

Dr. Shiming Lei
Department of Physics, Room 4482,
The Hong Kong University of Science and Technology
Clear Water Bay, Kowloon, Hong Kong SAR

Phone: (852) 2358-7529

Email: phslei@ust.hk

Education

- 08/2012— **Doctor of Philosophy**, Materials Science and Engineering,
12/2017 *The Pennsylvania State University, State College, USA,*
Thesis: *Coupled Phenomena in Domains and Domain Walls in Complex Polar Oxides.*
Advisor: Prof. Venkatraman Gopalan
- 08/2005— **Bachelor of Science**, Physics,
07/2009 *Harbin Institute of Technology, Harbin, China*

Employment

- 04/2023— **Assistant Professor**
present The Hong Kong University of Science and Technology, Hong Kong SAR, China
- 11/2020— **Research Scientist**
03/2023 Rice University, Houston, USA
- 12/2017— **Postdoctoral Fellow**
11/2020 Princeton University, Princeton, USA
- 08/2012— **Research Assistant**
12/2017 The Pennsylvania State University, State College, USA
- 09/2011— **Visiting Scholar**
07/2012 The Pennsylvania State University, State College, USA
- 08/2009— **Research Assistant**
07/2011 Harbin Institute of Technology, Harbin, China

Honors and Awards

- 09/2018 3rd Place Prize for 2018 Chemistry Department Retreat Presentation at Princeton University
- 2016— Intercollege Graduate Student Outreach Achievement Award for year 2016-17 (one per
2017 year in Grad School at Penn State)
- 05/2013 The Howard and Jean Beaver Award in the Department of Materials Science and Engineering at Penn State

Professional Activities

- 2011— Member of American Physical Society (APS)
present
- 2011— Member of Materials Research Society (MRS)
2017

- 08/02/2023 Session Chair, Condensed Matter Physics, Materials Physics and Engineering, 2023 Joint Annual Conference of Physical Societies in Guangdong-Hong Kong-Macao Greater Bay Area, Hong Kong
- 03/08/2023 Session Chair, Session N43: Magnetic Topological Semimetals, APS March Meeting 2023, Las Vegas, Nevada
- 03/09/2023 Session Chair, Session S62: Machine Learning for Quantum Matter IV, APS March Meeting 2023, Las Vegas, Nevada
- 2017—
present Journal Referee for: *Physical Review Letters*, *Physical Review B*, *Physical Review X*, *Physical Review Materials*, *Physical Review Applied*, *Physical Review Research*, *Nature Communications*, *The Journal of Physical Chemistry Letters*, *Chemistry of Materials*, *Inorganic Chemistry*, *Advanced Materials*, *Advanced Electronic Materials*, and *APL Materials*.

Outreach and Community Service

- 04/17/2021 Exhibitor, the 12th Reach For The Stars STEM Festival, Rice University
- 05/09/2019 Session Char, "S4.3 Revolution/Resistance", Princeton Research Day 2019, Princeton University
- 07/2019 Organizer, the 2019 Princeton Summer School on Condensed Matter Physics, Princeton University
- 09/2018 Poster judge, the 2018 Chemistry Department Retreat Poster Presentation, Princeton University
- 2005—2017 Member of the MRSEC Graduate Advisory Committee, The Pennsylvania State University
- 2005—2017 Representative of the MRSEC Teacher and Education Team, The Pennsylvania State University
- 2015,2017 Science Interpreter in the activity of Hidden Power Demonstration at Park Forest Elementary School, State College
- 08/2016 Science mentor in the Summer Academy Program for high-school students who are blind or visually impaired, also see the link for [Youtube video](#).
- 2014, 2015 Science interpreter in the activities of NanoDays at Penn State, and Kids Day for the Central PA Festival of the Arts, State College

Workshops Attended

- 10/31/2022—
11/2/2022 RCQM workshop on Strange Metals and Emergent Phases in Materials and Structures, Rice University
- 12/9/2021—
12/10/2021 RCQM-UBC Workshop on New Frontiers in Quantum Materials Research
- 11/15/2021—
11/17/2021 RCQM Workshop on Topological Materials and Electron Correlations, Rice University
- 02/18/2021—
02/19/2021 Virtual Science Forum: Quantum Oscillations in Insulators
- 12/09/2020—
12/11/2020 RCQM-UBC Workshop on New Frontiers in Quantum Materials Research
- 12/01/2020 CEMS Topical Meeting Online: Complex Magnetism meets Topology: New Coupling Mechanisms and Responses, RIKEN, Japan
- 06/08/2020—
06/15/2020 2020 Princeton Summer School on Condensed Matter Physics: Magnetism in Quantum Materials, Princeton University, Princeton, New Jersey

