

Name: Shizhong Zhang

Present Academic Position: Assistant Professor

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Academic Qualification

2012 Postdoctoral Fellow, The Ohio State University, Columbus, Ohio, USA

2009 Ph.D. in Physics, University of Illinois at Urbana-Champaign, USA

2003 B.S. in Physics, Tsinghua University, Beijing, PRC.

Academic Positions

2012 - 2018: Assistant Professor, Department of Physics, The University of Hong Kong

2018 - present: Associate Professor, Department of Physics, The University of Hong Kong

Research Overview

My research area are in theoretical condensed matter and cold atom physics. For the past few years, my research focus on the effects of spin-orbit coupling in a Bose-condensed quantum gas. I am also interested in the transport properties of strongly interacting Fermi gas, in particular, its spin diffusion behaviour.

Prizes and Awards

2015: Croucher Innovation Awards (The Croucher Foundation, Hong Kong)

2017: Outstanding Young Researcher Award, HKU.

Selected Publications

1. Shizhong Zhang and Anthony J. Leggett, Sum-rule analysis of radio-frequency spectroscopy of ultracold Fermi gas, *Physics Review A*, **77**, 033614 (2008).
2. Shizhong Zhang and Anthony J. Leggett, Universal properties of ultracold Fermi gases, *Physics Review A*, **79**, 023601 (2009).
3. Shizhong Zhang, Hsiang-hsuan Hung and Congjun Wu, Proposed realization of itinerant ferromagnetism in optical lattices, *Physics Review A*, **82**, 053618 (2010)
4. Zeng-Qiang Yu, Shizhong Zhang and Hui Zhai, Stability condition of a strongly interacting boson-fermion mixture across an interspecies Feshbach resonance, *Physics Review A, Rapid Communication*, **83**, 041603(R) (2011)
5. Jayantha Vyasnakere, Shizhong Zhang and Vijay B. Shenoy, BCS-BEC crossover induced by a synthetic non-Abelian gauge field, *Physics Review B*, **84**, 014512 (2011)
6. Shizhong Zhang and Tin-Lun Ho, Atom loss maximum in ultra-cold Fermi gases, *New Journal of Physics*, **13**, 055003 (2011).
7. Tin-Lun Ho and Shizhong Zhang, Bose-Einstein condensate with spin-orbit coupling, *Physics Review Letters*, **107**, 150403 (2011).
8. Edward Taylor, Shizhong Zhang, William Schneider and Mohit Randeria, Colliding clouds of strongly interacting spin-polarized fermions, *Physics Review A*, **84**, 063622 (2011)
9. Dimitry Borzov, Mohammad Mashayeskhii, Shizhong Zhang, Jun-liang Song and Fei Zhou, Three-dimensional Bose gas near a Feshbach resonance, *Physics Review A*, **85**, 023620 (2012)
10. William Cole, Zhang Shizhong, A. Paramekanti, and N. Trivedi, Bose-Hubbard models with synthetic spin-orbit coupling: Mott insulators, spin textures, and superfluidity, *Physics Review Letters*, **109**, 085302 (2012)

