of the polaronic character of excitons in a two-dimensional semiconducting magnet CrI_3
W. Jin, H. H. Kim, Z. Ye, G. Ye , L. Rojas, X. Luo, B. Yang, F. Yin, J. Horng, S. Tian, Y. Fu, H. Deng, H. Lei, A. W. Tsen, K. Sun, R. He, and L. Zhao
Nature Communications 11, 4780 (2020)

24. Tunable layered-magnetism-assisted magneto-Raman effect in a two-dimensional magnet CrI_3
W. Jin, Z. Ye, X. Luo, B. Yang, G. Ye, F. Yin, H. H. Kim, L. Rojas, S. Tian, Y. Fu, S. Yan, H. Lei, K. Sun, A. W. Tsen, R. He, and L. Zhao
Proceedings of the National Academy of Sciences 117, 24664-24669 (2020)

23. Bulk-like dielectric and magnetic properties of sub 100 nm thick single crystal Cr_2O_3 films on an epitaxial oxide electrode
N. M. Vu, X. Luo, S. Novakov, W. Jin, J. Nordlander, P. B. Meisenheimer, M. Trassin, L. Zhao, and J. T. Heron
Scientific Reports 10, 14721 (2020)

22. Symmetry-resolved two-magnon excitations in a strong spin-orbit-coupled bilayer antiferromagnet
S. Li, E. Drueke, Z. Porter, W. Jin, Z. Lu, D. Smirnov, R. Merlin, S. D. Wilson, K. Sun, and L. Zhao
Physical Review Letters 125, 087202 (2020)

21. Observation of a ferro-rotational order coupled with second-order nonlinear optical fields
W. Jin, E. Drueke, S. Li, A. Admasu, R. Owen, M. Day, K. Sun, S.-W. Cheong, and L. Zhao
Nature Physics 16, 42-46 (2020).
"News & Views" at Nature Physics ("Order! Order!!") and News at Umich (Link)

20. Spectroscopic photoemission and low energy electron microscopy studies of surface- and electronic structure of low-dimensional materials
W. Jin and R. M. Osgood, Jr.
Advances in Physics: X 4, 1688187 (2019) (**Invited review article**)

19. Polarized Raman spectroscopy study of metallic $(Sr_{1-x}La_x)_3Ir_2O_7$: a consistent picture of disorder-interrupted unidirectional charge order
W. Jin, S. Li, J. Liu, Q. Han, Z. Porter, C. Peterson, J. Schmehr, I. Boulares, K. Sun, R. Merlin, S. D. Wilson, and L. Zhao
Physical Review B 99, 041109(R) (2019). **(Rapid Communications)**

18. Raman fingerprint of two terahertz spin wave branches in a two-dimensional honeycomb Ising ferromagnet
W. Jin, H. H. Kim, Z. Ye, S. Li, P. Rezaie, F. Diaz, S. Siddiq, E. Wauer, B. Yang, C. Li, S. Tian, K. Sun, H. Lei, A. W. Tsen, L. Zhao, and R. He
Nature Communications 9, 5122 (2018). **(Editors' Highlights)**

17. Phase transition and electronic structure evolution of $MoTe_2$ induced by W substitution
W. Jin, T. Schiros, Y. Lin, J. Ma, R. Lou, Z. Dai, J.-X. Yu, D. Rhodes, J. T. Sadowski, X. Tong, T. Qian, M. Hashimoto, D. Lu, J. I. Dadap, S. Wang, E. J. G. Santos, J. Zang, K. Pohl, H. Ding, J. Hone, L. Balicas, A. N. Pasupathy, and R. M. Osgood, Jr.
Physical Review B 98, 144114 (2018).

16. Excitation and characterization of image potential state electrons on quasi-free-standing graphene
Y. Lin, Y. Li, J. T. Sadowski, W. Jin, J. I. Dadap, M. S. Hybertsen, and R. M. Osgood, Jr.

Physical Review B 97, 165413 (2018).

