CURRICULUM VITAE

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EDUCATION:

2011: Tolman Fellow, California Institute of Technology, advisor: James P. Eisenstein

2008: Ph.D. Physics, Stanford University, advisor: Aharon Kapitulnik

2003: B.S. Physics, Special Class for the Gifted Young, University of Science and Technology of China

ACADEMIC HONORS:

2019: Elected Fellow of American Physical Society

2018: OCPA Macronix Prize 2017

2014: NSF CAREER award

2013: Sloan Fellowship

2011: Lee-Osheroff-Richardson Science Prize for low temperature physics, North America

2008: Tolman Fellow, California Institute of Technology

PROFESSIONAL POSITIONS:

07/2018 - present: Professor of Physics, University of California, Irvine

01/2018 - present: Editor-in-Chief, Materials Science and Engineering B

07/2015 - 06/2018: Associate Professor of Physics, University of California, Irvine

07/2011 - 06/2015: Assistant Professor of Physics, University of California, Irvine

08/2008 - 06/2011: Tolman Postdoc Fellow, California Institute of Technology

10/2003 - 08/2008: Research Assistant, GLAM, Stanford University

PROFESSIONAL SERVICE:

- Editor-in-Chief, Materials Science and Engineering B, 2018/1- present.
- External grant reviewer for NSF, DOE, ARMY, DARPA, ERC (EU), NRF (Singapore).
- Reviewer for journals including Nature, Science, Nature Journals, Science Journals, Physical Review Letters, Advanced Materials and Nano Letters.
- Faculty advisor for Society of Physics Students (SPS) and Sigma Pi Sigma, UCI division, 2012-2017.

RESARCH PROJECTS:

Our lab specializes in ultra-sensitive magneto-optical measurements using a unique instrument called loopless fiber-optical Sagnac interferometer, which the PI invented a decade ago (***Physics Today*** "Search & discovery: Superconductor forms domains that break time-reversal symmetry", 2006). We also specialize in sensitive electrical, thermal and mechanical measurements often at low temperature (mK) and high magnetic field (12 T). In general, our lab is interested in two major topics: (1) Fabrication and investigation of quantum materials for constructing quantum computers and other novel electronic devices. These materials include topological insulators, 2D van der Waals atomic layers, atomic-thin oxide heterostructures and unconventional superconductors. (2) Ultra-sensitive magnetic sensing using optical magnetic Sagnac magnetometer, which is on its way to achieving magnetic field sensitivity comparable to SQUID magnetometer. One of the major motivations is for room temperature functional brain imaging. In the past few years, our group has pioneered the study of topological Kondo insulator SmB_6 (***Nature*** "Hopes surface for exotic insulator", 2012), and we have made perhaps one of the first working electronics devices based on SmB_6: a micro RF oscillator device. We have for the first time realized magnetic order in van der Waals atomic layers (***Physics Today*** "Search and Discovery: Ferromagnetism found in two-dimensional materials", ***Nature*** "Magnetism in flatland", 2017) that would open the door for atomic-sized spintronic devices.

PUBLICATIONS:

1. Jing Xia, Peter T. Beyersdorf, Martin M. Fejer, and Aharon Kapitulnik, "Modified Sagnac interferometer for high-sensitivity magneto-optic measurements at cryogenic temperatures", *Appl. Phys. Lett.* 89, 062508 (2006).

2. Jing Xia, Maeno Yoshiteru, Peter T. Beyersdorf, M. M. Fejer, and Aharon Kapitulnik, "High Resolution Polar Kerr Effect Measurements of Sr_2RuO_4: Evidence for Broken Time Reversal Symmetry in the Superconducting State", *Phys. Rev. Lett.* 97, 167002 (2006).

   See also: Physics Today "Search & discovery: Superconductor forms domains that break time-reversal symmetry".

3. David Weld, Jing Xia, B. Cabrera, Aharon Kapitulnik, "A New Apparatus for Detecting Micron-Scale Deviations from Newtonian Gravity", *Phys. Rev. D* 77, 062006 (2008).

4. Aharon Kapitulnik, Jing Xia, and Elizabeth Schemm, "Search for time-reversal symmetry breaking in unconventional superconductors", *Physica B*: Condensed Matter, doi:10.1016/j.physb.2008.11.058 (2008).

