

Jun Xiao, Ph.D.

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Education

University of California at Berkeley

Ph. D., Applied Science & Technology, advised by Prof. Xiang Zhang 2018

Nanjing University

B.S., Physics, emphasis on Condensed Matter Physics and Optoelectronics 2012

Appointments

University of Wisconsin-Madison 2021.08 - present

Assistant Professor, Materials Science & Engineering

Stanford University & SLAC National Accelerator Laboratory 2018.07- 2021.06

Postdoctoral Scholar, Materials Science & Engineering, Photon Science, with Prof. Aaron Lindenberg

Applied Physics, co-advised by Prof. Tony Heinz from 09/2020

Awards & Honors

FECS 2022 Physical Electronics Conference Mini-Grant 2022

Madison Teaching and Learning Excellence Fellow 2022

AVS NSTD Early Career Award (finalists) 2021

AVS EMPD Postdoctoral Travel Award 2021

Award for Outstanding Self-Financed Students Abroad 2018

Samsung Enterprise Scholarship 2011

Excellent Student Award, Nanjing University 2010

National Scholarship for undergraduates, Department of Education 2009

Invited Talks & Conference Presentations

- *Dynamic control of structural phase transitions in layered materials for information application.* PEC 2022
- *THz dynamics of emerging low-dimensional antiferromagnets* MRS Fall 2021
- *Terahertz optoelectronic property of correlated quasiparticles in atomically-thin superlattices* AVS 2021
- *Berry curvature memory through stacking transitions in topological semimetals* AVS 2021
- *Novel orderings and quantum properties in layered materials and devices*
invited virtual seminar Zhejiang University 10. 2021
- *Berry curvature memory enabled by 2D ferroelectric semimetals* EMC 2021

- *Manipulation of the quantum geometrical property in ferroelectric semimetals* Ferro 2021
- *Optical probing emergent orderings and their quantum properties in layered materials*
University of California, Los Angeles, MSE seminar 01/2021
- *2D Materials For Next-Generation Information Technology: From Functional Material Miniaturization To Energy-Efficient Phase Engineering*
Northeastern University, ECE seminar 01/2021
- *Optical probing emergent orderings and their quantum properties in layered materials*
University of Wisconsin-Madison, MSE seminar 01/2021
- *Manipulation of topological properties in Weyl semimetal* MRS Fall 2019
- *2D polar crystals, invited seminar* USTC 2018
- *Exploration of 2D layered polar materials, invited colloquium* Nanjing University 2018
- *Dipole locking in 2D ferroelectric In₂Se₃ crystal* MRS Spring 2018
- *Ferroelectricity and dipole locking in 2D In₂Se₃ crystal* APS March 2018
- *Exploration of vertical dipole in 2D layered polar crystal* APS March 2017
- *Generation and Control of Valley Polarization in 2D Materials, invited talk* MRS Spring 2017
- *Valley-Exciton Locked Optical Selection Rule in Monolayer WS₂* APS March 2015

Teaching

Instructor, MS&E 803: Quantum Materials and Devices (UW-Madison) 2021 Fall

Service to the UW-Madison

- Graduate Affairs Committee, MSE Department 2021-present
- Graduate Admission Committee, MSE Department 2021-present
- Undergraduate Faculty Academic Advisor, MSE Department 2021-present
- Ph.D. qualifying examiner, MSE Department 2021-present

Service to the Community

Co-organizer, Session “2D Materials: Devices and Functionalities”, APS March meeting, 2023

Session Chair, Session M72 “Mn-Te Magnetic Topology III”, APS March meeting, 2022

Co-host, People Program, UW-Madison, 07/2022

Faculty advisor, WiscProf: Future Faculty in Engineering Workshop, UW-Madison, 05/2022

Member, APS, MRS, AVS, Optica, SPIE

Reviewer of Research Journals: *Nature*, *Physical Review Letters*, *2D Materials*, *Laser & Photonics Review*, *ACS Applied Materials & Interface*, *Optics Communications*, *Optical Materials Express*, *Advanced Optical Materials*.