15. Surface buckling of black phosphorus: Determination, origin, and influence on electronic structure
Z. Dai, W. Jin, J.-X. Yu, M. Grady, J. T. Sadowski, Y. D. Kim, J. Hone, J. I. Dadap, J. Zang, R. M. Osgood, Jr. and K. Pohl
Physical Review Materials 1, 074003 (2017).

14. Electronic structure of the metastable epitaxial rock-salt SnSe $\{111\}$ topological crystalline insulator
W. Jin, S. Vishwanath, J. Liu, L. Kong, R. Lou, Z. Dai, J. Sadowski, X. Liu, H.-H. Lien, A. Chaney, Y. Han, M. Cao, J. Ma, T. Qian, S. Wang, M. Dobrowolska, J. Furdyna, D. A. Muller, K. Pohl, H. Ding, J. I. Dadap, H. G. Xing, and R. M. Osgood, Jr.
Physical Review X 7, 041020 (2017).

13. Engineering the structural and electronic phases of $MoTe_2$ through W substitution
D. Rhodes, D. A. Chenet, B. E. Janicek, C. Nyby, Y. Lin, W. Jin, D. Edelberg, E. Mannebach, N. Finney, A. Antony, T. Schiros, T. Klarr, A. Mazzoni, M. Chin, Y.-C. Chiu, W. Zheng, Q. R. Zhang, F. Ernst, J. I. Dadap, X. Tong, J. Ma, R. Lou, S. Wang, T. Qian, H. Ding, R. M. Osgood, Jr., D. W. Paley, A. M. Lindenberg, P. Y. Huang, A. N. Pasupathy, M. Dubey, J. Hone, and L. Balicas
Nano Letters 17, 1616-1622 (2017).

12. Two-color filed enhancement at an STM junction for spatiotemporally resolved photoemission
X. Meng, W. Jin, H. Yang, J. I. Dadap, R. M. Osgood, Jr., A. Dolocan, P. Sutter, and N. Camilone
Optics Letter 42, 2651-2654 (2017).

11. Surface Structure of bulk 2H-MoS_2 (0001) and exfoliated suspended monolayer MoS_2: A selected area low energy electron diffraction study
Z. Dai, W. Jin*, M. Grady, J. T. Sadowski, J. I. Dadap, R. M. Osgood, Jr. and K. Pohl
Surface Science 660, 16-21 (2017).

10. Rigorous theoretical analysis of a surface-plasmon nanolaser with monolayer MoS_2 gain medium
X. Meng, R. R. Grote, W. Jin, J. I. Dadap, N. C. Panoiu, and R. M. Osgood, Jr.
Optics Letters 41, 2636-2639 (2016).

9. Direct measurement of the tunable electronic structure of bilayer MoS_2 by interlayer twist
P.-C. Yeh, W. Jin, N. Zaki, J. Kunstmann, D. Chenet, G. Arefe, J. T. Sadowski, J. I. Dadap, P. Sutter, J. Hone, and R. M. Osgood, Jr.
Nano Letters 16, 953-959 (2016).

8. Tuning the electronic structure of monolayer graphene/MoS_2 van der Waals heterostructure via interlayer twist
W. Jin, P.-C. Yeh, N. Zaki, D. Chenet, G. Arefe, Y. Hao, A. Sala, T. O. Mentes, J. I. Dadap, A. Locatelli, J. Hone, and R. M. Osgood, Jr.
Physical Review B 92, 201409(R) (2015). **(Editors' Suggestion)**

7. Sudden gap closure across the topological phase transition in $Bi_{2-x}In_xSe_3$
R. Lou, Z. Liu, W. Jin, H. Wang, Z. Han, K. Liu, X. Wang, T. Qian, Y. Kushnirenko, S.-W. Cheong, R. M. Osgood, Jr., H. Ding, and S. Wang
Physical Review B 92, 115150 (2015).