5. Jing Xia, E. Schemm, G. Deutscher, S.A. Kivelson, D. A. Bonn, W. N. Hardy, R. Liang, G. Koster, M. M. Fejer, and A. Kapitulnik, "Polar Kerr Effect Measurements of $YBa_2Cu_3O_{6+x}$: Evidence for Broken Symmetry Near the Pseudogap Temperature", *Phys. Rev. Lett.* 100, 127002 (2008).

6. Jing Xia, W. Siemons, G. Koster, M. R. Beasley, and A. Kapitulnik, "Critical thickness for itinerant ferromagnetism in ultrathin films of $SrRuO_3$", *Phys. Rev. B* 79, 140407 (2009).

7. Aharon Kapitulnik, Jing Xia, Elizabeth Schemm, Alexander Palevski, "Polar Kerr E*ff*ect as Probe for Time-Reversal Symmetry Breaking in Unconventional Superconductors", *New J. Phys.* 11 No 5, 055060 (2009).

8. Jing Xia, V. Shelukhin, M. Karpovski, A. Kapitulnik, A. Palevski, "Inverse proximity effect in superconductor-ferromagnet bilayer structures", *Phys. Rev. Lett.* 102, 087004 (2009).

9. Jing Xia, Vaclav Cvicek, J.P. Eisenstein, L.N. Pfeiffer, K.W. West, "Tilt-Induced Anisotropic to Isotropic Phase Transition at ν= 5/2", *Phys. Rev. Lett.* 105, 176807 (2010).

10. Jing Xia, J.P. Eisenstein, L.N. Pfeiffer, K.W. West, "Experimental Evidence for a Fractionally Quantized Hall State with Anisotropic Longitudinal Transport", *Nature Physics*, 7(11), 845-848, (2011).

    See also: *Nature Physics* "Fractional quantum hall effect: Full tilt".

11. Hovnatan Karapetyan, M. Hucker, G. D. Gu, J. M. Tranquada, M. M. Fejer, Jing Xia, A. Kapitulnik, "Magneto-Optical Measurements of a Cascade of Transitions in Superconducting $La_{1.875}Ba_{0.125}CuO_4$ Single Crystals", *Phys. Rev. Lett.* 109, 147001 (2012).

12. D.J. Kim, S. Thomas, T. Grant, J. Botimer, Z. Fisk, Jing Xia, "Surface Hall Effect and Nonlocal Transport in SmB6: Evidence for surface conduction", *Scientific Reports* 3, 3150, (2013).

    See also: Nature "Hopes surface for exotic insulator".

13. Hovnatan Karapetyan, Jing Xia, M. Hucker, G. D. Gu, J. M. Tranquada, M.M. Fejer, and A. Kapitulnik, "Evidence of chiral order in the charge-ordered phase of La1.875Ba0.125CuO4", *Phys. Rev. Lett.* 112, 047003 (2014).

14. Maarten Nijland, Antony George, Sean Thomas, Evert P. Houwman, Jing Xia, Dave H. A. Blank, Guus Rijnders, Gertjan Koster, Johan E. ten Elshof, "Patterning of Epitaxial Perovskites from Micro and Nano Molded Stencil Masks", *Advanced Functional Materials*, 24, 43, 6853 (2014).

15. D.J. Kim, J Xia, Z. Fisk, "Topological surface state in the Kondo Insulator Samarium Hexaboride", *Nature Materials*, 13, 446-470, (2014).

16. Maarten Nijland, Sean Thomas, Mark A. Smithers, Nirupam Banerjee, Dave H. A. Blank, Guus Rijnders, Jing Xia, Gertjan Koster, and Johan E. ten Elshof, "Epitaxy on Demand", *Advanced Functional Materials*, 25, 32, 5140 (2015).

17. S. M. Thomas, P. F. S. Rosa, S. B. Lee, S.A. Parameswaran, Z. Fisk, and J. Xia, "Low Temperature metamagnetism and Hall effect anomaly in Kondo compound CeAgBi2", *Phys. Rev. B.* 93, 075149 (2016).

18. Maxim Dzero, Jing Xia, Victor Galitski, Piers Coleman, "Topological Kondo Insulators", *Annual Review of Condensed Matter Physics*, 7, 249 (2016).