- 10/02/2019— 10/05/2019 Workshop on “The Future of Topological Materials”, Princeton Center for Theoretical Science, Princeton University, Princeton, New Jersey
- 07/29/2019— 08/01/2019 2019 Princeton Summer School on Condensed Matter Physics: Emergent phenomena and correlated physics in two-dimensional materials, Princeton University, Princeton, New Jersey
- 04/25/2019— 04/28/2019 Workshop on “Strongly Correlated Systems and Interactions in Quantum Matter”, Princeton University, Princeton, New Jersey
- 03/26/2019— 03/27/2019 2019 PRISM Annual Research Symposium, Princeton University, Princeton, New Jersey
- 06/10/2018— 06/22/2019 2018 NSF/DOE Quantum Science Summer School (QS3): Fundamentals and Applications of Quantum Materials, Cornell University, Ithaca, New York
- 06/16/2014— 06/20/2014 2014 Quantum ESPRESSO Workshop, the Pennsylvania State University, State College, Pennsylvania
- 01/26/2014— 01/29/2014 2014 Workshop on the Fundamental Physics of Ferroelectrics and Related Materials, Carnegie Institution of Washington, Washington, DC
- 06/23/2011— 06/26/2011 The 4th International Workshop on Emergent Phenomena in Quantum Hall Systems, Peking University, Beijing, China

Teaching

- 09/2023—present Introductory Physics
- 02/2018—03/2018 Python Crash Course—Scientific Data Analysis and Visualization, Schoop Lab at Princeton University

Publications

ORCID: [000-0001-8041-7161](https://orcid.org/000-0001-8041-7161)

Google Scholar: [Profile](#)

- [1] **Shiming Lei***, Kevin Allen, Jianwei Huang, Jaime M. Moya, Brian Casas, Yichen Zhang, Donghui Lu, Makoto Hashimoto, Jonathan Denlinger, Luis Balicas, Ming Yi, Yan Sun, and Emilia Morosan*, Weyl nodal ring states and Landau quantization with very large magnetoresistance in square-net magnet EuGa_4 , *Nature Communications* 14, 5812 (2023) (***corresponding author**)
- [2] Jaime M. Moya, **Shiming Lei***, Eleanor M. Clements, Caitlin S. Kengle, Stella Sun, Kevin Allen, Qizhi Li, Y. Y. Peng, Ali A. Husain, Matteo Mitrano, Matthew J. Krogstad, Raymond Osborn, Anand B. Puthirath, Songxue Chi, L. Debeer-Schmitt, J. Gaudet, P. Abbamonte, Jeffrey W. Lynn, and E. Morosan*, Incommensurate magnetic orders and topological Hall effect in the square-net centrosymmetric EuGa_2Al_2 system, *Physical Review Materials* 6, 074201 (2022). (***corresponding author**)
- [3] **Shiming Lei**, Samuel M. L. Teicher, Andreas Topp, Kehan Cai, Jingjing Lin, Guangming Cheng, Tyger H. Salters, Fanny Rodolakis, Jessica L. McChesney, Saul Lapidus, Nan Yao, Maxim Krivenkov, Dmitry Marchenko, Andrei Varykhalov, Christian R. Ast, Roberto Car, Jennifer Cano, Maia G. Vergniory, Ong N. Phuan, and Leslie M. Schoop, “Band Engineering of Dirac Semimetals using Charge Density Waves”, *Advanced Materials* 33, 2101591 (2021).
- [4] **Shiming Lei**, Audrey Saltzman, and Leslie M. Schoop. Complex magnetic phases enriched by charge density waves in the topological semimetals $\text{GdSb}_x\text{Te}_{2-x-\delta}$, *Phys. Rev. B* 103, 134418 (2021).
- [5] **Shiming Lei**, Jingjing Lin, Yanyu Jia, Mason Gray, Andreas Topp, Gelareh Farahi, Sebastian Klemenz, Tong Gao, Fanny Rodolakis, Jessica L McChesney, Christian R Ast, Ali Yazdani, Kenneth

