Yin, Gen

Assistant Professor
Department of Physics
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Research Interests

- Theory of charge and spin transport in solid-state materials and devices.
- Topological materials and systems.
- Machine learning in physics.

Education

University of California - Riverside, CA, USA *2016*
Electrical and Computer Engineering Ph.D.

Fudan University, Shanghai, China *2010*
Theoretical Physics Sc.M.

Fudan University, Shanghai, China *2007*
Physics Sc.B.

Employment

Georgetown University *8/2020-present*
Assistant Professor Washington, DC

University of California - Los Angeles *1/2019 - 8/2020*
Assistant Project Scientist Los Angeles, CA

University of California - Los Angeles *1/2016 - 1/2019*
Postdoctoral Researcher Los Angeles, CA

Professional Activity

- Over 50 peer-reviewed publications, 2292 citations, h-index 21 from Google Scholar. *7/2023*
- 1679 citations, h-index 19 from Web of Science. *7/2023*
- IEEE Magnetics Society Standards Committee. *2022-present*
- Editor of IEEE Transactions on Magnetics. *2022-present*

Awards and Honors

- Chancellor's award for postdoctoral research, UCLA. *2018*
- Dissertation Year Program Fellowship, UC Riverside. *2014-2015*
- NCN scholarship of summer program, Purdue Univ. *7/2011*
- Dean's Distinguished Fellowship, UC Riverside. *9/2010*

Invited Talks

- *"Electric and spin Hall transition in monolayer Fe3GeTe2"*, *23rd American Conference on Crystal Growth and Epitaxy (ACCGE-23) and the 21st US Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-21)*, Tucson, Arizona, August 13-19, (2023)
- *"Spin scattering and Hall effects in monolayer Fe3GeTe2"*, *The Chinese University of Hong Kong, Department of Physics* ,May, (2023)
- *"Discrete geometry and topology of Fermi surfaces"*, *King Abdullah University of Science and Technology* ,Feb, Saudi Arabia (2023)
- *"Large Exchange Splitting in Monolayer Graphene Magnetized by an Antiferromagnet"*, *Joint MMM-Intermag Conference*, Jan 10-14, New Orleans, LA, USA (2022)

- *"Discrete quantum geometry and intrinsic spin Hall effect"*, *Colloquium at Department of Physics, Georgetown University*, Feb, Washington DC, USA (2022)
- *"Discrete quantum geometry and intrinsic spin Hall effect"*, *APS Mid-Atlantic Section Meeting*, Dec 3-5, New Brunswick, NJ, USA (2021)
- *"Discrete quantum geometry and topology in solid-state materials"*, *QMC Condensed Matter Colloquium at U of Maryland*, Oct 28, College Park, MD, USA (2021)
- *"Controlling and sensing skyrmions"*, *Fall Meeting & Exhibit, Materials Research Society (MRS)*, Nov 27-Dec 2, Boston, Massachusetts, USA (2016)
- *"Coherent itinerant spin transport in a skyrmion spin texture"*, *Hefei mini-workshop on skyrmions*, May 18-19, Hefei, China (2015)

Publications

[1] W. B. Beeson, D. Bista, H. Zhang, S. Krylyuk, A. Davydov, G. Yin, and K. Liu, *Single-Phase $L1_0$-Ordered High Entropy Thin Films with High Magnetic Anisotropy* (2023), arXiv:2311.06618 [cond-mat].

[2] L. Yu, J.-X. Yu, J. Zang, R. K. Lake, H. Zhuang, and G. Yin, *Spin scattering and Hall effects in monolayer Fe_3GeTe_2*, Physical Review B **108**, 134425 (2023).

[3] B. J. Fugetta, Z. Chen, D. Bhattacharya, K. Yue, K. Liu, A. Y. Liu, and G. Yin, *Machine-learning recognition of Dzyaloshinskii-Moriya interaction from magnetometry*, Physical Review Research **5**, 043012 (2023).

[4] P. Deng, P. Zhang, C. Eckberg, S. K. Chong, G. Yin, E. Emmanouilidou, X. Che, N. Ni, and K. L. Wang, *Quantized resistance revealed at the criticality of the quantum anomalous Hall phase transitions*, Nature Communications **14**, 5558 (2023).