6. Layer-dependent electronic structure of an atomically heavy two-dimensional dichalcogenide
P.-C. Yeh, W. Jin, N. Zaki, D. Zhang, J. T. Liou, J. T. Sadowski, A. Al-Mahboob, J. I. Dadap, I. P. Herman, P. Sutter, and R. M. Osgood, Jr.
Physical Review B 91, 041407(R) (2015). **(Editors' Suggestion)**

5. Substrate interaction with suspended and supported monolayer MoS_2: angle-resolved photoemission spectroscopy
W. Jin, P.-C. Yeh, N. Zaki, D. Zhang, J. T. Liou, J. T. Sadowski, A. Barinov, M. Yablonskikh, J. I. Dadap, P. Sutter, I. P. Herman, and R. M. Osgood, Jr.
Physical Review B 91, 121409(R) (2015).

4. Quasiparticle interference, quasiparticle interactions, and the origin of the charge density wave in 2H-$NbSe_2$
   C. Arguello, E. Rosenthal, E. Andrade, W. Jin, P. Yeh, N. Zaki, S. Jia, R. Cava, R. Fernandes, A. Millis, T Valla, R. M. Osgood, Jr., and A. N. Pasupathy
   Physical Review Letters 114, 037001 (2015). **(Editors' Suggestion & On the Cover)**
3. Probing substrate-dependent long-range surface structure of single-layer and multilayer MoS_2 by low-energy electron microscopy and microprobe diffraction
   P.-C. Yeh, W. Jin, N. Zaki, D. Zhang, J. T. Sadowski, A. Al-Mahboob, A. M. van der Zande, D. A. Chenet, J. I. Dadap, I. P. Herman, P. Sutter, J. Hone, and R. M. Osgood, Jr.
   Physical Review B 89, 155408 (2014).
2. Direct measurement of the thickness-dependent electronic band structure of MoS_2 using angle-resolved photoemission spectroscopy
   W. Jin, P.-C. Yeh, N. Zaki, D. Zhang, J. T. Sadowski, A. Al-Mahboob, A. M. van der Zande, D. A. Chenet, J. I. Dadap, I. P. Herman, P. Sutter, J. Hone, and R. M. Osgood, Jr.
   Physical Review Letters 111, 106801 (2013). (**Highly Cited Paper - Web of Science**)
1. Absence of a holelike Fermi surface for the iron-based $K_{0.8}Fe_{1.7}Se_2$ superconductor revealed by angle-resolved photoemission spectroscopy
   T. Qian, X.-P. Wang, W.-C. Jin, P. Zhang, P. Richard, G. Xu, X. Dai, Z. Fang, J.-G. Guo, X.-L. Chen, and H. Ding
   Physical Review Letters 106, 187001 (2011). (**Highly Cited Paper - Web of Science**)

Presentations

Invited talks

47. Multimode magnon-phonon cavity driven by symmetry-locked strain fields
    Department of Physics, **New Jersey Institute of Technology**, Jun. 17, 2026
46. Multimode magnon-phonon cavity driven by symmetry-locked strain fields
    Department of Applied Physics and Applied Mathematics, **Columbia University**, Jun. 15, 2026
45. Tunable magnon-phonon cavity via structural phase transition
    QT03:05: Quantum Information Generation and Processing, **MRS Spring Meeting**, Apr. 29, 2026
44. Optical second harmonic generation fingerprint of order-disorder transition in electron-doped $SrTiO_3$
    EL08.06: Emergent Optical Properties in Advanced Oxides and Nitrides, **MRS Spring Meeting**, Apr. 28, 2026
43. Tunable magnon-phonon cavity via structural phase transition
    Department of Materials Engineering, **Auburn University**, Feb. 09, 2026
42. Hybrid magnon-phonon cavity realized in a magnetoelastic heterostructure
    Interface Phenomena, **Workshop on Innovative Nanoscale Devices and Systems (WINDS)**, Dec. 12, 2025
41. Origin of large effective phonon magnetic moments in monolayer MoS_2
    1D and 2D Materials: Multiferroics and Magnetism, **Workshop on Innovative Nanoscale Devices and Systems (WINDS)**, Dec. 10, 2025
40. Tunable magnon-phonon cavity via structural phase transition
    Department of Electrical and Computer Engineering, **Texas Tech University**, Nov. 10, 2025
39. Expecto Quantum: Physics Behind Nobel Prize 2025
    Department of Physics, **Auburn University**, Oct. 31, 2025
38. Hybrid magnon-phonon cavity realized in a magnetoelastic heterostructure
    Department of Materials Science and Engineering, **Rensselaer Polytechnic Institute**, Jul. 28, 2025