19. Thomas, S., Kim, D. J., Chung, S. B., Grant, T., Fisk, Z., and Xia, J. "Weak Antilocalization and Linear Magnetoresistance in the Surface State of SmB_6", *Phys. Rev. B.* 94, 205114 (2016).

20. A. Stern^, D.K. Efimkin^, V. Galitski, Z. Fisk and J. Xia, "Radio Frequency Tunable Oscillator Device Based on SmB_6 Micro-crystal", *Phys. Rev. Lett.* 116(16), 166603, (2016).

21. Zhaoliang Liao, Nicolas Gauquelin, Robert J. Green, Sebastian Macke, Julie Gonnissen, Sean Thomas, Zhicheng Zhong, Lin Li, Liang Si, Sandra Van Aert, Philipp Hansmann, Karsten Held, Jing Xia, Johan Verbeeck, Gustaaf Van Tendeloo, George A. Sawatzky, Gertjan Koster, Mark Huijben, Guus Rijnders, "Thickness dependent properties in oxide heterostructures driven by structurally induced metal-oxygen hybridization variations", *Advanced Functional Materials* 2017, 1606717, (2017).

22. Xinxin Gong, Mehdi Kargarian, Alex Stern, Di Yue, Hexin Zhou, Xiaofeng Jin, Victor M. Galitski, Victor M. Yakovenko and Jing Xia, "Time-Reversal-Symmetry-Breaking Superconductivity in Epitaxial Bismuth/Nickel Bilayers", *Science Advances* 3, 3, e1602579 (2017).

23. A. Stern, M. Dzero, V. M. Galitski, Z. Fisk, J. Xia, "Surface-dominated conduction up to 240 K in the Kondo insulator SmB6 under strain", *Nature Materials* 16, 708-711 (2017).

    See also: Nature Materials "Topological Kondo insulators: Negative pressure tuning"

24. Cheng Gong^, Lin Li^, Zhenglu Li^, Huiwen Ji, Alex Stern, Yang Xia, Ting Cao, Wei Bao, Chenzhe Wang, Yuan Wang, Z. Q. Qiu, R. J. Cava, Steven G. Louie*, Jing Xia*, Xiang Zhang*, "The Discovery of Intrinsic Ferromagnetism in Two-Dimensional van der Waals Crystals", *Nature*, 546, 265-269 (2017).

    See also: Physics Today "Search and Discovery: Ferromagnetism found in two-dimensional materials".

    See also: Nature "Magnetism in flatland".

25. S. Thomas, B. Kuiper, J. Hu, J. Smit, Z. Liao, Z. Zhong, G. Rijnders, A. Vailionis, R. Wu, G. Koster, J. Xia, "Localized Control of Curie Temperature in Perovskite Oxide Film by Capping-layer- induced Octahedral Distortion", *Phys. Rev. Lett.*, 119, 177203 (2017).

26. Brian Casas, Alex Stern, Dmitry K. Efimkin, Zachary Fisk, and Jing Xia, "Direct observation of surface-state thermal oscillations in SmB6 oscillators", *Phys. Rev. B* 97, 035121 (2018).

27. Yi Zhang, Lin Xie, Jeongwoo Kim, Alex Stern, Hui Wang, Kui Zhang, Xingxu Yan, Linze Li, Henry Liu, Gejian Zhao, Hang Chi, Chaitanya Gadre, Qiyin Lin, Yichun Zhou, Ctirad Uher, Tingyong Chen, Yinghao Chu, Jing Xia, Ruqian Wu, & Xiaoqing Pan, "Discovery of a Magnetic Conductive Interface in ferroelectric/insulator Heterostructures", *Nature Communication* 9, 658 (2018).

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29. Qing Lin He, Gen Yin, Luyan Yu, Alexander J. Grutter, Lei Pan, Chui-Zhen Chen, Xiaoyu Che, Guoqiang Yu, Bin Zhang, Qiming Shao, Alexander L. Stern, Brian Casas, Jing Xia, Xiaodong Han, Brian J. Kirby, Roger K. Lake, K. T. Law, and Kang L. Wang ,"Topological Transitions Induced by Antiferromagnetism in a Thin-Film Topological Insulator", *Phys. Rev. Lett.* , 121, 096802 (2018).