[5] H. Chi, Y. Ou, T. B. Eldred, W. Gao, S. Kwon, J. Murray, M. Dreyer, R. E. Butera, A. C. Foucher, H. Ambaye, J. Keum, A. T. Greenberg, Y. Liu, M. R. Neupane, G. J. de Coster, O. A. Vail, P. J. Taylor, P. A. Folkes, C. Rong, G. Yin, R. K. Lake, F. M. Ross, V. Lauter, D. Heiman, and J. S. Moodera, *Strain-tunable Berry curvature in quasi-two-dimensional chromium telluride*, Nature Communications **14**, 3222 (2023).

[6] L. Yu, J.-X. Yu, J. Zang, R. K. Lake, H. Zhuang, and G. Yin, *Spin scattering and Hall effects in monolayer Fe3GeTe2* (2023), arXiv:2305.09743 [cond-mat].

[7] C. Zhang, C. Liu, J. Zhang, Y. Yuan, Y. Wen, Y. Li, D. Zheng, Q. Zhang, Z. Hou, G. Yin, K. Liu, Y. Peng, and X.-X. Zhang, *Room-Temperature Magnetic Skyrmions and Large Topological Hall Effect in Chromium Telluride Engineered by Self-Intercalation*, Advanced Materials **35**, 2205967 (2023).

[8] D. Bhattacharya, Z. Chen, C. J. Jensen, C. Liu, E. C. Burks, D. A. Gilbert, X. Zhang, G. Yin, and K. Liu, *3D Interconnected Magnetic Nanowire Networks as Potential Integrated Multistate Memristors*, Nano Letters **22**, 10010 (2022).

[9] G. Chen, C. Ophus, R. Lo Conte, R. Wiesendanger, G. Yin, A. K. Schmid, and K. Liu, *Ultrasensitive Sub-monolayer Palladium Induced Chirality Switching and Topological Evolution of Skyrmions*, Nano Letters **22**, 6678 (2022).

[10] G. Chen, C. Ophus, P. D. Murray, C. J. Jensen, A. Quintana, M. Robertson, E. C. Burks, D. A. Gilbert, J. Malloy, D. Bhattacharya, Z. J. Chen, G. Yin, A. K. Schmid, and K. Liu, in *2022 IEEE 33rd Magnetic Recording Conference (TMRC)* (2022), pp. 1–2.

[11] P. Deng, C. Eckberg, P. Zhang, G. Qiu, E. Emmanouilidou, G. Yin, S. K. Chong, L. Tai, N. Ni, and K. L. Wang, *Probing the mesoscopic size limit of quantum anomalous Hall insulators*, Nature Communications **13**, 4246 (2022).

[12] P. Liu, C. Liu, Z. Wang, M. Huang, G. Hu, J. Xiang, C. Feng, C. Chen, Z. Ma, X. Cui, H. Zeng, Z. Sheng, Y. Lu, G. Yin, G. Chen, K. Liu, and B. Xiang, *Planar-symmetry-breaking induced antisymmetric magnetoresistance in van der Waals ferromagnet Fe3GeTe2*, Nano Research **15**, 2531 (2022).

[13] Y. Wu, B. Francisco, Z. Chen, W. Wang, Y. Zhang, C. Wan, X. Han, H. Chi, Y. Hou, A. Lodesani, G. Yin, K. Liu, Y.-t. Cui, K. L. Wang, and J. S. Moodera, *A Van der Waals Interface Hosting Two Groups of Magnetic Skyrmions*, Advanced Materials **34**, 2110583 (2022).

[14] J. Wei, X. Wang, B. Cui, C. Guo, H. Xu, Y. Guang, Y. Wang, X. Luo, C. Wan, J. Feng, H. Wei, G. Yin, X. Han, and G. Yu, *Field-Free Spin–Orbit Torque Switching in Perpendicularly Magnetized Synthetic Antiferromagnets*, Advanced Functional Materials **32**, 2109455 (2022).

