Dr. Shi-Zeng Lin

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EDUCATION

B.S.	Zhejiang University, China	*2001 - 2005*
Ph.D.	University of Tsukuba, Japan	*2008 - 2010*

PROFESSIONAL EMPLOYMENT

Research Assistant 2006. 9 - 2008. 4

Strong Coupling Modeling group, National Institute for Material Science, Tsukuba, Japan

Junior Researcher 2008. 4 - 2010. 4

Nano-System Theoretical Physics Group, National Institute for Materials Science, Japan

Research Associate 2010. 4 - 2011. 7

Nano-System Theoretical Physics Group, National Institute for Materials Science, Japan

Postdoctoral Researcher 2011. 8 - 2014. 10

Physics of Condensed Matter and Complex Systems Group (T4), Los Alamos National Laboratory, USA

Staff Scientist 2014. 11 - present

Physics of Condensed Matter and Complex Systems Group (T4), Los Alamos National Laboratory, USA
Center for Nonlinear Studies, Los Alamos National Laboratory, USA

AWARDS

- The Laboratory Directed Research and Development (LDRD) Program early career award ($450K for two years)
- The award for the best bachelor thesis of Zhejiang University
- The Dean Award for Excellent Doctoral Thesis in GSPAS of Tsukuba University
- National Institute for Materials Science (NIMS) junior Researcher fellowship

RESEARCH INTERESTS

- Quantum materials including superconductivity, magnetism, topological materials, two dimensional materials and Moiré materials

PROJECTS

Acronym: The Laboratory Directed Research and Development (LDRD), Early Career Research (ECR), Exploratory Research (ER), Directed Research (DR), Basic Energy Sciences of U.S. Department of Energy (BES)

- 2011-2014, LDRD-ER: Superconducting Vortices in Magnetic Media, as a Co-Investigator
- 2011-2014, LDRD-ER: Exact Renormalization Method for Frustrated Systems and Optimization, as a Co-Investigator
- 2013-2016, LDRD-ER: Phase Transitions at Extremes: Emergence of Topological Defects, as a Co-Investigator
- 2014-2017, LDRD-DR: A New Approach to Mesoscale Functionality: Emergent Tunable Superlattices, as a Co-Investigator
- 2017-2019, LDRD-ECR: Understanding the Magnetic Properties of Heavy Fermion Materials, as PI
- 2017-2020, LDRD-ER: Quantitative Understanding of Electronic Correlations in f-electron Materials, as PI
- 2018-2021, LDRD-ER: Emergent Bogoliubov Fermi Surface in Unconventional Superconductors, as as Co-PI
- 2018-2021, LDRD-DR: Driven Quantum Matter: A Route Towards Novel Phases, as a Co-Investigator
- 2018-2021, BES: Topological phases of quantum matter and decoherence, as a Co-Investigator
- 2019-2022, LDRD-ER: Design principles for skyrmions in f-electron materials, as PI
- 2020-2023, LDRD-DR: Topological Quantum Materials for Robust Quantum Computing, as PI
- 2020-2023, LDRD-ER: High-temperature Superconductivity in the Nickelates, as Co-Investigator
- 2021-2024, LDRD-ER: Moiré Physics in Quantum Flatland, as PI

CONFERENCE ORGANIZER

- Skyrmionics: Materials, Phenomena and Applications, Aug. 7 -10, 2017 at Santa Fe, NM (http://cnls.lanl.gov/skyrmionics). Primary organizer.

POSTDOCS MENTORED

- Satoru Hayami (2015 - 2016, Ph.D. The University of Tokyo, now Assistant Professor at the University of Tokyo, Co-mentor with Cristian D. Batista)
- Ying Su (2018 - 2021, now Postdoc at UT Dallas)
- Umesh Kumar (2019 - 2021, Ph.D. now Postdoc at Rutgers University working with Prof. Gabriel Kotliar)
- Saikat Banerjee (2021 - present, Ph.D. Nordita, KTH Royal Institute of Technology, Sweden)
- Chunli Huang (2021 - present)

STUDENTS MENTORED

- Tom Kim (2017, 2018, PhD student at UC Merced)

- Bishal Parajuli (2019, PhD student at UC Merced)
- Zhijie Fan (2019, PhD student at The University of Virginia)
- Heqiu Li (2020, PhD student at University of Michigan, Ann Arbor, Michigan)
- Lingyu Yang (2021, 2022, PhD student at The University of Virginia)
- Xiaohan Wan (2022, PhD student at University of Michigan, Ann Arbor, Michigan)

COLLABORATORS

Theoriest: Lev N. Bulaevskii, Masashi Tachiki, Vladimir Kogan, Alex E. Koshelev, Cristian D. Batista, Matthias J. Graf, Jian-Xin, Zhu, Roy Dibyendu, Yoshimoto Kamiya, Gia-Wei Chern, Satoru Hayami, Wojciech Zurek, Ivar Martin, Andrey Chubukov, Chih-Chun Chien, Kai Sun, Chin-Sen Ting, Chuanwei Zhang, Wei Zhu