- S. Burch, Sanfeng Wu, N. Phuan Ong, and Leslie M. Schoop, High mobility in a van der Waals layered antiferromagnetic metal, *Science Advances* 6, eaay6407 (2020).
- [6] Sebastian Klemenz*, **Shiming Lei***, and Leslie M. Schoop*, Topological Semimetals in Square-Net Materials, *Annual Review of Materials Research* 49, 185–206 (2019).
*Authors contribute equally.
- [7] **Shiming Lei**, Viola Duppel, Judith M. Lippmann, Jürgen Nuss, Bettina V. Lotsch, and Leslie M. Schoop, Charge Density Waves and Magnetism in Topological Semimetal Candidates $\text{GdSb}_x\text{Te}_{2-x-6}$, *Advanced Quantum Technologies* 2, 1900045 (2019).
- [8] **Shiming Lei**, Shalinee Chikara, Danilo Puggioni, Jin Peng, Mengze Zhu, Mingqiang Gu, Weiwei Zhao, Yu Wang, Yakun Yuan, Hirofumi Akamatsu, Moses H. W. Chan, Xianglin Ke, Zhiqiang Mao, James M. Rondinelli, Marcelo Jaime, John Singleton, Franziska Weickert, Vivien S. Zapf, and Venkatraman Gopalan, Comprehensive Magnetic Phase Diagrams of the Polar Metal $\text{Ca}_3(\text{Ru}_{0.95}\text{Fe}_{0.05})_2\text{O}_7$, *Phys. Rev. B* 99, 224411 (2019).
- [9] Yanfeng Cui, Yameng Xu, Xin Liu, Yahong Li, Bao-Lin Wang, Yaping Dong, Wu Li, and **Shiming Lei**, Field-Induced Single-Ion Magnetic Behavior in Two Mononuclear Cobalt(II) Complexes, *Chemistry – An Asian Journal* 14, 2620–2628 (2019).
- [10] **Shiming Lei**, Mingqiang Gu, Danilo Puggioni, Greg Stone, Jin Peng, Jianjian Ge, Yu Wang, Baoming Wang, Yakun Yuan, Ke Wang, Zhiqiang Mao, James M. Rondinelli, and Venkatraman Gopalan, Observation of Quasi-Two-Dimensional Polar Domains and Ferroelastic Switching in a Metal, $\text{Ca}_3\text{Ru}_2\text{O}_7$, *Nano Letters* 18, 3088–3095 (2018).
- [11] **Shiming Lei**, Tae-Yeong Koo, Wenwu Cao, Eugene A Eliseev, Anna N Morozovska, S-W Cheong, and Venkatraman Gopalan, Quantitative Lateral and Vertical Piezoresponse Force Microscopy on a PbTiO_3 Single Crystal, *Journal of Applied Physics* 120, 124106 (2016).
- [12] **Shiming Lei**, Eugene A. Eliseev, Anna N. Morozovska, Ryan C. Haislmaier, Tom T. A. Lummen, W. Cao, Sergei V. Kalinin, and Venkatraman Gopalan, Reply to “Comment on ‘Origin of Piezoelectric Response under a Biased Scanning Probe Microscopy Tip across a 180° Ferroelectric Domain Wall’ ”, *Phys. Rev. B* 89, 226102 (2014).
- [13] **Shiming Lei**, Eugene A. Eliseev, Anna N. Morozovska, Ryan C. Haislmaier, Tom T. A. Lummen, W. Cao, Sergei V. Kalinin, and Venkatraman Gopalan, Origin of Piezoelectric Response under a Biased Scanning Probe Microscopy Tip across a 180° Ferroelectric Domain Wall, *Phys. Rev. B* 86, 134115 (2012).
- [14] Jaime M. Moya, Jianwei Huang, **Shiming Lei**, Kevin Allen, Yuxiang Gao, Yan Sun, Ming Yi, and E. Morosan, Real-space and reciprocal-space topology in the $\text{Eu}(\text{Ga}_{1-x}\text{Al}_x)_4$ square net system, *Phys. Rev. B* 108, 064436 (2023).
- [15] Robert J Kirby, Angela Montanaro, Francesca Giusti, André Koch-Liston, **Shiming Lei**, Ioannis Petrides, Prineha Narang, Kenneth S Burch, Daniele Fausti, Gregory D Scholes, and Leslie M Schoop, Ultrafast Dynamics of the Topological Semimetal $\text{GdSb}_x\text{Te}_{2-x-6}$ in the Presence and Absence of a Charge Density Wave, *J. Phys. Chem. C* 127, 57 (2023)
- [16] Fang Yuan, Yanyu Jia, Guangming Cheng, Ratnadwip Singha, **Shiming Lei**, Nan Yao, Sanfeng Wu, and Leslie M Schoop, Atomic Resolution Imaging of Highly Air-Sensitive Monolayer and Twisted-Bilayer WTe_2 , *Nano Letters* 23, 6868 (2023).
- [17] A. M. Vibhakar, D. D. Khalyavin, J. M. Moya, P. Manuel, F. Orlandi, **S. Lei**, E. Morosan, and A. Bombardi, Competing charge and magnetic order in the candidate centrosymmetric skyrmion host EuGa_2Al_2 , *Phys. Rev. B* 108, L100404 (2023).
- [18] Alla Chikina, Henriette Lund, Marco Bianchi, Davide Curcio, Kirstine J. Dalgaard, Martin Bremholm, **Shiming Lei**, Ratnadwip Singha, Leslie M. Schoop, and Philip Hofmann, Charge density wave generated Fermi surfaces in NdTe_3 , *Phys. Rev. B* 107, L161103 (2023).