37. Hybrid magnon-phonon cavity realized in a magnetoelastic heterostructure
Department of Materials Science and Engineering, **University of Delaware**, Jul. 25, 2025
36. Hybrid magnon-phonon cavity realized in a magnetoelastic heterostructure
Photonics Initiative seminar, **Advanced Science Research Center, City University of New York**, Jun. 25, 2025
35. Hybrid magnon-phonon cavity realized in a magnetoelastic heterostructure
IEEE Nanotechnology Council Chapter, North Jersey Section, **Stevens Institute of Technology**, Apr. 18, 2025
34. Origin of large effective phonon magnetic moments in monolayer MoS_2
Department of Physics and Astronomy, **University of Alabama**, Apr. 9, 2025
33. Exciton-activated effective phonon magnetic moment in monolayer MoS_2
Center for Functional Nanomaterials, **Brookhaven National Laboratory**, Oct. 16, 2024
32. Exciton-activated effective phonon magnetic moment in monolayer MoS_2
Department of Physics, **Stony Brook University**, Oct. 15, 2024
31. Exciton-activated effective phonon magnetic moment in monolayer MoS_2
Department of Physics, **Towson University**, Oct. 11, 2024
30. Exciton-activated effective phonon magnetic moment in monolayer MoS_2
Department of Physics, **University of Maryland, Baltimore County**, Oct. 10, 2024
29. Exciton-activated effective phonon magnetic moment in monolayer MoS_2
Center for Integrated Nanotechnologies, **Los Alamos National Laboratory**, Sept. 17, 2024
28. Exciton-activated effective phonon magnetic moment in monolayer MoS_2
Department of Physics, **Florida International University**, Sept. 6, 2024
27. Exciton-activated effective phonon magnetic moment in monolayer MoS_2
Department of Mechanical Engineering, **Columbia University**, May. 16, 2024
26. Exciton-activated effective phonon magnetic moment in monolayer MoS_2
Department of Mechanical Engineering, **Stevens Institute of Technology**, May. 14, 2024
25. Exciton-activated effective phonon magnetic moment in monolayer MoS_2
Department of Physics and Astronomy, **University of Delaware**, May. 13, 2024
24. Magneto-Raman studies of chiral phonons in monolayer MoS_2
The 23rd IEEE International Conference on Nanotechnology, **IEEE-Nano 2023**,
Jeju Island, Korea, July 05, 2023
23. Raman spectroscopy studies of magneto-optical effects in CrI_3
Department of Physics and Astronomy, **University of North Carolina at Chapel Hill**, Jan. 20, 2023
22. Raman spectroscopy studies of magneto-optical effects in CrI_3
Advances in Emerging Electronic Nanomaterials: Synthesis, Enhanced Properties, Integration, and Applications, **MS&T**, Pittsburg, PA, Oct. 10, 2022
21. Probing a ferro-rotational order by optical second harmonic generation
Department of Physics, **University of Alabama at Birmingham**, AL, Sept. 16, 2022
20. Probing a ferro-rotational order by optical second harmonic generation
Department of Electrical and Computer Engineering, **University of Houston**, TX, May. 06, 2022
19. Probing a ferro-rotational order by optical second harmonic generation
Department of Physics and Astronomy, **Mississippi State University**, MS, Feb. 05, 2021
18. Probing a ferro-rotational order by optical second harmonic generation
Department of Physics, **Nanjing University**, Nanjing, China, Jun. 12, 2020
17. Shedding light on ferroic materials: novel phases of matter unraveled by ultrafast lasers
School of Physics, **Zhengzhou University**, Zhengzhou, China, Jan. 16, 2020