Experimentalists: Boris Maiorov, Leonardo Civale, Jeehoon Kim, Duk, Y. Kim, Yukio Hasegawa, Sang-Wook Cheong, Vivien Zapf, Filip Ronning, Marc Janoschek, Roman Movshovich, Joe Thompson, Priscilla Rosa, Hou-Tong Chen, Ying Zhang, Andrew D. Christianson, Wanjun Jiang, Haifeng Du

REFEREE

DOE BES proposal reviewer; Deutsche Forschungsgemeinschaft (German Research Foundation, DFG) proposal reviewer; The LANL Laboratory Directed Research and Development proposal reviewer; Nature; PNAS; Phys. Rev. X; Phys. Rev. Lett., Phys. Rev. B; Phys. Rev. Appl.; Nano. Lett., Phys. Lett. A; Phys. Status Solidi B; J. Supercond. Nov. Magn.; Physica C; J. Appl. Phys., J. Phys. Soc. Jpn., New J. Phys., Appl. Phys. Lett., Nature Nanotechnology, Nature Communications, Scientific Reports, Supercond. Sci. Technol., Chinese Physics Letters, J. Phys. Condens. Matter., npj Quantum Materials, Annalen der Physik

OTHER SERVICE

- LANL Condensed Matter Colloquium Speakers Committee
- T4 Group Seminar (BLABS) organizer
- 2018 APS March meeting session chair
- Reviewer committee for Institute for Material Science at LANL
- Steering Committee of Institute for Material Science at LANL
- APS Division of Materials Physics (DMP) Fellowship Selection Committee

PUBLICATION

Citations and H-index can be found at
https://scholar.google.com/citations?user=D0xCqk4AAAAJhl=en
http://www.researcherid.com/rid/B-2906-2008.
Incomplete list of publication is available at arXiv: https://arxiv.org/a/lin_s_1.html

• Journal papers

1. **Shi-Zeng Lin**, B. Zheng, and S. Trimper. Computer simulations of two-dimensional melting with dipole-dipole interactions. *Phys. Rev. E*, 73:066106, Jun 2006. doi: 10.1103/PhysRevE.73.066106. URL https://link.aps.org/doi/10.1103/PhysRevE.73.066106

2. **Shi-Zeng Lin** and B. Zheng. Short-time critical dynamics at perfect and imperfect surfaces. *Phys. Rev. E*, 78:011127, Jul 2008a. doi: 10.1103/PhysRevE.78.011127. URL https://link.aps.org/doi/10.1103/PhysRevE.78.011127

3. **Shi-Zeng Lin**, Xiao Hu, and Masashi Tachiki. Computer simulation on terahertz emission from intrinsic josephson junctions of high-T_c superconductors. *Phys. Rev. B*, 77:014507, Jan 2008. doi: 10.1103/PhysRevB.77.014507. URL https://link.aps.org/doi/10.1103/PhysRevB.77.014507

4. **Shi-Zeng Lin** and Xiao Hu. Possible dynamic states in inductively coupled intrinsic josephson junctions of layered high-T_c superconductors. *Phys. Rev. Lett.*, 100:247006, Jun 2008. doi: 10.1103/PhysRevLett.100.247006. URL https://link.aps.org/doi/10.1103/PhysRevLett.100.247006

5. Xiao Hu and **Shi-Zeng Lin**. Three-dimensional phase-kink state in a thick stack of josephson junctions and terahertz radiation. *Phys. Rev. B*, 78:134510, Oct 2008. doi: 10.1103/PhysRevB.78.134510. URL https://link.aps.org/doi/10.1103/PhysRevB.78.134510

6. Takahiro Nishio, Toshu An, Atsushi Nomura, Kousuke Miyachi, Toyoaki Eguchi, Hideaki Sakata, **Shi-Zeng Lin**, Nobuhiko Hayashi, Noriyuki Nakai, Masahiko Machida, and Yukio Hasegawa. Superconducting pb island nanostructures studied by scanning tunneling microscopy and spectroscopy. *Phys. Rev. Lett.*, 101:167001, Oct 2008. doi: 10.1103/PhysRevLett.101.167001. URL https://link.aps.org/doi/10.1103/PhysRevLett.101.167001

7. **Shi-Zeng Lin** and Xiao Hu. Phase dynamics in intrinsic josephson junctions and their electrodynamics. *Phys. Rev. B*, 79:104507, Mar 2009a. doi: 10.1103/PhysRevB.79.104507. URL https://link.aps.org/doi/10.1103/PhysRevB.79.104507

8. Xiao Hu and **Shi-Zeng Lin**. Cavity phenomena in mesas of cuprate high-T_c superconductors under voltage bias. *Phys. Rev. B*, 80:064516, Aug 2009. doi: 10.1103/PhysRevB.80.064516. URL https://link.aps.org/doi/10.1103/PhysRevB.80.064516

9. **Shi-Zeng Lin** and Xiao Hu. Kink State in a Stack of Intrinsic Josephson Junctions in Layered High-T_c Superconductors and Terahertz Radiation. *Journal of Superconductivity and Novel Magnetism*, 23(6):1025–1029, 2010a. doi: 10.1007/s10948-010-0673-4