30. S. M. Thomas, Xiaxin Ding, F. Ronning, V. Zapf, J. D. Thompson, Z. Fisk, J. Xia, and P. F. S. Rosa ,"Quantum Oscillations in Flux-Grown SmB6 with Embedded Aluminum", *Phys. Rev. Lett.* , 122, 166401 (2019).

31. Wei Liu, Lei Zhao, Eva Zurek, Jing Xia, Yong-hao Zheng, Hai-qing Lin, Jing-yao Liu and Mao-sheng Miao, "Building egg-tray-shaped graphenes that have superior mechanical strength and band gap", NPJ Computational Materials, 5, 71 (2019).

32. P. Wittlich, H. Boschker, T. Asaba, L. Li, H. M. L. Noad, C. A. Watson, K. A. Moler, D. Daraselia, D. Japaridze, A. Shengelaya, J. Wang, J. Xia, and J. Mannhart, "Exploring possible ferromagnetism of the LaAl O 3 - SrTi O 3 interface", Phys. Rev. Materials, 3, 104418 (2019).

33. P. Chen, Y. Zhang, Q. Yao, F. Tian, L. Li, Z. Qi, X. Liu, L. Liao, C. Song, J. Wang, J. Xia, G. Li, D. M. Burn, G. van der Laan, T. Hesjedal, S. Zhang, X. Kou, Tailoring the Hybrid Anomalous Hall Response in Engineered Magnetic Topological Insulator Heterostructures. Nano Lett. 20, 1731–1737 (2020).

34. Zhangzhang Cui, Alexander J. Grutter, Hua Zhou, Hui Cao, Yongqi Dong, Dustin A. Gilbert, Jingyuan Wang, Yi-Sheng Liu, Jiaji Ma, Zhenpeng Hu, Jinghua Guo, Jing Xia, Brian J. Kirby, Padraic Shafer, Elke Arenholz, Hanghui Chen, Xiaofang Zhai, and Yalin Lu, "Correlation-driven eightfold magnetic anisotropy in a two-dimensional oxide monolayer", Science Advances, Vol. 6, no. 15, eaay0114 (2020).

35. Lei Pan, Xiaoyang Liu, Qing Lin He, Alexander Stern, Gen Yin, Xiaoyu Che, Qiming Shao, Peng Zhang, Peng Deng, Chao-Yao Yang, Brian Casas, Eun Sang Choi, *Jing Xia*, Xufeng Kou, Kang L. Wang, "Probing the low-temperature limit of the quantum anomalous Hall effect", Science Advances, Vol. 6, no. 25, eaaz3595 (2020).

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37. Jingyuan Wang, Camron Farhang, Di Yue, Xiaofeng Jin, Xiangde Zhu, and Jing Xia (2022). Absence of spontaneous time-reversal symmetry breaking and ferromagnetism in superconducting NiBi3 single crystal. Phys. Rev. B 107, 024415 (2022)

38. Camron Farhang, Nader Zaki, Jingyuan Wang1, Genda Gu, Peter D. Johnson and Jing Xia (2022). Revealing the Origin of Time-reversal Symmetry Breaking in Fe-chalcogenide Superconductor FeTe1-xSex. Phys. Rev. Lett. 130, 046702 (2023)

39. Chong SK, Zhang P, Li J, Zhou Y, Wang J, Zhang H, Davydov AV, Eckberg C, Deng P, Tai L, Xia J, Wu R, Wang KL (2023) Electrical Manipulation of Topological Phases in a Quantum Anomalous Hall Insulator. Advanced Materials, 35(11):2207622 (2023).

40. David R. Saykin*, Camron Farhang*, Erik D. Kountz, Dong Chen, Brenden R. Ortiz, Chandra Shekhar, Claudia Felser, Stephen D. Wilson, Ronny Thomale, Jing Xia, Aharon Kapitulnik (2022). High Resolution Polar Kerr Effect Studies onf CsV3Sb5: Tests for Time Reversal Symmetry Breaking Below the Charge Order Transition. (* equal contributions) Phys. Rev. Lett. 131, 016901 (2023)

41. Camron Farhang, Jingyuan Wang, Brenden R. Ortiz, Stephen D. Wilson and Jing Xia. Unconventional specular optical rotation in the charge ordered state of Kagome metal CsV3Sb5. Nature Communications 14, 5326 (2023).