- [19] Yichen Zhang, Yuxiang Gao, Xue-Jian Gao, **Shiming Lei**, Zhuoliang Ni, Ji Seop Oh, Jianwei Huang, Ziqin Yue, Marta Zonno, Sergey Gorovikov, Makoto Hashimoto, Donghui Lu, Jonathan D. Denlinger, Robert J. Birgeneau, Junichiro Kono, Liang Wu, Kam Tuen Law, Emilia Morosan, and Yi Ming, Kramers nodal lines and Weyl fermions in SmAlSi, *Communications Physics* 6, 134 (2023).
- [20] Stephan Kim, **Shiming Lei**, Leslie M. Schoop, R. J. Cava, and N. P. Ong, Eavesdropping by the edge supercurrent on blockade correlation between competing condensates in a Weyl superconductor, *Nature Physics* in print (2023).
- [21] Pengjie Wang, Guo Yu, Yves H Kwan, Yanyu Jia, **Shiming Lei**, Sebastian Klemenz, F Alexandre Cevallos, Trithep Devakul, Kenji Watanabe, Takashi Taniguchi, Shivaji L Sondhi, Robert J Cava, Leslie M Schoop, Siddharth A Parameswaran, and Sanfeng Wu, One-Dimensional Luttinger Liquids in a Two-Dimensional Moiré Lattice, *Nature* 605, 57–62 (2022).
- [22] Yiping Wang, Ioannis Petrides, Grant McNamara, Md Mofazzel Hosen, **Shiming Lei**, Yueh-Chun Wu, James L Hart, Hongyan Lv, Jun Yan, Di Xiao, Judy J Cha, Prineha Narang, Leslie M Schoop, and Kenneth S Burch, Axial Higgs Mode Detected by Quantum Pathway Interference in RTe_3 , *Nature* 606, 896–901 (2022).
- [23] Yanyu Jia, Pengjie Wang, Cheng-Li Chiu, Zhida Song, Guo Yu, Berthold Jäck, **Shiming Lei**, Sebastian Klemenz, F Alexandre Cevallos, Michael Onyszczak, Nadezhda Fishchenko, Xiaomeng Liu, Gelareh Farahi, Fang Xie, Yuanfeng Xu, Kenji Watanabe, Takashi Taniguchi, B. Andrei Bernevig, Robert J. Cava, Leslie M. Schoop, Ali Yazdani, and Sanfeng Wu, Evidence for a Monolayer Excitonic Insulator, *Nature Physics* 18, 87–93 (2022).
- [24] Jaime M. Moya, Alannah M. Hallas, Vaideesh Loganathan, C.-L. Huang, Lazar L. Kish, Adam A. Aczel, J. Beare, Y. Cai, G. M. Luke, Franziska Weickert, Andriy H. Nevidomskyy, Christos D. Malliakas, Mercouri G. Kanatzidis, **Shiming Lei**, Kyle Bayliff, and E. Morosan, Field-induced quantum critical point in the itinerant antiferromagnet Ti_3Cu_4 , *Communications Physics* 5, 136 (2022).
- [25] Zheyi Zhu, Stephan Kim, **Shiming Lei**, Leslie M. Schoop, R. J. Cava, and N. P. Ong, Phase tuning of multiple Andreev reflections of Dirac fermions and the Josephson supercurrent in Al-MoTe₂-Al junctions, *PNAS* 119, e2204468119 (2022).
- [26] J. W. Lee, K. Eom, T. R. Paudel, B. Wang, H. Lu, H. X. Huyan, S. Lindemann, S. Ryu, H. Lee, T. H. Kim, Y. Yuan, J. A. Zorn, **S. Lei**, W. P. Gao, T. Tybell, V. Gopalan, X. Q. Pan, A. Gruverman, L. Q. Chen, E. Y. Tsybal, and C. B. Eom, In-plane quasi-single-domain BaTiO_3 via interfacial symmetry engineering, *Nature Communications* 12, 6784 (2021).
- [27] Ratnadwip Singha, Tyger H. Salters, Samuel M. L. Teicher, **Shiming Lei**, Jason F. Khoury, N. Phuan Ong, Leslie M. Schoop, Evolving Devil's Staircase Magnetization from Tunable Charge Density Waves in Nonsymmorphic Dirac Semimetals, *Advanced Materials* 33, 2103476 (2021).
- [28] Pengjie Wang, Guo Yu, Yanyu Jia, Michael Onyszczak, F. Alexandre Cevallos, **Shiming Lei**, Sebastian Klemenz, Kenji Watanabe, Takashi Taniguchi, Robert J. Cava, Leslie M. Schoop, and Sanfeng Wu, Landau Quantization and Highly Mobile Fermions in an Insulator, *Nature* 589, 225–229 (2021).
- [29] Long Qian, **Shiming Lei**, Binod K Rai, C-L Huang, Alannah M Hallas, Gregory T McCandless, Julia Y Chan, and Emilia Morosan, Unconventional magnetic order emerging from competing energy scales in the new RRh_3Si_7 intermetallics ($R = \text{Gd-Yb}$), *Physical Review Materials* 5, 094416 (2021).
- [30] Kirstine J. Dalgaard, **Shiming Lei**, Steffen Wiedmann, Martin Bremholm, and Leslie M. Schoop, Anomalous Shubnikov-de Haas quantum oscillations in rare-earth tritelluride NdTe_3 , *Phys. Rev. B* 102, 245109 (2020).
- [31] Austin Ferrenti, Sebastian Klemenz, **Shiming Lei**, Xiaoyu Song, Ganter Pirmin, Bettina Lotsch, and Leslie M. Schoop, Change in magnetic properties upon chemical exfoliation of FeOCl , *Inorganic Chemistry* 59, 1176–1182 (2020).