10. **Shi-Zeng Lin** and Xiao Hu. Stability of the kink state in a stack of intrinsic Josephson junctions. *Physica C: Superconductivity*, 470, Supplement 1:S201–S202, December 2010b. doi: 10.1016/j.physc.2009.11.042

11. **Shi-Zeng Lin** and Xiao Hu. Response and amplification of terahertz electromagnetic waves in intrinsic josephson junctions of layered high-T_c superconductor. *Phys. Rev. B*, 82:020504, Jul 2010c. doi: 10.1103/PhysRevB.82.020504. URL https://link.aps.org/doi/10.1103/PhysRevB.82.020504

12. Takahiro Nishio, **Shi-Zeng Lin**, Toshu An, Toyoaki Eguchi, and Yukio Hasegawa. Tip-induced excitation of a single vortex in nano-size superconductors using scanning tunneling microscopy.

Nanotechnology, 21(46):465704, November 2010. doi: 10.1088/0957-4484/21/46/465704. [Reported in http://nanotechweb.org/cws/article/lab/44288]

13. **Shi-Zeng Lin** and Xiao Hu. Radiation of Terahertz Electromagnetic Waves from Build-In Nano Josephson Junctions of Cuprate High-Tc Superconductors. *Journal of Nanoscience and Nanotechnology*, 11(4):2916–2921, 2011a. doi: 10.1166/jnn.2011.3907

14. **Shi-Zeng Lin**, Xiao Hu, and Lev Bulaevskii. Synchronization in a one-dimensional array of point josephson junctions coupled to a common load. *Phys. Rev. B*, 84:104501, Sep 2011. doi: 10.1103/PhysRevB.84.104501. URL https://link.aps.org/doi/10.1103/PhysRevB.84.104501

15. **Shi-Zeng Lin** and Xiao Hu. Vortex states and the phase diagram of a multiple-component ginzburg-landau theory with competing repulsive and attractive vortex interactions. *Phys. Rev. B*, 84:214505, Dec 2011b. doi: 10.1103/PhysRevB.84.214505. URL https://link.aps.org/doi/10.1103/PhysRevB.84.214505

16. **Shi-Zeng Lin** and Lev N. Bulaevskii. Measuring spectrum of spin wave using vortex dynamics. *Phys. Rev. B*, 85:134508, Apr 2012a. doi: 10.1103/PhysRevB.85.134508. URL https://link.aps.org/doi/10.1103/PhysRevB.85.134508. [selected as an Editors' Suggestion]

17. **Shi-Zeng Lin** and Xiao Hu. Massless leggett mode in three-band superconductors with time-reversal-symmetry breaking. *Phys. Rev. Lett.*, 108:177005, Apr 2012a. doi: 10.1103/PhysRevLett.108.177005. URL https://link.aps.org/doi/10.1103/PhysRevLett.108.177005

18. **Shi-Zeng Lin**, Takahiro Nishio, Lev N. Bulaevskii, Matthias J. Graf, and Yukio Hasegawa. Thermally assisted penetration and exclusion of single vortex in mesoscopic superconductors. *Phys. Rev. B*, 85:134534, Apr 2012a. doi: 10.1103/PhysRevB.85.134534. URL https://link.aps.org/doi/10.1103/PhysRevB.85.134534

19. **Shi-Zeng Lin** and Xiao Hu. Phase solitons in multi-band superconductors with and without time-reversal symmetry. *New Journal of Physics*, 14(6):063021, June 2012b. doi: 10.1088/1367-2630/14/6/063021

20. **Shi-Zeng Lin**. Josephson effect between a two-band superconductor with $s++$ or $s\pm$ pairing symmetry and a conventional s-wave superconductor. *Phys. Rev. B*, 86:014510, Jul 2012. doi: 10.1103/PhysRevB.86.014510. URL https://link.aps.org/doi/10.1103/PhysRevB.86.014510

21. Jeehoon Kim, N. Haberkorn, **Shi-Zeng Lin**, L. Civale, E. Nazaretski, B. H. Moeckly, C. S. Yung, J. D. Thompson, and R. Movshovich. Measurement of the magnetic penetration depth of a superconducting MgB_2 thin film with a large intraband diffusivity. *Phys. Rev. B*, 86:024501, Jul 2012. doi: 10.1103/PhysRevB.86.024501. URL https://link.aps.org/doi/10.1103/PhysRevB.86.024501

22. Lev N. Bulaevskii and **Shi-Zeng Lin**. Prediction of polaronlike vortices and a dissociation depinning transition in magnetic superconductors: The example of erni$_2$**b**$_2$**C**. *Phys. Rev. Lett.*, 109:027001, Jul 2012a. doi: 10.1103/PhysRevLett.109.027001. URL https://link.aps.org/doi/10.1103/PhysRevLett.109.027001

23. **Shi-Zeng Lin** and Lev N. Bulaevskii. Theory for measurements of penetration depth in magnetic superconductors by magnetic force microscopy and scanning squid microscopy. *Phys. Rev. B*, 86:014518, Jul 2012b. doi: 10.1103/PhysRevB.86.014518. URL https://link.aps.org/doi/10.1103/PhysRevB.86.014518

