

JING XIA

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(a) Professional Preparation

University of Science and Technology of China	Physics	B.S.	2003
Stanford University	Physics	Ph.D.	2008
California Institute of Technology	Tolman Postdoc Fellow in Physics		2008 – 2011

(b) Appointments

Time	Position	Institution
07/2018 - present	Professor	Department of Physics and Astronomy University of California, Irvine
01/2018 - present	Editor-in-Chief	Materials Science and Engineering B
07/2015 – 07/2018	Associate Professor	Department of Physics and Astronomy University of California, Irvine
07/2011 – 07/2015	Assistant Professor	Department of Physics and Astronomy University of California, Irvine
08/2008 – 07/2011	Tolman Prize Postdoc Fellow	Division of Physics, Mathematics & Astronomy California Institute of Technology
10/2003 – 08/2008	Research Assistant	Department of Physics Stanford University

(c) Academic Distinctions

2018 – 2017 OCPA Macronix Prize

(<http://ocpaweb.org/home/jingxiao-2017-oyra/>)

2014 – NSF CAREER award

(https://en.wikipedia.org/wiki/National_Science_Foundation_CAREER_Awards)

2013 – Sloan Fellowship

(https://en.wikipedia.org/wiki/Sloan_Fellowship)

2011 – Lee-Osheroff-Richardson Science Prize for North America

(<https://www.oxford-instruments.com/businesses/nanotechnology/nanoscience/north-american-science-prize>)

2008 - Tolman Postdoctoral Fellow, California Institute of Technology

(d) Research 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 motivation 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. Recently we have discovered the chiral edge state of Majorana fermions in a quantum anomalous Hall insulator-superconductor structure" (*Science* "[A twist on the Majorana fermion](#)", 2017) that could play an important role in making robust topologically protected quantum computers.

(e) Publications

1. 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).
2. Liu, W., Liu, J.-Y., **Xia, J.**, Lin, H.-Q., & Miao, M.-S., Bubble-wrap carbon: an integration of graphene and fullerenes", *Nanoscale*, **306**, 666 (2018).
3. 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).
4. Brian Casas, Alex Stern, Dmitry K. Efimkin, Zachary Fisk, and **Jing Xia**, "Direct observation of surface-state thermal oscillations in SmB_6 oscillators", *Phys. Rev. B* **97**, 035121 (2018).
5. 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).
6. Qing Lin He, Lei Pan, Alexander L. Stern, Edward Burks, Xiaoyu Che, Gen Yin, Jing Wang, Biao Lian, Quan Zhou, Eun Sang Choi, Koichi Murata, Xufeng Kou, Tianxiao Nie, Qiming Shao, Yabin Fan, Shou-Cheng Zhang, Kai Liu, **Jing Xia**, Kang L. Wang, "Chiral Majorana Fermion modes in a quantum anomalous Hall insulator-superconductor structure", *Science*, **357**(6348), 294–299 (2017).

See also: *Science* "[A twist on the Majorana fermion](#)".

7. 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](#)".

8. 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](#)"

9. 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).

10. 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).

11. A. Stern[^], D.K. Efimkin[^], V. Galitski, Z. Fisk and **J. Xia**, "Radio Frequency Tunable Oscillator Device Based on SmB₆ Micro-crystal", *Phys. Rev. Lett.* **116**(16), 166603, (2016).

12. 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 SmB₆", *Phys. Rev. B.* **94**, 205114 (2016).

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

14. 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).

15. 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).

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

17. 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).

18. 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 $\text{La}_{1.875}\text{Ba}_{0.125}\text{CuO}_4$ ", [*Phys. Rev. Lett.* **112**, 047003 \(2014\)](#).
19. D.J. Kim, S. Thomas, T. Grant, J. Botimer, Z. Fisk, **Jing Xia**, "Surface Hall Effect and Nonlocal Transport in SmB_6 : Evidence for surface conduction", [*Scientific Reports* **3**, 3150, \(2013\)](#).
See also: Nature "[*Hopes surface for exotic insulator*](#)".
20. 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 $\text{La}_{1.875}\text{Ba}_{0.125}\text{CuO}_4$ Single Crystals", [*Phys. Rev. Lett.* **109**, 147001 \(2012\)](#).
21. **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*](#)".
22. **Jing Xia**, Vaclav Cvicek, J.P. Eisenstein, L.N. Pfeiffer, K.W. West, "Tilt-Induced Anisotropic to Isotropic Phase Transition at $\nu = 5/2$ ", [*Phys. Rev. Lett.* **105**, 176807 \(2010\)](#).
23. **Jing Xia**, V. Shelukhin, M. Karpovski, A. Kapitulnik, A. Palevski, "Inverse proximity effect in superconductor-ferromagnet bilayer structures", [*Phys. Rev. Lett.* **102**, 087004 \(2009\)](#).
24. Aharon Kapitulnik, **Jing Xia**, Elizabeth Schemm, Alexander Palevski, "Polar Kerr Effect as Probe for Time-Reversal Symmetry Breaking in Unconventional Superconductors", [*New J. Phys.* **11** No 5, 055060 \(2009\)](#).
25. **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 \(2009\)](#).
26. **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 $\text{YBa}_2\text{Cu}_3\text{O}_{6+x}$: Evidence for Broken Symmetry Near the Pseudogap Temperature", [*Phys. Rev. Lett.* **100**, 127002 \(2008\)](#).
27. 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 \(2008\)](#).
28. David Weld, **Jing Xia**, B. Cabrera, Aharon Kapitulnik, "A New Apparatus for Detecting Micron-Scale Deviations from Newtonian Gravity", [*Phys. Rev. D* **77**, 062006 \(2008\)](#).
29. **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*](#)".

30. **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).

(f) Synergistic Activities

1. Editor-in-Chief, Materials Science and Engineering B (<https://www.journals.elsevier.com/materials-science-and-engineering-b>)
2. Faculty advisor for Society of Physics Students (SPS) and Sigma Pi Sigma, UCI division, 2012-2017.
3. Developed lab experience and science education activities in UC Irvine’s K-12 outreach program (LEAPS) in 2012 - 2017. Hosted 500 middle school students and 7 teachers.
4. Developed a new online class called “Dance and Physics”, which will be offered next year to help to bridge undergraduates majoring in art and science.
5. Served as a Grand Awards Judge at the Intel International Science and Engineering Fair (ISEF). Judged science projects of 32 high school finalists from around the world.
6. Served as a reviewer for journals including Nature, Science, Nature Journals, Science Journals, Physical Review Letters, Advanced Materials and Nano Letters.
7. Organized UC Irvine Condensed Matter Physics seminar series. Given 60 invited conference talks, seminar and colloquium talks in the last 5 years.