- [32] Mason J. Gray, Narendra Kumar, Ryan O'Connor, Marcel Hoek, Erin Sheridan, Meaghan C. Doyle, Marisa L. Romanelli, Gavin B. Osterhoudt, Yiping Wang, Vincent Plisson, **Shiming Lei**, Ruidan Zhong, Bryan Rachmilowitz, He Zhao, Hikari Kitadai, Steven Shepard, Leslie M. Schoop, G. D. Gu, Ilija Zeljkovic, Xi Ling, and K.S. Burch, A Cleanroom in a Glovebox, *Review of Scientific Instruments* 91, 073909 (2020).
- [33] Robert J. Kirby, Austin Ferrenti, Caroline Weinberg, Sebastian Klemenz, Mohamed Oudah, **Shiming Lei**, Chris P. Weber, Daniele Fausti, Gregory D. Scholes, and Leslie M. Schoop, Transient Drude Response Dominates Near-IR Pump-Probe Reflectivity in Nodal-Line Semimetals ZrSiS and ZrSiSe, *The Journal of Physical Chemistry Letters* 11, 6105–6111 (2020).
- [34] Xiaoyu Song, Guangming Cheng, Daniel Weber, Florian Pielnhofer, **Shiming Lei**, Sebastian Klemenz, Yao-Wen Yeh, Kai Filsinger, Craig Arnold, Nan Yao, and Leslie M. Schoop, Soft chemical synthesis of H_xCrS_2 : an antiferromagnetic material with alternating amorphous and crystalline layers, *J. Am. Chem. Soc.* 141, 15634–15640 (2019).
- [35] V. A. Stoica, N. Laanait, C. Dai, Z. Hong, Y. Yuan, Z. Zhang, **S. Lei**, M. R. McCarter, A. Yadav, A. R. Damodaran, S. Das, G. A. Stone, J. Karapetrova, D. A. Walko, X. Zhang, L. W. Martin, R. Ramesh, L.-Q. Chen, H. Wen, V. Gopalan, and J. W. Freeland, Optical Creation of a Supercrystal with Three-dimensional Nanoscale Periodicity, *Nature Materials* 18, 377 (2019).
- [36] Greg Stone, Danilo Puggioni, **Shiming Lei**, Mingqiang Gu, Ke Wang, Yu Wang, Jianjian Ge, Xue-Zeng Lu, Zhiqiang Mao, James M. Rondinelli, and Venkatraman Gopalan, Atomic and Electronic Structure of Domains Walls in a Polar Metal, *Phys. Rev. B* 99, 014105 (2019).
- [37] Yakun Yuan, Peter Kissin, Danilo Puggioni, Kevin Cremin, **Shiming Lei**, Yu Wang, Zhiqiang Mao, James M. Rondinelli, Richard D. Averitt, and Venkatraman Gopalan, Ultrafast Quasiparticle Dynamics in the Correlated Semimetal $Ca_3Ru_2O_7$, *Phys. Rev. B* 99, 155111 (2019).
- [38] Hirofumi Akamatsu, Yakun Yuan, Vladimir A. Stoica, Greg Stone, Tiannan Yang, Zijian Hong, **Shiming Lei**, Yi Zhu, Ryan C. Haismaier, John W. Freeland, Long-Qing Chen, Haidan Wen, and Venkatraman Gopalan, Light-Activated Gigahertz Ferroelectric Domain Dynamics, *Phys. Rev. Lett.* 120, 096101 (2018).
- [39] Lei Zhang, Yakun Yuan, Jason Lapano, Matthew Brahlek, **Shiming Lei**, Bernd Kabius, Venkatraman Gopalan, and Roman Engel-Herbert, Continuously Tuning Epitaxial Strains by Thermal Mismatch, *ACS Nano* 12, 1306–1312 (2018).
- [40] Ruidan Zhong, Mimi Chung, Tai Kong, Loi T. Nguyen, **Shiming Lei**, and R. J. Cava, Field-Induced Spin-Liquid-Like State in a Magnetic Honeycomb Lattice, *Phys. Rev. B* 98, 220407 (2018).
- [41] Xiaoyu Ji, Shih-Ying Yu, **Shiming Lei**, Hui Yan Cheng, Subhasis Chaudhuri, Suzanne Mohney, John Badding, and Venkatraman Gopalan, Single Crystal Small Core Semiconductor Optical Fibers for All-Fiber Optoelectronics, *2017 Conference on Lasers and Electro-Optics (CLEO)*, 1–2 (2017).
- [42] Hai-Tian Zhang, Matthew Brahlek, Xiaoyu Ji, **Shiming Lei**, Jason Lapano, John W Freeland, Venkatraman Gopalan, and Roman Engel-Herbert, High-Quality $LaVO_3$ Films as Solar Energy Conversion Material, *ACS Applied Materials & Interfaces* 9, 12556–12562 (2017).
- [43] Arnab Sen Gupta, Hirofumi Akamatsu, Megan E. Strayer, **Shiming Lei**, Toshihiro Kuge, Koji Fujita, Clarina dela Cruz, Atsushi Togo, Isao Tanaka, Katsuhisa Tanaka, Thomas E. Mallouk, and Venkatraman Gopalan, Improper Inversion Symmetry Breaking and Piezoelectricity through Oxygen Octahedral Rotations in Layered Perovskite Family, $LiRTiO_4$ (R = Rare Earths), *Advanced Electronic Materials* 2, 1500196 (2016).
- [44] Jia-Mian Hu, Tiannan Yang, Kasra Momeni, Xiaoxing Cheng, Lei Chen, **Shiming Lei**, Shujun Zhang, Susan Trolier-McKinstry, Venkatraman Gopalan, Gregory P Carman, Ce-Wen Nan, and Long-Qing Chen, Fast Magnetic Domain-Wall Motion in a Ring-Shaped Nanowire Driven by a Voltage, *Nano Letters* 16, 2341–2348 (2016).