24. **Shi-Zeng Lin** and Xiao Hu. In-plane dissipation as a possible synchronization mechanism for terahertz radiation from intrinsic josephson junctions of layered superconductors. *Phys. Rev. B*,

86:054506, Aug 2012c. doi: 10.1103/PhysRevB.86.054506. URL https://link.aps.org/doi/10.1103/PhysRevB.86.054506

25. **Shi-Zeng Lin** and Lev N. Bulaevskii. Enhancement of critical current density in superconducting/magnetic multilayers with slow magnetic relaxation dynamics and large magnetic susceptibility. *Phys. Rev. B*, 86:064523, Aug 2012c. doi: 10.1103/PhysRevB.86.064523. URL https://link.aps.org/doi/10.1103/PhysRevB.86.064523

26. **Shi-Zeng Lin**, Lev N. Bulaevskii, and Cristian D. Batista. Vortex dynamics in ferromagnetic superconductors: Vortex clusters, domain walls, and enhanced viscosity. *Phys. Rev. B*, 86:180506, Nov 2012b. doi: 10.1103/PhysRevB.86.180506. URL https://link.aps.org/doi/10.1103/PhysRevB.86.180506

27. Lev N. Bulaevskii and **Shi-Zeng Lin**. Self-induced pinning of vortices in the presence of ac driving force in magnetic superconductors. *Phys. Rev. B*, 86:224513, Dec 2012b. doi: 10.1103/PhysRevB.86.224513. URL https://link.aps.org/doi/10.1103/PhysRevB.86.224513

28. Feng Liu, **Shi-Zeng Lin**, and Xiao Hu. Cavity phenomenon and terahertz radiation of a tall stack of intrinsic Josephson junctions wrapped by a dielectric material. *Superconductor Science and Technology*, 26(2):025003, February 2013. doi: 10.1088/0953-2048/26/2/025003

29. **Shi-Zeng Lin** and Alexei E. Koshelev. Synchronization of Josephson oscillations in a mesa array of Bi2sr2cacu2o8+ through the Josephson plasma waves in the base crystal. *Physica C: Superconductivity*, 491:24–29, August 2013a. doi: 10.1016/j.physc.2012.11.008

30. **Shi-Zeng Lin** and Lev N. Bulaevskii. Dissociation transition of a composite lattice of magnetic vortices in the flux-flow regime of two-band superconductors. *Phys. Rev. Lett.*, 110:087003, Feb 2013a. doi: 10.1103/PhysRevLett.110.087003. URL https://link.aps.org/doi/10.1103/PhysRevLett.110.087003

31. **Shi-Zeng Lin** and Charles Reichhardt. Stabilizing fractional vortices in multiband superconductors with periodic pinning arrays. *Phys. Rev. B*, 87:100508, Mar 2013. doi: 10.1103/PhysRevB.87.100508. URL https://link.aps.org/doi/10.1103/PhysRevB.87.100508

32. **Shi-Zeng Lin**, Charles Reichhardt, Cristian D. Batista, and Avadh Saxena. Driven skyrmions and dynamical transitions in chiral magnets. *Phys. Rev. Lett.*, 110:207202, May 2013a. doi: 10.1103/PhysRevLett.110.207202. URL https://link.aps.org/doi/10.1103/PhysRevLett.110.207202

33. **Shi-Zeng Lin**, Oscar Ayala-Valenzuela, Ross D. McDonald, Lev N. Bulaevskii, Terry G. Holesinger, Filip Ronning, Nina R. Weisse-Bernstein, Todd L. Williamson, Alexander H. Mueller, Mark A. Hoffbauer, Michael W. Rabin, and Matthias J. Graf. Characterization of the thin-film nbn superconductor for single-photon detection by transport measurements. *Phys. Rev. B*, 87:184507, May 2013b. doi: 10.1103/PhysRevB.87.184507. URL https://link.aps.org/doi/10.1103/PhysRevB.87.184507

34. **Shi-Zeng Lin**, Charles Reichhardt, Cristian D. Batista, and Avadh Saxena. Particle model for skyrmions in metallic chiral magnets: Dynamics, pinning, and creep. *Phys. Rev. B*, 87:214419, Jun 2013c. doi: 10.1103/PhysRevB.87.214419. URL https://link.aps.org/doi/10.1103/PhysRevB.87.214419. [One figure is selected in Kaleidoscope of Phys. Rev. B]

35. **Shi-Zeng Lin** and Alexei E. Koshelev. Linewidth of the electromagnetic radiation from josephson junctions near cavity resonances. *Phys. Rev. B*, 87:214511, Jun 2013b. doi: 10.1103/PhysRevB.87.214511. URL https://link.aps.org/doi/10.1103/PhysRevB.87.214511

36. **Shi-Zeng Lin**, Charles Reichhardt, and Avadh Saxena. Manipulation of skyrmions in nanodisks with a current pulse and skyrmion rectifier. *Applied Physics Letters*, 102(22):222405, June 2013d. doi: doi:10.1063/1.4809751

37. **Shi-Zeng Lin** and Dibyendu Roy. Role of kinetic inductance in transport properties of shunted superconducting nanowires. *J. Phys.: Condens. Matter*, 25(32):325701, August 2013. doi: 10.1088/0953-8984/25/32/325701