16. Probing a ferro-rotational order by optical second harmonic generation
Department of Physics, **Renmin University of China**, Beijing, China, Jan. 8, 2020
15. Probing a ferro-rotational order by optical second harmonic generation
Institute of Physics, **University of Chinese Academy of Sciences**, Beijing, China, Jan. 7, 2020
14. Probing a ferro-rotational order by optical second harmonic generation
Department of Mechanical Engineering, **Beijing Institute of Technology**, Beijing, China, Jan. 6, 2020
13. Shedding light on ferroic materials: novel phases of matter unraveled by ultrafast lasers
School of Chemical and Material Engineering, **Jiangnan University**, Wuxi, China, Jan. 3, 2020
12. Probing a ferro-rotational order by optical second harmonic generation
Department of Physics, **Southern University of Science and Technology**, Shenzhen, China, Dec. 26, 2019
11. Shedding light on ferroic materials: novel phases of matter unraveled by ultrafast lasers
Department of Physics, **Georgia Southern University**, GA, Nov. 4, 2019
10. Probing a ferro-rotational order by optical second harmonic generation
Center for Functional Nanomaterials, **Brookhaven National Laboratory**, NY, Oct. 10, 2019
9. Probing a ferro-rotational order by optical second harmonic generation
Department of Electrical & Computer Engineering, **University of Nebraska-Lincoln**, NE, Feb. 25, 2019
8. Probing a ferro-rotational order by optical second harmonic generation
Department of Physics, **Auburn University**, AL, Feb. 7, 2019
7. Shedding Light on Quantum Materials: Spectroscopic and Symmetry Insights of Novel Phases of Matter
National High Magnetic Field Laboratory, FL, Feb. 5, 2019
6. Probing a ferro-rotational order by optical second harmonic generation
Department of Physics, **Florida State University**, FL, Feb. 4, 2019
5. Raman Spectroscopy Studies of Charge Order in Metallic La-doped $Sr_3Ir_2O_7$
Department of Physics, **University of Michigan**, MI, Oct. 31, 2017
4. Electronic Structure and Surface Physics of Two-dimensional Materials
Department of Physics, **University of New Hampshire**, NH, Dec. 7, 2016
3. Electronic Structure and Surface Physics of Transition Metal Dichalcogenides
Department of Physics, **University of Michigan**, MI, Dec. 2, 2016
2. Applications of LEEM/PEEM in Electronic Structure and Surface Physics of Atomically Thin Materials
Center for Functional Nanomaterials, **Brookhaven National Laboratory**, NY, Nov. 17, 2016
1. Electronic- and Surface Structure of Transition Metal Dichalcogenides and van der Waals Interfaces
Center for Nanophase Materials Sciences, **Oak Ridge National Laboratory**, TN, Jun. 13, 2016

Contributed talks

48. Understanding origin of unexpected nonlinear optical response in $TaTe_2$
APS Global Physics Summit, Denver, CO; March 15-20, 2026
47. Optical second harmonic generation fingerprint of order-disorder transition in electron-doped $SrTiO_3$
APS Global Physics Summit, Denver, CO; March 15-20, 2026
46. Tunable magnon-phonon cavity via structural phase transition
APS Global Physics Summit, Denver, CO; March 15-20, 2026
45. Dilute magnetic impurity-induced effective phonon magnetic moment in Fe-doped monolayer MoS_2
APS Global Physics Summit, Denver, CO; March 15-20, 2026
44. Origin of large effective phonon magnetic moments in monolayer MoS_2
APS Global Physics Summit, Anaheim, CA; March 16-21, 2025