- [45] Xiaoyu Ji, **Shiming Lei**, Shih-Ying Yu, Hui Yan Cheng, Wenjun Liu, Nicolas Poilvert, Yihuang Xiong, Ismaila Dabo, Suzanne E Mohny, John V Badding, and Venkatraman Gopalan, Single-Crystal Silicon Optical Fiber by Direct Laser Crystallization, *ACS Photonics* 4, 85–92 (2016).
- [46] Megan E. Strayer, Arnab Sen Gupta, Hirofumi Akamatsu, **Shiming Lei**, Nicole A. Benedek, Venkatraman Gopalan, and Thomas E. Mallouk, Emergent Noncentrosymmetry and Piezoelectricity Driven by Oxygen Octahedral Rotations in $n = 2$ Dion–Jacobson Phase Layer Perovskites, *Advanced Functional Materials* 26, 1930–1937 (2016).
- [47] Takeshi Yajima, Fumitaka Takeiri, Kohei Aidzu, Hirofumi Akamatsu, Koji Fujita, Wataru Yoshimune, Masatoshi Ohkura, **Shiming Lei**, Venkatraman Gopalan, Katsuhisa Tanaka, Craig M. Brown, Mark A. Green, Takafumi Yamamoto, Yoji Kobayashi, and Hiroshi Kageyama, A Labile Hydride Strategy for the Synthesis of Heavily Nitridized BaTiO₃, *Nature Chemistry* 7, 1017 (2015).
- [48] Hirofumi Akamatsu, Koji Fujita, Toshihiro Kuge, Arnab Sen Gupta, Atsushi Togo, **Shiming Lei**, Fei Xue, Greg Stone, James M. Rondinelli, Long-Qing Chen, Isao Tanaka, Venkatraman Gopalan, and Katsuhisa Tanaka, Inversion Symmetry Breaking by Oxygen Octahedral Rotations in the Ruddlesden-Popper NaRTiO₄ Family, *Phys. Rev. Lett.* 112, 187602 (2014).
- [49] Yijia Gu, Fei Xue, **Shiming Lei**, Tom T. A. Lummen, Jianjun Wang, Venkatraman Gopalan, and Long-Qing Chen, Monoclinic Phases Arising across Thermal Inter-Ferroelectric Phase Transitions, *Phys. Rev. B* 90, 024104 (2014).
- [50] Tom T.A. Lummen, Yijia Gu, Jianjun Wang, **Shiming Lei**, Fei Xue, Amit Kumar, Andrew T Barnes, Eftihia Barnes, Sava Denev, Alex Belianinov, Martin Holt, Anna N. Morozovska, Sergei V. Kalinin, Long-Qing Chen, and Venkatraman Gopalan, Thermotropic Phase Boundaries in Classic Ferroelectrics, *Nature Communications* 5, 3172 (2014).
- [51] Che-Hui Lee, Volodymyr Skoromets, Michael D. Biegalski, **Shiming Lei**, Ryan Haislmaier, Margitta Bernhagen, Reinhard Uecker, Xiaoxing Xi, Venkatraman Gopalan, Xavier Martí, Stanislav Kamba, Petr Kužel, and Darrell G. Schlom, Effect of Stoichiometry on the Dielectric Properties and Soft Mode Behavior of Strained Epitaxial SrTiO₃ Thin Films on DyScO₃ Substrates, *Applied Physics Letters* 102, 082905 (2013).
- [52] Gang Liu, **Shiming Lei**, Wenhua Jiang, Jiaqi Zhu, and Wenwu Cao, $k32$ -Type Low-Frequency Bimorph with Giant Electromechanical Coupling Factor, *physica status solidi (a)* 210, 2183– 2187 (2013).