38. **Shi-Zeng Lin** and Lev N. Bulaevskii. Quantum motion and level quantization of a skyrmion in a pinning potential in chiral magnets. *Phys. Rev. B*, 88:060404, Aug 2013b. doi: 10.1103/PhysRevB.88.060404. URL https://link.aps.org/doi/10.1103/PhysRevB.88.060404

39. L. N. Bulaevskii and **Shi-Zeng Lin**. Polaron-like vortices, dissociation transition, and self-induced pinning in magnetic superconductors. *J. Exp. Theor. Phys.*, 117(3):407–417, September 2013. doi: 10.1134/S1063776113110071

40. **Shi-Zeng Lin** and Cristian D. Batista. Orbital magnetism induced by heat currents in mott insulators. *Phys. Rev. Lett.*, 111:166602, Oct 2013. doi: 10.1103/PhysRevLett.111.166602. URL https://link.aps.org/doi/10.1103/PhysRevLett.111.166602

41. B. Maiorov, P. Mele, S. A. Baily, M. Weigand, **Shi-Zeng Lin**, F. F. Balakirev, K. Matsumoto, H. Nagayoshi, S. Fujita, Y. Yoshida, Y. Ichino, T. Kiss, A. Ichinose, M. Mukaida, and L. Civale. Inversion of the upper critical field anisotropy in FeTeS films. *Supercond. Sci. Technol.*, 27(4):044005, April 2014. doi: 10.1088/0953-2048/27/4/044005

42. **Shi-Zeng Lin**, Charles Reichhardt, Cristian D. Batista, and Avadh Saxena. Dynamics of skyrmions in chiral magnets: Dynamic phase transitions and equation of motion. *Journal of Applied Physics*, 115(17):17D109, January 2014a. doi: 10.1063/1.4861576. URL http://scitation.aip.org/content/aip/journal/jap/115/17/10.1063/1.4861576

43. **Shi-Zeng Lin**, Cristian D. Batista, and Avadh Saxena. Internal modes of a skyrmion in the ferromagnetic state of chiral magnets. *Phys. Rev. B*, 89:024415, Jan 2014b. doi: 10.1103/PhysRevB.89.024415. URL https://link.aps.org/doi/10.1103/PhysRevB.89.024415

44. **Shi-Zeng Lin** and Lev N. Bulaevskii. I–V characteristics of short superconducting nanowires with different bias and shunt: a dynamic approach. *J. Phys.: Condens. Matter*, 26(15):155703, April 2014. doi: 10.1088/0953-8984/26/15/155703

45. **Shi-Zeng Lin**, Yoshitomo Kamiya, Gia-Wei Chern, and Cristian D. Batista. Stiffness from disorder in triangular-lattice ising thin films. *Phys. Rev. Lett.*, 112:155702, Apr 2014c. doi: 10.1103/PhysRevLett.112.155702. URL https://link.aps.org/doi/10.1103/PhysRevLett.112.155702

46. **Shi-Zeng Lin**, Cristian D. Batista, Charles Reichhardt, and Avadh Saxena. ac current generation in chiral magnetic insulators and skyrmion motion induced by the spin seebeck effect. *Phys. Rev. Lett.*, 112:187203, May 2014d. doi: 10.1103/PhysRevLett.112.187203. URL https://link.aps.org/doi/10.1103/PhysRevLett.112.187203

47. **Shi-Zeng Lin**. Mutual synchronization of two stacks of intrinsic Josephson junctions in cuprate superconductors. *Journal of Applied Physics*, 115(17):173901, May 2014a. doi: 10.1063/1.4874677

48. C. J. Olson Reichhardt, **Shi-Zeng Lin**, D. Ray, and C. Reichhardt. Comparing the dynamics of skyrmions and superconducting vortices. *Physica C: Superconductivity*, 503:52–57, August 2014. doi: 10.1016/j.physc.2014.03.029

49. **Shi-Zeng Lin**, Kipton Barros, Eundeok Mun, Jae-Wook Kim, Matthias Frontzek, S. Barilo, S. V. Shiryaev, Vivien S. Zapf, and Cristian D. Batista. Magnetic-field-induced phases in anisotropic triangular antiferromagnets: Application to $CuCrO_2$. *Phys. Rev. B*, 89:220405, Jun 2014e. doi: 10.1103/PhysRevB.89.220405. URL https://link.aps.org/doi/10.1103/PhysRevB.89.220405. [selected as an Editors' Suggestion]

50. **Shi-Zeng Lin**, Xueyun Wang, Yoshitomo Kamiya, Gia-Wei Chern, Fei Fan, David Fan, Brian Casas, Yue Liu, Valery Kiryukhin, Wojciech H. Zurek, Cristian D. Batista, and Sang-Wook Cheong. Topological defects as relics of emergent continuous symmetry and Higgs condensation of disorder in ferroelectrics. *Nature Physics*, 10(12):970–977, December 2014f. doi: 10.1038/nphys3142. URL https://www.nature.com/articles/nphys3142. [selected as Cover Story]