43. Exciton-activated giant phonon magnetic moment in monolayer MoS_2
Joint MMM-Intermag Conference, New Orleans, LA; January 13-17, 2025
42. Hybrid magnon-phonon cavity realized in a magnetoelastic heterostructure
Joint MMM-Intermag Conference, New Orleans, LA; January 13-17, 2025
41. Exciton-activated phonon magnetic moment in monolayer MoS_2
MRS Fall Meeting & Exhibit, Boston, MA; December 1-6, 2024
40. Spin dynamics in van der Waals magnetic systems
APS March Meeting, Minneapolis, MN; March 4-8, 2024
39. Machine learning-based prediction of optical activity in chiral materials
APS March Meeting, Minneapolis, MN; March 4-8, 2024
38. Magneto-Raman signature of chiral phonon in monolayer MoS_2
APS March Meeting, Minneapolis, MN; March 4-8, 2024
37. Magneto-Raman studies of chiral phonon in Fe-doped MoS_2
APS March Meeting, Minneapolis, MN; March 4-8, 2024
36. Magneto-Raman signature of exciton-activated chiral phonon in MoS_2
APS March Meeting, Minneapolis, MN; March 4-8, 2024
35. Developing an open-source data analysis package for optical second harmonic generation
APS March Meeting, Las Vegas, NV; March 5-10, 2023
34. Ferromagnetic resonance study of spin-phonon coupling in $La_{0.7}Sr_{0.3}MnO_3/La_{0.7}Sr_{0.3}FeO_3$ superlattices
APS March Meeting, Las Vegas, NV; March 5-10, 2023
33. $SrHfO_3$ films and heterostructures grown by hybrid molecular beam epitaxy
APS March Meeting, Las Vegas, NV; March 5-10, 2023
32. Engineering metal oxidation towards epitaxial growth of complex iridates
APS March Meeting, Las Vegas, NV; March 5-10, 2023
31. Structural monoclinicity and its coupling to layered magnetism in few-layer CrI_3
APS March Meeting, Chicago, IL; March 14-18, 2022
30. Growth and characterization of stoichiometry-varied $Mn_xCo_{3-x}O_4$ manganese-cobalt spinel thin films
APS March Meeting, Chicago, IL; March 14-18, 2022
29. Polaronic character of excitons in a two-dimensional ferromagnet CrI_3
APS March Meeting, Virtual; March 15-19, 2021
28. Low-energy electron diffraction and microscopy studies of Fe_5GeTe_2
APS March Meeting, Virtual; March 15-19, 2021
27. Magnetization dynamics of room temperature vdWs magnet Fe_5GeTe_2
APS March Meeting, Virtual; March 15-19, 2021
26. Optical and structural properties of type-II multiferroic candidates $RbFe(AO_4)_2$ (A = Mo, Se, S)
APS March Meeting, Virtual; March 15-19, 2021
25. Raman spectroscopy studies of spin-lattice coupling in bilayer CrI_3
APS March Meeting, Denver, CO; March 2-6, 2020
24. Evidence of the polaronic character of excitons in a two-dimensional ferromagnet
APS March Meeting, Denver, CO; March 2-6, 2020
23. Ultrafast nonlinear optical spectroscopy of the charge density wave in 1T-TaS_2
APS March Meeting, Denver, CO; March 2-6, 2020
22. Magnetism-induced Raman modes in two-dimensional CrI_3 atomic layers
APS March Meeting, Denver, CO; March 2-6, 2020
21. Raman scattering from magnetic excitations in CrI_3 atomic layers
APS March Meeting, Boston, MA; March 3-8, 2019