11. Sumilan Banerjee, Shizhong Zhang, and Mohit Randeria, Theory of quantum oscillations in the vortex-liquid state of high-Tc superconductors, *Nature Communications* 4, 1700 (2013).
12. Zhengkun Fu, Lianghai Huang, Zengming Meng, Pengjun Wang, Long Zhang, Shizhong Zhang, Hui Zhai, Peng Zhang, Jing Zhang, Production of Feshbach molecules induced by spin-orbit coupling in Fermi gases, *Nature Physics* 10, 110 (2014).
13. Alma Bardon, S. Beattie, C. Luciuk, W. Cairncross, D. Fine, N. S. Cheng, G. J. A. Edge, E. Taylor, Shizhong Zhang, S. Trotzky, J. H. Thywissen, Transverse demagnetization dynamics of a unitary Fermi gas, *Science* 344, 722 (2014)
14. Zhihao Xu, William Cole, Shizhong Zhang, Mott-superfluid transition for spin-orbit coupled bosons in one-dimensional optical lattices, *Physics Review A, Rapid Communication*, 89, 051604(R) (2014)
15. Juan Yao, Shizhong Zhang, Bose-Hubbard models with staggered flux: quantum phases, collective excitation, and tricriticality, *Physics Review A* 90, 023608 (2014)
16. Boyang Liu, Hui Zhai and Shizhong Zhang, Fluctuation effects on the transport properties of unitary Fermi gases, *Physics Review A, Rapid Communication*, 90, 051602(R) (2014)
17. S. Trotzky, S. Beattie, C. Luciuk, S. Smale, A. B. Bardon, T. Enss, E. Taylor, Shizhong Zhang, and J. H. Thywissen, Observation of the Leggett-Rice effect in a unitary Fermi gas, *Physics Review Letters*, 114, 015301 (2015)
18. Xiaoke Li, Bing Zhu, Xiaodong He, Fudong Wang, Mingyang Guo, Zhi-Fang Xu, Shizhong Zhang, and Dajun Wang, Coherent heteronuclear spin dynamics in an ultracold spinor mixture, *Physics Review Letters*, 114, 255301 (2015)
19. Zhenhua Yu, Joseph H. Thywissen, and Shizhong Zhang, Universal Relations for a Fermi Gas Close to a p-Wave Interaction Resonance, *Physics Review Letters*, 115, 135304 (2015)
20. Zhihao Xu, Zhenhua Yu and Shizhong Zhang, Evidence for correlated states in a cluster of bosons with Rashba spin-orbit coupling, *New Journal of Physics* 18, 025002 (2016)
21. Christopher Luciuk, Stefan Trotzky, Scott Smale, Zhenhua Yu, Shizhong Zhang and Joseph H. Thywissen, Evidence for universal relations describing a gas with p-wave interactions, *Nature Physics* 12, 599 (2016)
22. Boyang Liu, Hui Zhai, and Shizhong Zhang, Evolution of the Higgs mode in a fermion superfluid with tunable interactions, *Physics Review A* 93, 033641 (2016)
23. Wen-Yu He, Shizhong Zhang and K. T. Law, Realization and detection of Weyl semimetals and the chiral anomaly in cold atomic systems, *Physics Review A* 94, 013606 (2016)
24. Wen-Bin He, Yang-Yang Chen, Shizhong Zhang, and Xi-Wen Guan, Universal properties of Fermi gases in one dimension, *Physics Review A, Rapid Communication*, 94, 031604(R) (2016)
25. Yi-Cai Zhang, Zeng-Qiang Yu, Tai Kai Ng, Shizhong Zhang, Lev Pitaevskii and Sandro Stringari, Superfluid density of a spin-orbit-coupled Bose gas, *Physics Review A* 94, 033635 (2016)
26. Yi-Cai Zhang, Shanshan Ding, and Shizhong Zhang, Collective modes in a two-band superfluid of ultracold alkaline-earth-metal atoms close to an orbital Feshbach resonance, *Physics Review A, Rapid Communication*, 95, 041603(R) (2017)
27. Yi-Cai Zhang Zhihao Xu and Shizhong Zhang, Topological superfluids and the BEC-BCS crossover in the attractive Haldane-Hubbard model, *Physics Review A* 95, 043640 (2017)

28. Boyang Liu, Hui Zhai, and Shizhong Zhang, Anomalous conductance of a strongly interacting Fermi gas through a quantum point contact, *Physics Review A* 95, 013623 (2017)
29. Yi-Cai Zhang and Shizhong Zhang, Strongly interacting p-wave Fermi gas in two dimensions: Universal relations and breathing mode, *Physics Review A* 95, 023603 (2017)
30. Pengfei Zhang, Shizhong Zhang, and Zhenhua Yu, Effective theory and universal relations for Fermi gases near a d-wave interaction resonance, *Physics Review A* 95, 043609 (2017)