51. Lev N. Bulaevskii and **Shi-Zeng Lin**. Dissipation in josephson tunneling junctions at low temperatures. *Phys. Rev. B*, 90:054509, Aug 2014. doi: 10.1103/PhysRevB.90.054509. URL https://link.aps.org/doi/10.1103/PhysRevB.90.054509

52. Pinaki Das, **Shi-Zeng Lin**, N. J. Ghimire, K. Huang, F. Ronning, E. D. Bauer, J. D. Thompson, C. D. Batista, G. Ehlers, and M. Janoschek. Magnitude of the magnetic exchange interaction in the heavy-fermion antiferromagnet $cerhin_5$. *Phys. Rev. Lett.*, 113:246403, Dec 2014. doi: 10.1103/PhysRevLett.113.246403. URL https://link.aps.org/doi/10.1103/PhysRevLett.113.246403

53. **Shi-Zeng Lin**, Avadh Saxena, and Cristian D. Batista. Skyrmion fractionalization and merons in chiral magnets with easy-plane anisotropy. *Phys. Rev. B*, 91:224407, Jun 2015. doi: 10.1103/PhysRevB.91.224407. URL https://link.aps.org/doi/10.1103/PhysRevB.91.224407

54. **Shi-Zeng Lin** and Avadh Saxena. Noncircular skyrmion and its anisotropic response in thin films of chiral magnets under a tilted magnetic field. *Phys. Rev. B*, 92:180401, Nov 2015. doi: 10.1103/PhysRevB.92.180401. URL https://link.aps.org/doi/10.1103/PhysRevB.92.180401

55. Avadh Saxena and **Shi-Zeng Lin**. Skyrmions in Functional Materials. *Integrated Ferroelectrics*, 166(1):1–9, October 2015. doi: 10.1080/10584587.2015.1102528

56. **Shi-Zeng Lin** and Avadh Saxena. Dynamics of dirac strings and monopolelike excitations in chiral magnets under a current drive. *Phys. Rev. B*, 93:060401, Feb 2016. doi: 10.1103/PhysRevB.93.060401. URL https://link.aps.org/doi/10.1103/PhysRevB.93.060401

57. **Shi-Zeng Lin** and Satoru Hayami. Ginzburg-landau theory for skyrmions in inversion-symmetric magnets with competing interactions. *Phys. Rev. B*, 93:064430, Feb 2016. doi: 10.1103/PhysRevB.93.064430. URL https://link.aps.org/doi/10.1103/PhysRevB.93.064430

58. Hong Chul Choi, **Shi-Zeng Lin**, and Jian-Xin Zhu. Density functional theory study of skyrmion pinning by atomic defects in MnSi. *Phys. Rev. B*, 93:115112, Mar 2016. doi: 10.1103/PhysRevB.93.115112. URL https://link.aps.org/doi/10.1103/PhysRevB.93.115112

59. **Shi-Zeng Lin**, Satoru Hayami, and Cristian D. Batista. Magnetic vortex induced by nonmagnetic impurity in frustrated magnets. *Phys. Rev. Lett.*, 116:187202, May 2016a. doi: 10.1103/PhysRevLett.116.187202. URL https://link.aps.org/doi/10.1103/PhysRevLett.116.187202

60. Satoru Hayami, **Shi-Zeng Lin**, and Cristian D. Batista. Bubble and skyrmion crystals in frustrated magnets with easy-axis anisotropy. *Phys. Rev. B*, 93:184413, May 2016a. doi: 10.1103/PhysRevB.93.184413. URL https://link.aps.org/doi/10.1103/PhysRevB.93.184413

61. **Shi-Zeng Lin**. Edge instability in a chiral stripe domain under an electric current and skyrmion generation. *Phys. Rev. B*, 94:020402, Jul 2016. doi: 10.1103/PhysRevB.94.020402. URL https://link.aps.org/doi/10.1103/PhysRevB.94.020402

62. Howon Kim, **Shi-Zeng Lin**, Matthias J. Graf, Yoshinori Miyata, Yuki Nagai, Takeo Kato, and Yukio Hasegawa. Electrical conductivity through a single atomic step measured with the proximity-induced superconducting pair correlation. *Phys. Rev. Lett.*, 117:116802, Sep 2016a. doi: 10.1103/PhysRevLett.117.116802. URL https://link.aps.org/doi/10.1103/PhysRevLett.117.116802

