CURRICULUM VITAE

Personal Information

Last Name: Xiao
First Name: Cong
Gender: Male
Date of Birth: 04/23/1989
Place of Birth: Yicheng, Hubei Province, China
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Education

Sep, 2011-Jul, 2016 **Institute of Theoretical Physics, School of Physics, Peking University,**
Beijing, China
- Degree: PhD
- Major: Physics
- Research Focus: Theoretical Condensed Matter Physics
- PHD thesis topic: Thermoelectric responses in spin-orbit coupled Rashba two-dimensional electron systems

Sep, 2007-Jul, 2011 **Department of Physics, Beijing Normal University,**
Beijing, China
- Degree: Bachelor of Science
- Major: Physics

Professional Experiences and Activities

Jan, 2022 – Present **Department of Physics, The University of Hong Kong,**
Hong Kong, China
- Research Assistant Professor, Supervisor: Prof. Wang Yao
- Research Focus: Theoretical Condensed Matter Physics

Jul, 2021 – Dec, 2021 **Department of Physics, The University of Hong Kong,**
Hong Kong, China
- Senior Research Assistant, Supervisor: Prof. Wang Yao
- Research Focus: Theoretical Condensed Matter Physics

Sep, 2016 - Jan, 2021 **Department of Physics, The University of Texas at Austin, Austin, Texas, the United States**

- Post-doctoral researcher, Supervisor: Prof. Qian Niu
- Research Focus: Theoretical Condensed Matter Physics

Jun, 2016 – present **Referee**

- Physical Review Letters, Physical Review B, Physical Review Materials, Nature Physics, Nature Communications, Communications Physics, Frontiers of Physics

Conference Session Chair

- 2019, Spin Mini Workshop 2019: Emerging Spin Dynamics and Phenomena in Magnetic Geometries and Structures, Cheng Du, China

Research Experience and Interests

- Berry phase and quantum geometric effects on exotic nonlinear responses
- Nonlinear Hall transport
- Nonlinear spintronics
- Quantum layertronics
- Magnetoelectric and magnetothermal effects
- Anomalous Hall effect, spin Hall effect, and spin-orbit torque
- Thermal Hall effect and thermomagnetic transport
- Magneto-resistance of band geometrical origin

Theoretical Skills

- Second order semiclassical dynamics of Bloch electrons
- Nonlinear Boltzmann transport theory incorporating Berry-phase related effects
- Density matrix nonlinear response theories
- Semiclassical dynamics of superconducting quasiparticles
- Green's function theory for linear response

Teaching Experience

- Teaching Assistant, School of Physics, Peking University
  09/2012 – 01/2013, Graduate Course: Quantum Statistical Physics
  02/2014 – 06/2014, Undergraduate Course: Thermal Physics
  09/2014 – 01/2015, Undergraduate Course: Methods of Mathematical Physics

- Teacher, Department of Physics, The University of Hong Kong
  01/2022 – 05/2022, Undergraduate Course: Advanced Quantum Mechanics

Honors & Prizes

1. President Scholarship, Peking University, Sep. 2015
2. Chen Huxiong First Scholarship, Peking University, Oct. 2015
3. President Scholarship, Peking University, Sep. 2014
4. President Scholarship, Peking University, Sep. 2013
5. May Fourth Scholarship, Peking University, Nov. 2012
6. President Scholarship, Peking University, Sep. 2012
7. President Scholarship, Peking University, Sep. 2011
8. First Academic Scholarship, Beijing Normal University, Nov. 2010
9. First prize of Mathematical Modeling Contest of Beijing Normal University, May. 2010
10. Third Academic Scholarship, Beijing Normal University, Nov. 2009
11. First Academic Scholarship, Beijing Normal University, Nov. 2008

Main Publications (first author and corresponding author)

1. Yue-Xin Huang, Xiaolong Feng, Hui Wang, **Cong Xiao (corresponding author)**, and Shengyuan A. Yang, "Intrinsic Nonlinear Planar Hall Effect", arXiv: 2208.03639.

2. Dawei Zhai, Cong Chen, **Cong Xiao (corresponding author)**, and Wang Yao, "Layer-Contrasted Hall Effect in Twisted Bilayers with Time Reversal Symmetry", arXiv: 2207.14644.

3. **Cong Xiao**, Huiying Liu, Weikang Wu, Hui Wang, Qian Niu, and Shengyuan A. Yang, "Intrinsic Nonlinear Electric Spin Generation in Centrosymmetric Magnets", Phys. Rev. Lett. 129, 086602 (2022).

4. Huiying Liu, Jianzhou Zhao, Yue-Xin Huang, Weikang Wu, Xian-Lei Sheng, **Cong Xiao (corresponding author)**, and Shengyuan A. Yang, "Intrinsic Second-Order Anomalous Hall Effect and Its Application in Compensated Antiferromagnets", Phys. Rev. Lett. 127, 277202 (2021).

5. **Cong Xiao** and Qian Niu, "Conserved current of nonconserved quantities", Phys. Rev. B 104, L241411 (2021).

6. **Cong Xiao**, Bangguo Xiong, and Qian Niu, "Electric driving of magnetization dynamics in a hybrid insulator", Phys. Rev. B 104, 064433 (2021).

7. Zhi Wang, Liang Dong, **Cong Xiao (corresponding author)**, and Qian Niu, "Berry curvature effects on quasiparticle dynamics in superconductors", Phys. Rev. Lett. 126, 187001 (2021).

8. **Cong Xiao**, Yafei Ren, and Bangguo Xiong, "Adiabatically induced orbital magnetization", Phys. Rev. B 103, 115432 (2021).