[15] C. Zhang, C. Liu, S. Zhang, B. Zhou, C. Guan, Y. Ma, H. Algaidi, D. Zheng, Y. Li, X. He, J. Zhang, P. Li, Z. Hou, G. Yin, K. Liu, Y. Peng, and X.-X. Zhang, *Magnetic Skyrmions with Unconventional Helicity Polarization in a Van Der Waals Ferromagnet*, Advanced Materials **34**, 2204163 (2022).

[16] J.-X. Yu, J. Zang, R. K. Lake, Y. Zhang, and G. Yin, *Discrete quantum geometry and intrinsic spin Hall effect*, Physical Review B **104**, 184408 (2021).

[17] E. C. Burks, D. A. Gilbert, P. D. Murray, C. Flores, T. E. Felter, S. Charnvanichborikarn, S. O. Kucheyev, J. D. Colvin, G. Yin, and K. Liu, *3D Nanomagnetism in Low Density Interconnected Nanowire Networks*, Nano Letters **21**, 716 (2021).

[18] Y. Wu, G. Yin, L. Pan, A. J. Grutter, Q. Pan, A. Lee, D. A. Gilbert, J. A. Borchers, W. Ratcliff, A. Li, X.-d. Han, and K. L. Wang, *Large exchange splitting in monolayer graphene magnetized by an antiferromagnet*, Nature Electronics **3**, 604 (2020).

[19] C.-Y. Yang, L. Pan, A. J. Grutter, H. Wang, X. Che, Q. L. He, Y. Wu, D. A. Gilbert, P. Shafer, E. Arenholz, H. Wu, G. Yin, P. Deng, J. A. Borchers, W. Ratcliff, and K. L. Wang, *Termination switching of antiferromagnetic proximity effect in topological insulator*, Science Advances **6**, eaaz8463 (2020).

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[21] L. Pan, X. Liu, Q. L. He, A. Stern, G. Yin, X. Che, Q. Shao, P. Zhang, P. Deng, C.-Y. Yang, B. Casas, E. S. Choi, J. Xia, X. Kou, and K. L. Wang, *Probing the low-temperature limit of the quantum anomalous Hall effect*, Science Advances **6**, eaaz3595 (2020).

[22] K. L. Wang, Y. Wu, C. Eckberg, G. Yin, and Q. Pan, *Topological quantum materials*, MRS Bulletin **45**, 373 (2020).

[23] X. Che, Q. Pan, B. Vareskic, J. Zou, L. Pan, P. Zhang, G. Yin, H. Wu, Q. Shao, P. Deng, and K. L. Wang, *Strongly Surface State Carrier-Dependent Spin–Orbit Torque in Magnetic Topological Insulators*, Advanced Materials **32**, 1907661 (2020).

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[39] H. Wang, H. Han, G. Yin, C.-Y. Wang, Y.-Y. Hou, J. Tang, J.-X. Dai, C.-L. Ren, W. Zhang, and P. Huai, *First-Principles Study of Vacancies in TiSiC and TiAlC.*, Materials (Basel, Switzerland) **10**, E103 (2017).

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[42] T. Nie, J. Tang, X. Kou, Y. Gen, S. Lee, X. Zhu, Q. He, L.-T. Chang, K. Murata, Y. Fan, and K. L. Wang, *Enhancing electric-field control of ferromagnetism through nanoscale engineering of high-Tc MnxGe1x nanomesh*, Nature Communications **7**, 12866 (2016).

[43] Y. Liu, G. Yin, J. Zang, R. K. Lake, and Y. Barlas, *Spin-Josephson effects in exchange coupled antiferromagnetic insulators*, Physical Review B **94**, 094434 (2016).

[44] G. Yin, Y. Li, L. Kong, R. K. Lake, C. L. Chien, and J. Zang, *Topological charge analysis of ultrafast single skyrmion creation*, Physical Review B **93**, 174403 (2016).

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[48] G. Yin, Y. Liu, Y. Barlas, J. Zang, and R. K. Lake, *Topological spin Hall effect resulting from magnetic skyrmions*, Physical Review B **92**, 024411 (2015).

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