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• Review papers

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• Book chapter

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• Ph.D. Dissertation

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• Invited

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2. "Computer simulation on Terahertz Emission from Intrinsic Josephson Junctions of High-Tc Superconductor", presented at "International Workshop on Vortex Physics: Phase Diagram, Dynamics and Novel Applications", held at Tsukuba, Japan, on Mar. 29 -30, 2007.
3. "Terahertz Emission from High-Tc Superconductors", presented at "4th International Workshop Hangzhou 2007 on Simulational Physics", held at Hangzhou, China, on Nov. 10 -11, 2007.
4. "π Phase Kink in a Stack of Intrinsic Josephson Junctions and THz Radiation", presented at "The Joint JSPS-ESF International Conference on Nanoscience and Engineering in Superconductivity", held at Tsukuba, Japan, on Mar. 23, 2009.
5. "Phase Dynamics and Electromagnetic Properties of Intrinsic Josephson Junctions in Layered High-Tc Superconductors", presented at "Seventh International Conference on New Theories, Discoveries, and Applications of Superconductors and Related Materials (New3SC7)", held at Beijing, China, on May. 14- May. 16. 2009.
6. "The Kink State and Terahertz Radiation", presented at "The 7th International Symposium on Intrinsic Josephson Effects and Plasma Oscillations in High-Tc Superconductors", held at Hirosaki, Japan, on Apr. 29 - May. 2, 2010.
7. "The in-plane dissipation and phase kink as mechanism of strong terahertz radiation from BSCCO", presented at "The 7th International Symposium on Intrinsic Josephson Effects and Plasma Oscillations in High-Tc Superconductors", held at Izmir, Turkey, on Jun. 13-16 , 2012.
8. "Dynamics of skyrmions in metallic chiral magnets" presented at Ames National Laboratory on Sep. 26, 2013.
9. "Fractionalizing the vortex lattice in multiband superconductors in the flux flow region", presented at "APS March Meeting 2014", held at Denver, USA, on Mar. 3 – Mar. 7, 2014.
10. "Skyrmions in frustrated magnets", presented at "APS March Meeting 2016", held at Baltimore, USA, on Mar. 14 - Mar. 18, 2016.
11. "Time-reversal symmetry breaking in multi-band superconductors with frustration: the soft Leggett mode and spontaneous magnetization", presented at " Condensed Matter Physics Seminar Series hosted by the Department of Physics and Astronomy at Northwestern University at Chicago" on Mar. 31, 2016.
12. "Skyrmions in magnets with inversion symmetry", presented at "MATERIALS SCIENCE DIVISION SEMINAR" at Argonne National Laboratory on Apr. 1st, 2016.
13. "Ground state vortex configuration induced by defects in superconductors and magnets", presented at "Interference of Magnetism and Superconductivity" at International Institute of Physics, Natal, Brazil on Aug. 25th, 2016.
14. "Possible skyrmion lattice in rare-earth magnets", presented at Shull-Wollan center, Oak Ridge National Laboratory on Oct. 28, 2016.

15. “Edge instability in a chiral stripe domain under an electric current and skyrmion generation”, presented at The 10th International Conference on Computational Physics (ICCP10), Jan. 16-20, 2017

16. “Face centered cubic and hexagonal skyrmion pancake lattice in inversion symmetric magnets”, presented at University of California San Diego Physical Seminar on April. 26, 2017.

17. “Skyrmion spin texture in inversion symmetric magnets”, presented at Open Quantum Systems, International Center for Theoretical Sciences, Bengaluru, India on Jul. 20, 2017.

18. “Skyrmion dynamics in multiferroics in the presence of a temperature gradient”, presented at The International Meeting on Ferroelectricity (IMF) 2017, San Antonio, Texas on Sep. 4 - 8, 2017.

19. “Stabilization and dynamics of skyrmions in magnets”, presented at 33rd Summer Conference on Topology and its Applications, Bowling Green, KY on Jul. 17 - 20, 2018.

20. “Ground state topological spin textures induced by defects in frustrated magnets”, presented at Emergent Topological Order in Classical Systems, Santa Fe, NM on Aug. 20 - 23, 2018.

21. “Topology and Anderson Localization in the Kondo Lattice Model”, presented at Shull-Wollan center, Oak Ridge National Laboratory on Sep. 28, 2018.

22. “Novel thermal gradient induced charge transport in magnetic insulators with multiple-Q spin texture”, presented at CNLS 39th Annual Conference - Strongly Correlated Quantum Materials, Santa Fe, NM on Apr. 29 - May 3, 2019.

23. “Enhanced superconductivity in quasiperiodic systems”, presented at Quantum Matter Working Group 2019, Los Alamos, Jul. 22 - 26, 2019

24. “Dynamics of multiple-Q spin textures and its effect on electronic state”, presented at Sungkyunkwan University, Korea, Sep. 17, 2019

25. “Dimension transcendence and anomalous charge transport in magnets with moving multiple-Q spin textures”, presented at The 2nd workshop on Spin-orbit Coupled Topological States, Pohang, Korea, Sep. 19 - Sep. 21, 2019

26. “Magnetic skyrmions: stabilization and dynamics”, presented at Topology in Magnetism: Theory Meets Experiments 2019, La Plata, Buenos Aires, Argentina, Oct. 22 - 24, 2019 (video presentation).

27. “Switching of valley polarization and topology in twisted bilayer graphene by electric currents”, presented at Theoretical Condensed Matter, Nordita, Nov. 24, 2020 (Zoom presentation).

28. “Topology and its electrical current control in two dimensional Moiré superlattice”, presented at Wutong forum organized by The Chinese University of Hong Kong, Aug. 14 - 16, 2021 (Zoom presentation).

29. “Correlated Chern insulator in two-dimensional materials”, presented at George Mason University, May. 20, 2022 (Zoom presentation).