20. Raman signature of layer number and crystal quality of chromium triiodide
APS March Meeting, Boston, MA; March 3-8, 2019
19. Raman phonon spectra from CrI_3 atomic layers
APS March Meeting, Boston, MA; March 3-8, 2019
18. Symmetry-based analysis on Raman spectroscopy of two-magnon excitations in a spin-orbit coupled bilayer magnet $Sr_3Ir_2O_7$
APS March Meeting, Boston, MA; March 3-8, 2019
17. Raman spectroscopy studies of spin waves in two-dimensional CrI_3
APS March Meeting, Boston, MA; March 3-8, 2019
16. An analysis of the symmetry evolution and domain structure in $RbFe(MoO_4)_2$ near its ferroaxial phase transition
APS March Meeting, Los Angeles, CA; March 5-9, 2018
15. Raman Spectroscopy Study of Magnetic Excitation across Insulator Metal Transition in $(Sr_{1-x}La_x)_3Ir_2O_7$
APS March Meeting, Los Angeles, CA; March 5-9, 2018
14. Low-lying Unoccupied Electronic States in Graphene on Ir (111) and Intercalated Interfaces by Time- and Angle-Resolved Two-Photon-Photoemission
APS March Meeting, Los Angeles, CA; March 5-9, 2018
13. Raman Spectroscopy Study of Charge Order Excitations in Metallic $(Sr_{1-x}La_x)_3Ir_2O_7$
APS March Meeting, Los Angeles, CA; March 5-9, 2018
12. Surface atomic structure characterization of SnSe and black phosphorus using selected area LEED-IV via LEEM
APS March Meeting, New Orleans, LA; March 13-17, 2017
11. Ultrafast time-resolved photoemission of a metallic tip/substrate junction
APS March Meeting, New Orleans, LA; March 13-17, 2017
10. Observation of Oscillatory Relaxation in the Sn-terminated Surface of Epitaxial Rock-salt SnSe $\{111\}$ Topological Crystalline Insulator
APS March Meeting, New Orleans, LA; March 13-17, 2017
9. SPELEEM Studies on the Surface and Electronic Structure of Halide Perovskites
AVS 62nd International Symposium & Exhibition, San Jose, CA; October 18-23, 2015.
8. Direct Measurements of the Electronic Structure of Twisted Graphene/MoS_2 van der Waals Heterostructures
International Conference on Electron Spectroscopy and Structure, Stony Brook, NY; September 28 - October 2, 2015.
7. SPE-LEEM Studies on the Electronic Structure of MoS_2/Graphene Heterostructure
APS March Meeting, San Antonio, TX; March 2-6, 2015.
6. ARPES and Low-energy electron microscopy study on supported, suspended, and bilayer twisted MoS_2
APS March Meeting, San Antonio, TX; March 2-6, 2015.
5. SPE-LEEM Studies on the Surface and Electronic Structure of 2D Transition Metal Dichalcogenides (Part II)
APS March Meeting, Denver, CO; March 3-7, 2014.
4. SPE-LEEM Studies on the Surface and Electronic Structure of 2D Transition Metal Dichalcogenides
APS March Meeting, Denver, CO; March 3-7, 2014.
3. Direct Measurement of the Thickness-Dependent Electronic Band Structure of MoS_2 using Angle-Resolved Photoemission Spectroscopy
Young Researcher Symposium, Brookhaven National Laboratory, NY; November 15, 2013.
2. Role of disorder in atomic scale onset of charge density waves
APS March Meeting, Baltimore, MD; March 18-22, 2013.

1. Electronic structure of suspended bilayer graphene
   APS March Meeting, Boston, MA; February 27 - March 2, 2012.

Honors & Awards

- IOP Publishing Top Cited Paper Award North America in the Nanosciences category 2024
- Graduate student professional development scholarship, Columbia University 2015
- Outstanding Undergraduate Thesis, Renmin University of China 2011

Synergistic Activities

- Referee of peer-reviewed journals *PNAS, Nature, Nature Nanotechnology, Nature Physics, Nature Communications, Science Advances, Physical Review Letters, Physical Review X, Physical Review Materials, Physical Review Research, Physical Review B, Nano Letters, Advanced Functional Materials, APL Materials, npj Quantum Materials, ACS Omega, Chemistry of Materials, Progress in Quantum Electronics*, and *National Science Review*
- Focus Topic Organizer, Correlated states: Superconductivity, Density Waves, and Ferroelectricity (DMP), APS March Meeting, 2026
- Panel Reviewer of DoD National Defense Science and Engineering Graduate (NDSEG) Fellowship, 2025
- Panel Reviewer of NSF Graduate Research Fellowship Program (GRFP), 2024 and 2025
- Proposal Reviewer of the Gordon and Betty Moore Foundation Experimental Physics Investigator (EPI) Program, 2024
- Proposal Reviewer of NSF, Division of Materials Research, Condensed Matter Physics, 2026
- Proposal Reviewer of AFOSR, Condensed Matter Physics, 2025
- Proposal Reviewer of DOE Basic Energy Sciences, Division of Materials Sciences and Engineering, 2024
- Subcommittee Chair of CLEO FS4: Optical Excitations and Ultrafast Phenomena in Condensed Matter, 2023 and 2024
- Center for Functional Nanomaterials (CFN) User Proposal Reviewer, 2022 - Present
- Focus Topic Chair, Correlated States II, APS March Meeting 2022
- Focus Topic Chair, Organic Conductors and CDW Materials, APS March Meeting 2021
- Panel Reviewer of NSF CMP Nanomaterials 2020
- Focus Topic Chair, Electronic and Optical Properties of 2D Materials III, APS March Meeting 2019