Presentations

Invited talks

- [1] “Weyl nodal-ring states and large, nonsaturating magnetoresistance in layered square-net magnets”, Conference of Condensed Matter Physics 2023, Liyang, Jiangsu, China, August 7, 2023.
- [2] “Magnetic Weyl nodal ring states and nonsaturating magnetoresistance in the Landau quantized regime”, 2023 Joint Annual Conference of Physical Societies in Guangdong-Hong Kong-Macao Greater Bay Area, Hong Kong SAR, China, August 2, 2023.
- [3] “Magnetic topological materials: design, synthesis and characterizations”, School of Electronic Science and Engineering, University of Electronic Science and Technology of China, Chengdu China, May 29, 2023.
- [4] “Magnetic topological materials: design, synthesis and characterizations”, School of Physics, Harbin Institute of Technology, Harbin, China, May 25, 2023.
- [5] “Magnetic topological materials: design, synthesis and characterizations”, Institute of Physics CAS, Beijing, China, May 24, 2023.

- [6] “Magnetic topological materials: design, synthesis and characterizations”, International Center for Quantum Materials, Peking University, Beijing, China, May 23, 2023.
- [7] “Magnetic topological materials: design, synthesis and characterizations”, Department of Physics, Tsinghua University, Beijing, China, May 22, 2023.
- [8] “Magnetic topological materials: design, synthesis and characterizations”, School of Physical Science and Technology, Shanghai Tech University, Shanghai, China, May 18, 2023.
- [9] “Magnetic topological materials: design, synthesis and characterizations”, Tsung-Dao Lee Institute, Shanghai Jiao Tong University, Shanghai, China, May 18, 2023.
- [10] “Magnetic topological materials: design, synthesis and characterizations”, Department of Physics, Southern University of Science and Technology, Shenzhen, China, May 08, 2023.
- [11] “Magnetic topological materials: design, synthesis and characterizations”, Institute for Quantum Science and Engineering, Southern University of Science and Technology, Shenzhen, China, March 15, 2023.
- [12] “Magnetic topological materials: design, synthesis and characterizations”, Institute for Advanced Interdisciplinary Research, University of Jinan, Jinan, China, March 17, 2023.
- [13] “Weyl Nodal-Ring States and Nonsaturating MR in Square-Net Magnets”, Session A43: Magnetic Weyl Semimetals, APS March Meeting 2023, March 6, 2023.
- [14] “Magnetic Quantum Materials: the Tale of Correlation and Topology”, 2021 Tsung-Dao Lee Institute Youth Forum for Quantum Physics, Shanghai Jiaotong University, May 18, 2021
- [15] “Magnetic quantum materials: design, synthesis and characterizations”, Condensed Matter Seminar, Institute for Molecules and Materials, RadBoud University, Nijmegen, the Netherlands, Feb. 25, 2021.
- [16] “A route to idealized topological semimetals: from design to characterization”, SLAC National Accelerator Laboratory, Stanford University, Menlo Park, CA, September 2020.
- [17] “Square-Net Magnetic Quantum Materials: Design, Synthesis and Characterizations”, Department of Physics and Astronomy, Rice University, Houston, Texas, July 2020.