Student Representative: NSF EFRI Two-dimensional Atomic-layer Research and Engineering (2016-2018)

Co-organizer, Stanford MSE Department weekly colloquium (2020-2021)

Member, Diversity, Equity, and Inclusion (DEI) Task Force in Stanford MSE Department (2020-2021)

Panelist, SLAC Public Lecture: Leaving Transistors in the Dust: Visualizing the Next Computing Revolution

Patent

- Nanometer scale nonvolatile memory device and method for storing binary and quantum memory states, U.S. Patent 11,355,697B2 (2022)
Jun Xiao, Aaron Lindenberg

Full Publications [*equal contribution]

[h-index: 19, i10-index: 21, total citations > 4500. [Google Scholar](#)]

23. X. Andrade, C.D. Pemmaraju, A. Kartsev, **Jun Xiao**, A. Lindenberg, S. Rajpurohit, L. Tan, T. Ogitsu, A. Correa, "INQ, a modern GPU-accelerated computational framework for (time-dependent) density functional theory", *Journal of Chemical Theory and Computation* 17, 7747 (2021).
22. Y. Wang, **Jun Xiao**, T. Chung, Z. Nie, S. Yang, X. Zhang, "Direct electrical modulation of second-order optical susceptibility with record-high strength", *Nature Electronics* 4, 725 (2021)
21. D. Luo, J. Tang, X. Shen, F. Ji, J. Yang, S. Weathersby, M. Kozina, Z. Chen, **J. Xiao**, Y. Ye, T. Cao, G. Zhang, X. Wang, A. M. Lindenberg, "Twist-Angle-Dependent Ultrafast Charge Transfer in MoS₂-Graphene van der Waals Heterostructures", *Nano Letters* 21, 8051 (2021)
20. **Jun Xiao**, Y. Wang, H. Wang, C.D. Pemmaraju, S. Wang, P. Muscher, E.J. Sie, C. Nyby, T.P. Devereaux, X. Qian, X. Zhang & A. M. Lindenberg, "Berry curvature memory through electrically driven stacking transitions", *Nature Physics*, 16, 1028 (2020). News: [Stanford News](#), [Phys.org](#)
19. Xu, J. Huang, E. Barnard, S.S. Hong, P. Singh, E. Wong, T. Jansen, V. Harbola, **Jun Xiao**, B.Y. Wang, S. Crossley, D. Lu, S. Liu, H. Hwang, "Strain-Induced Room-Temperature Ferroelectricity in SrTiO₃ Membranes", *Nature Communications* 11, 3141(2020).
18. S. Cheema, D. Kwon, N. Shanker, R. Reis, S. Hsu, **Jun Xiao**, H. Zhang, R. Wagner, A. Datar, M. R. McCarter, C. R. Serrao, A. K. Yadav, G. Karbasian, C. Hsu, A. J. Tan, L. Wang, V. Thakare, X. Zhang, A. Mehta, E. Karapetrova, R. Chopdekar, P. Shafer, E. Arenholz, C. Hu, R. Proksch, R. Ramesh, J. Ciston, S. Salahuddin, "Enhanced ferroelectricity in ultrathin films grown directly on silicon", *Nature* 580, 478 (2020).
17. Zhao, Y. Zhao, Y. Song, M. Zhou, W. Lv, L. Tao, Y. Feng, B. Song, Y. Ma, J. Zhang, **Jun Xiao**, Y. Wang, D. Lien, M. Amani, H. Kim, X. Chen, Z. Wu, Z. Ni, P. Wang, Y. Shi, Ha. Ma, X. Zhang, J. Xu, A. Troisi, A. Javey, X. Wang, "Strong optical response and light emission from a monolayer molecular crystal", *Nature Communications*, 10, 5589 (2019).
16. H. Lee, J. H. Lee, **Jun Xiao**, M. S. Desai, X. Zhang, S.W. Lee, "Vertical self-assembly of polarized phage nanostructure for energy harvesting", *Nano Letters*, 19, 2661 (2019).
15. Y. Wang, **Jun Xiao**, S. Yang, Yu. Wang, X. Zhang, "Second-harmonic generation spectroscopy on two-dimensional materials", *Optical Materials Express*, 9, 1136 (2019).

14. **Jun Xiao**, H. Zhu, Y. Wang, W. Feng, Y. Hu, A. Dasgupta, Y. Han, Yu. Wang, D.A. Muller, L. W. Martin, P. Hu & X. Zhang, “Intrinsic two-dimensional ferroelectricity with dipole locking”, *Physical Review Letters*, 120, 227601 (2018).