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31. “Correlated Chern insulator in two-dimensional materials”, presented at The International School and Workshop on Electronic Crystals ECRYS-202, Pohang, Cargese, Corsica, France (Institut d’Etudes Scientifiques de Cargèse), Aug. 8 - Aug. 20, 2022.

• Contributed

1. ”Phase Dynamics and Electromagnetic Properties of Intrinsic Josephson Junctions”, presented at ”The 16th Domestic Workshop on Vortex Physics”, held at Tokyo Institute of Technology, Japan, on Dec. 8 -10, 2008.
2. ”Radiation of terahertz electromagnetic waves from high-Tc superconductors”, presented at ”NIMS Junior Researcher Seminar”, held at Tsukuba, Japan, on Dec. 19, 2008.
3. ”Generation of Terahertz Electromagnetic waves by High-Tc Superconductors”, presented at ”the 6th NIMS/MANA-Nanoscience@Cambridge-UCLA/CNSA Nanotechnology Students’ Summer School”, held at Los Angeles, California, USA, on Jul. 26 - Aug. 1, 2009.
4. ”Detection and Amplification of THz Electromagnetic Waves Based on Intrinsic Josephson Junctions”, presented at ”The 17th Domestic Workshop on Vortex Physics”, held at Osaka Prefecture University, Japan, on Dec. 1 - 3, 2009.
5. ”Phase Dynamics in Intrinsic Josephson Junctions of Layered High-Tc Superconductors”, presented at ”NIMS Junior Researcher Seminar”, held at Tsukuba, Japan, on Dec. 4, 2009.
6. ”Vortex states and the phase diagram of a multiple-component Ginzburg-Landau theory with competing repulsive and attractive vortex interactions”, presented at ”4th AEARU Advanced Materials Science Workshop on Artificial and Self-Organized Nanostructure Sciences and Nano-Technologies”, held at University of Tsukuba, Japan, on Aug. 30 - Sep. 3, 2010.
7. ”Numerical study of vortex interactions and phase diagram in two-component superconductor”, presented at ”The 18th Domestic Workshop on Vortex Physics”, held at Japan Atomic Energy Agency, Tokyo, Japan, on Dec. 1 - 3, 2010.
8. ”Vortex Dynamics in Ferromagnetic Superconductors: Excitations of Domain Walls and Enhanced Viscosity”, presented at ”APS March Meeting 2012”, held at Boston, USA, on Feb. 27 - Mar. 2, 2012.
9. “Polaronic pinning of vortex in magnetic superconductors and magnetic-superconducting multilayers”, presented at ”APS March Meeting 2013”, held at Baltimore, USA, on Mar. 18 - Mar. 22, 2013.
10. “Dynamics of Emergent Spin Textures in Chiral Magnets”, presented at ”Emergent Paradigms in Nonlinear Complexity: From PT-Symmetry to Nonlinear Dirac Systems”, held at Santa Fe, USA, on Jun. 8 - Jun. 10, 2015.
11. “Meron Spin Texture in Chiral Magnets with an Easy-Plane Anisotropy”, presented at ”2015 MRS Fall Meeting and Exhibits”, held at Boston, Massachusetts, on Nov. 29 - Dec. 4, 2015.
12. “Generation of skyrmions by chopping magnetic chiral stripe domains with an electric current”, presented at ”61st Annual Conference on Magnetism and Magnetic Materials”, held at New Orleans, Louisiana, on Oct. 31 - Nov. 4, 2016.
13. “Impurity-induced magnetic droplet in unconventional superconductors near magnetic instability: Application to Nd doped CeCoIn5”, presented at ”APS March Meeting 2018”, held at Los Angeles, Ca, on Mar. 5 - Mar. 9, 2018.
14. “Enhanced superconductivity in quasiperiodic systems”, presented at ”APS March Meeting 2021” (virtual meeting) on Mar. 15 - Mar. 19, 2021.

• Poster

1. "Computer Simulation on Terahertz Emission from High-Tc Superconductors using Josephson flux flow", presented at "2nd International Autumn Seminar on Nanoscience and Engineering in Superconductivity for Young Scientist", held at Nasu, Tochigi preecture, Japan, on Nov. 25 - Dec. 2, 2007.
2. "Kink State in Inductively Coupled Intrinsic Josephson Junctions and The Terahertz Radiation", presented at "The 6th International Symposium on Intrinsic Josephson Effect and Plasma Oscillations in High-Tc Superconductors", held at Pohang, Korea, on July 17-19, 2008.
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6. "Excitation of Josephson Plasma by π Phase Kink and Terahertz Radiation in Layered High-Tc Superconductors", presented at "12th International Workshop on Vortex Matter in Superconductors", held at Yamanaka Naito Seminar House, Lake Yamanaka, Yamanashi, Japan, on September 12-16, 2009.
7. "Emission of Terahertz Electromagnetic Waves from Cuprate Superconductors ", presented at "MANA International Symposium 2010", held at Epochal Tsukuba, Japan, on Mar. 3 - 5, 2010.
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9. "Skyrmion functionality", presented at "Materials for the Future Capability Review", held at Los Alamos National Laboratory, USA, on May. 3 - May. 6, 2015.
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