- [18] “High-Quality Magnetic Quantum Materials Towards Spintronic Applications”, Institute of Materials Science, University of Connecticut, Mansfield, Connecticut, Feb. 2020.
- [19] “High-Quality Magnetic Quantum Materials Towards Spintronic Applications”, Department of Physics and Astronomy, and Department of Materials Science and Engineering, University of Delaware, Newark, Delaware, Feb. 2020.
- [20] “High-Quality Magnetic Quantum Materials Towards Spintronic Applications”, Department of Mechanical and Aerospace Engineering, University at Buffalo, Buffalo, New York, Nov. 2019.
- [21] “Magnetic Quantum Materials High-Quality Crystal as a First Step Toward Spintronic Devices”, Princeton Quantum Group Meeting, Princeton University, New Jersey, Oct. 2019.

Contributed talks

- [1] “Band Engineering of Dirac Semimetals using Charge Density Waves”, APS March Meeting 2021, online, March 17, 2021.
- [2] “A High-Mobility Van Der Waals Layered Antiferromagnet for Potential High-Speed Spintronics”, Princeton Research Day 2019, Princeton University, New Jersey, May 2019.
- [3] “Complicated Magnetic Phases Interplayed with Charge Density Waves in a New Topological Semimetal”, APS March Meeting 2019, Boston, Massachusetts, Mar. 2019.
- [4] “A New Two-Dimensional Magnetic Material for Next-Generation Electronics”, 2018 Chemistry Department Retreat, Minerals Hotel at Crystal Springs Resort, New Jersey, Sept. 2018.

- [5] "Multiferroic Polar Metal", APS March Meeting 2017, New Orleans, Louisiana, Mar. 2017.
- [6] "'Charged' Domain Wall in a Polar Metal $\text{Ca}_3\text{Ru}_2\text{O}_7$ ", 2016 MRS Fall Meeting, Boston, Massachusetts, Nov. 2016.
- [7] "Multiferroic Polar Metals", Program for EMN Las Vegas Meeting 2016, Las Vegas, Nevada, Oct. 2016.
- [8] "Correlated Switching Dynamics in the Nanoscale Proximity of 90° Ferroelectric Domain Walls", APS March Meeting 2015, San Antonio, Texas, Mar. 2015.
- [9] "Full Piezoelectric Tensors of PbTiO_3 by Quantitative Piezoresponse Force Microscopy", 2014 MRS Fall Meeting, Boston, Massachusetts, Dec. 2014.
- [10] "Enhanced Piezoelectric Properties of Monoclinic BaTiO_3 ", 2013 MRS Fall Meeting, Boston, Massachusetts, Dec. 2013.
- [11] "Towards Quantitative 3D PFM Imaging in One Scan", 2013 Joint UFFC, EFTF and PFM Symposium, Prague, Czech Republic, July 2013.
- [12] "Origin of Piezoelectric Response under a Biased Scanning Probe Microscopy Tip across a 180° Ferroelectric Domain Wall", 2012 MRS Fall Meeting, Boston, Massachusetts, Nov. 2012.

Posters

- [1] "A High-Mobility Van Der Waals Layered Antiferromagnet for Potential High-Speed Spintronics", IAP Career Symposium, Princeton University, New Jersey, June 2019.
- [2] "A High-Mobility Van Der Waals Layered Antiferromagnet for Potential High-Speed Spintronics", 2019 PRISM Annual Research Symposium, Princeton, New Jersey, Mar. 2019.
- [3] "Enhanced Piezoelectric Properties of Monoclinic BaTiO_3 ", 2014 Workshop on the Fundamental Physics of Ferroelectrics and Related Materials, Carnegie Institution of Washington, Washington, DC, Jan. 2014.