Outreach Activities

- Physics of Novel Phases of Matter, **Summer Science Institute**, College of Sciences and Mathematics, Auburn University, 2023 and 2024
- Crystal Structure in Virtual Reality, **Destination STEM**, Alabama 2024
- Crystal Structure in Virtual Reality, **Physics Tailgate on the Game Day**, Alabama 2024
- Laser Harp, **Destination STEM**, Alabama 2022 and 2023
- Laser Harp, **Physics Tailgate on the Game Day**, Alabama 2023
- Event organizer of Optics, **Alabama Science Olympiad**, 2024 and 2025
- Event organizer of Detector Building, **Alabama Science Olympiad**, 2022 and 2023
- Event organizer, **Girls Science Day**, Columbia University, 2016

- Organizer of OSA/SPIE Columbia Student Chapter, **Maker Faire at New York Hall of Science**, 2016

Teaching Experience

- PHYS 1610 - Engineering Physics II: Electromagnetism — Spring 2026
- PHYS 5500/6500 - Quantum Computing and Quantum Materials — Fall 2025
- PHYS 5610/6610 - Introduction to Solid State Physics — Spring 2024
- PHYS 1600 - Engineering Physics I: Classical Mechanics — Fall 2023
- PHYS 1600 - Engineering Physics I: Classical Mechanics — Spring 2023
- PHYS 8970 - Quantum Computing and Quantum Materials — Fall 2022
- PHYS 1600 - Engineering Physics I: Classical Mechanics — Spring 2022
- PHYS 1600 - Engineering Physics I: Classical Mechanics — Fall 2021
- PHYS 1600 - Engineering Physics I: Classical Mechanics — Spring 2020
- PHYS 8930 - Spectroscopy Studies of Low-dimensional Quantum Materials — Fall 2020
- PHYS 1610 - Engineering Physics II: Electromagnetism — Fall 2019

Mentoring

- **Auburn Graduate Students**: Spencer Johnson (Graduated), Wil Armstrong (Graduated), ChunliTang△ (Graduated), Hussam Mustafa, Mohamed Kandil, Harry Goyal, Pradip Karki
- **Auburn Undergraduate Students**: Mason Mathias, Matt Galinger, Dylan Thomas, Jack Batson, Jacob Duffy
- **Mentor of Society of Women in Physics (SWiP)**: Charlotte Brown
- **REU Students**: Niya Antoine (Summer 2022), Miguel Robledo (Summer 2023), Skai White (Summer 2024)
- **Graduate Student Thesis Committee Member**: Bhargav Yelamanchilli (Auburn ECE), Suresh Thapa (Auburn Physics), Dakotah Kirk (Auburn Physics), Noah Bessard (Auburn Physics), Mengqi Fang (Stevens Institute of Technology), Dimuthu Obeysekera (New Jersey Institute of Technology)
- **High School Students**: Naeim Mahjouri (Auburn High School), Wenjiang Wang (Manhasset Secondary School), Julang Wang (Friends Academy), Jingyu Jia (Great Neck South High School)

△ *Probing novel ferroic orders in oxide thin films using nonlinear optics and electrical transport*, **Alabama EPSCoR Graduate Research Scholars Program Award**, 08/15/2022–08/14/2023, **Awardee: Chunli Tang, Supervisor: Wencan Jin**