9. **Cong Xiao**, Huiying Liu, Jianzhou Zhao, Shengyuan A. Yang, and Qian Niu, "Thermoelectric generation of orbital magnetization in metals", Phys. Rev. B 103, 045401 (2021).

10. **Cong Xiao** and Qian Niu, "Unified bulk semiclassical theory for intrinsic thermal transport and magnetization currents", Phys. Rev. B 101, 235430 (2020).

11. **Cong Xiao**, Hua Chen, Yang Gao, Di Xiao, Allan H. MacDonald, and Qian Niu, "Linear

magnetoresistance induced by intra-scattering semiclassics of Bloch electrons", Phys. Rev. B 101, 201410(R) (2020).

12. Liang Dong, **Cong Xiao (corresponding author)**, Bangguo Xiong and Qian Niu, "Berry-phase effects in dipole density and Mott relation", Phys. Rev. Lett. 124, 066601 (2020).

13. Weiwei Chen, **Cong Xiao (corresponding author)**, Qinwei Shi and Qunxiang Li, "Spin-orbit related power-law dependence of the diffusive conductivity on the carrier density in disordered Rashba two-dimensional electron systems", Phys. Rev. B 101, 020203(R) (2020).

14. **Cong Xiao**, Z. Z. Du, and Qian Niu, "Theory of nonlinear Hall effects: Modified semiclassics from quantum kinetics", Phys. Rev. B 100, 165422 (2019).

15. **Cong Xiao**, Hailong Zhou, and Qian Niu, "Scaling parameters in anomalous and nonlinear Hall effects depend on temperature", Phys. Rev. B 100, 161403(R) (2019).

16. **Cong Xiao**, Yi Liu, Zhe Yuan, Shengyuan A. Yang, and Qian Niu, "Temperature dependence of side-jump spin Hall conductivity", Phys. Rev. B 100, 085425 (2019).

17. Hailong Zhou, **Cong Xiao (corresponding author)**, and Qian Niu, "Valley-contrasting orbital magnetic moment induced negative magnetoresistance", Phys. Rev. B 100, 041406(R) (2019).

18. **Cong Xiao**, Ying Liu, Ming Xie, Shengyuan A. Yang, and Qian Niu, "Theory of the phonon side-jump contribution in anomalous Hall effect", Phys. Rev. B 99, 245418 (2019).

19. **Cong Xiao**, Jihang Zhu, Bangguo Xiong, and Qian Niu, "Conserved spin current for the Mott relation ", Phys. Rev. B **98**, 081401(R) (2018).

20. **Cong Xiao**, Bangguo Xiong, and Fei Xue, "Boltzmann approach to spin-orbit-induced transport in effective quantum theories", J. Phys: Condens. Matter, **30**, 415002 (2018).

21. **Cong Xiao**, "Semiclassical Boltzmann theory of spin Hall effects in giant Rashba systems", Front. Phys. **13**, 137202 (2018).

22. **Cong Xiao** and Qian Niu, "Semiclassical theory of spin-orbit torques in disordered multiband electron systems", Phys. Rev. B **96**, 045428 (2017).

23. **Cong Xiao** and Qian Niu, "Rashba torque beyond the Boltzmann regime", Phys. Rev. B **96**, 035423 (2017).

24. **Cong Xiao**, Dingping Li, and Zhongshui Ma, "The role of band-index-dependent transport relaxation times in anomalous Hall effect", Phys. Rev. B **95**, 035426 (2017).

25. **Cong Xiao**, Dingping Li, and Zhongshui Ma, "*Unconventional thermoelectric behaviors and enhancement of figure of merit in Rashba spintronic systems*" Phys. Rev. B **93**, 075150 (2016).

26. **Cong Xiao** and Dingping Li, "*Semiclassical magnetotransport in strongly spin-orbit coupled Rashba two-dimensional electron systems*", J. Phys: Condens. Matter, **23**, 235801 (2016).

27. **Cong Xiao**, Dingping Li, and Zhongshui Ma, "*Thermoelectric response of spin polarization in Rashba spintronic systems*", Front. Phys. **11**, 117201 (2016).

Other Publications

1. Huiying Liu, Jianzhou Zhao, Yue-Xin Huang, Xiaolong Feng, **Cong Xiao**, Weikang Wu, Shen Lai, Wei-bo Gao, and Shengyuan A. Yang, "Berry connection polarizability tensor and third-order Hall effect", Phys. Rev. B 105, 045118 (2022).

2. Yafei Ren, **Cong Xiao**, Daniyar Saparov, and Qian Niu, "Phonon Magnetic Moment from Electronic Topological Magnetization", Phys. Rev. Lett. 127, 186403 (2021).

3. Archana Tiwari, Fangchu Chen, Shazhou Zhong, Elizabeth Drueke, Jahyun Koo, Austin Kaczmarek, **Cong Xiao**, Jingjing Gao, Xuan Luo, Qian Niu, Yuping Sun, Binghai Yan, Liuyan Zhao, Adam W. Tsen, "Giant c-axis nonlinear anomalous Hall effect in Td-MoTe2 and WTe2", Nat. Commun. 12, 2049 (2021).

4. Ying Liu, Zhi-Ming Yu, **Cong Xiao**, and Shengyuan A. Yang, "Quantized Circulation of Anomalous Shift in Interface Reflection", Phys. Rev. Lett. 125, 076801 (2020).

5. Jingjing Feng, **Cong Xiao**, Yang Gao, and Qian Niu, "Magnetic field influenced electron-impurity scattering and magnetotransport", Phys. Rev. B 100, 134202 (2019).