Editor's Suggestion; News & Views by *Nature*, [“Stable and switchable electric polarization in two dimensions”](#)

13. H. Zhu, J. Yi, M. Li, **Jun Xiao**, L. Zhang, C. Yang, Y. Wang, R. Kaindl, L. Li & X. Zhang, “Observation of chiral phonon”, *Science*, 359, 579 (2018).

12. S. Eggleston, S.B. Desai, K. Messer, S.A. Fortuna, S. Madhupathy, **Jun Xiao**, X. Zhang, E. Yablonovitch, A. Javey & M. Wu, “Ultrafast spontaneous emission from a slot-antenna coupled WSe₂ monolayer”, *ACS Photonics*, 5, 2701 (2018).

11. Y. Wan, **Jun Xiao**, J. Li, X. Fang, K. Zhang, L. Fu, P. Li, Z. Song, H. Zhang, Yu. Wang, M. Zhao, J. Lu, N. Tang, G. Ran, X. Zhang, Y. Ye & L. Dai, “Epitaxial single-layer MoS₂ on GaN with enhanced valley helicity”, *Advanced Materials*, 30, 1703888 (2018).

10. Q. Hu, D. Jin, **Jun Xiao**, S. H. Nam, X. Liu, Y. Liu, X. Zhang & N. X. Fang, “Ultrafast fluorescent decay induced by metal-mediated dipole-dipole interaction in two-dimensional molecular aggregates”, *PNAS*, 114, 10017 (2017).

9. Y. Wang*, **Jun Xiao***, H. Zhu, Y. Li, Y. Alsaied, K. Y. Fong, Y. Zhou, S. Wang, W. Shi, Yu. Wang, A. Zettl, E. J. Reed & X. Zhang, “Structural phase transition in monolayer MoTe₂ driven by electrostatic doping”, *Nature*, 550, 487 (2017). *News: DOE, NSF*

8. Y. Lu*, H. Zhu*, **Jun Xiao***, C.-P. Chuu, Y. Han, M.-H. Chiu, C.-C. Cheng, C.-W. Yang, K.-H. Wei, Y. Yang, Yu. Wang, D. Sokaras, D. Nordlund, P. Yang, D. A. Muller, M.-Y. Chou, X. Zhang & L.-J. Li, “Janus monolayers of transition metal dichalcogenides”, *Nature Nanotechnology*, 12, 744 (2017).

7. **Jun Xiao**, M. Zhao, Yu. Wang & X. Zhang, “Excitons in atomically thin 2D semiconductors and their applications”, *Nanophotonics*, 6, 1309 (2017).

6. M. Zhao, Z. Ye, R. Suzuki, Y. Ye, H. Zhu, **Jun Xiao**, Yu. Wang, Y. Iwasa & X. Zhang, “Atomically Phase-Matched Second-Harmonic Generation in a 2D Crystal”, *Light: Science & Applications*, 5, e16131 (2016).

5. Y. Ye, **Jun Xiao**, H. Wang, Z. Ye, H. Zhu, M. Zhao, Yu. Wang, J. Zhao, X. Yin & X. Zhang, “Electrical generation and control of the valley carriers in a monolayer transition metal dichalcogenide”, *Nature Nanotechnology*, 11, 598–602 (2016).

4. **Jun Xiao**, Z. Ye, Y. Wang, H. Zhu, Yu. Wang & X. Zhang, “Nonlinear optical selection rule based on valley-exciton locking in monolayer WS₂”, *Light: Science & Applications* 4, e366 (2015).

3. M. Amani*, D. Lien*, D. Kiriya*, **Jun Xiao**, A. Azcatl, J. Noh, S. R. Madhupathy, R. Addou, S. KC, M. Dubey, K. Cho, R. M. Wallace, S.-C. Lee, J.-H. He, J. W. Ager, X. Zhang, E. Yablonovitch & A. Javey, “Near-unity photoluminescence quantum yield in MoS₂.” *Science*, 350, 1065 (2015).

2. H. Zhu*, Yu. Wang*, **Jun Xiao**, M. Liu, S. Xiong, Z. Wong, Z. Ye, Y. Ye, X. Yin & X. Zhang, “Observation of piezoelectricity in free-standing monolayer MoS₂”, *Nature Nanotechnology*, 10, 151-155 (2015).

1. **Jun Xiao**, Y. Wang, Z. Hua, X. Wang, C. Zhang & M. Xiao, “Carrier multiplication in semiconductor nanocrystals detected by energy transfer to organic dye molecules”, *Nature Communications*, 3, 1170 (2012)