# Professor Jimin Zhao

Beijing National Laboratory for Condensed Matter Physics
Institute of Physics, Chinese Academy of Sciences
#8 Zhongguancun South, 3rd Str. M-912, P. O. Box 603-24
Haidian, Beijing 100190, China

Phone: +86-10-82649503
+86-13051422511
Fax: +86-10-82649228
E-mail: jmzhao@iphy.ac.cn

## Affiliation

| | | |
|---|---|---|
| 2015.09-current | Professor | Institute of Physics, Chinese Academy of Sciences |
| 2007.01-2015.08 | Associate Professor | Institute of Physics, Chinese Academy of Sciences |

## Research Interest

Ultrafast dynamics of quantum materials, including superconductors, topological materials, 2D layered materials. Pump-probe investigation of quasiparticle ultrafast dynamics, coherent control of bosonic elementary excitations, time-resolved nonlinear ultrafast optical spectroscopies of condensed matters under low temperature and high magnetic field.

## Degrees and Experience

| | | |
|---|---|---|
| 2004-2006 | University of Iowa | *Postdoctoral Research Scholar* |
| 1998-2004 | University of Michigan | *Ph.D. Physics* Advisor: Professor Roberto Merlin |
| 1995-1998 | Tsinghua University, Beijing, China | *M.S. Physics* |
| 1990-1995 | Tsinghua University, Beijing, China | *B.S. Physics* |

## Publications

1. Fei Sun, Q. Wu, Y. L. Wu, H. Zhao, C. J. Yi, Y. C. Yian, H. W. Liu, Y. G. Shi, H. Ding, X. Dai, P. Richard, and **Jimin Zhao***, *Coherent helix vacancy phonon and its ultrafast dynamics waning in topological Dirac semimetal $Cd_3As_2$,* **Physical Review B** 95, 235108 (2017).

2. Yichao Tian, W. H. Zhang, F. S. Li, Y. L. Wu, Q. Wu, F. Sun, G. Y. Zhou, Lili Wang, Xucun Ma*, Qi-Kun Xue*, **Jimin Zhao***, *Ultrafast Dynamics Evidence of High Temperature Superconductivity in Single Unit Cell FeSe on $SrTiO_3$*, **Physical Review Letters** 116, 107001 (2016).

3. W. H. Wang, Y. L. Wu, Q. Wu, J. J. Hua, **Jimin Zhao***, *Coherent Nonlinear Optical Response Spatial Self-Phase Modulation in $MoSe_2$ Nano-Sheets*, **Scientific Reports** 6, 22072 (2016).

4. Y. L. Wu, L. L. Zhu, Q. Wu, F. Sun, J. K. Wei, Y. C. Tian, W. L. Wang, X. D. Bai, Xu Zuo*, **Jimin Zhao***, *Electronic Origin of Spatial Self-phase Modulation: Evidenced by Comparing Graphite with $C_{60}$ and Graphene*, **Applied Physics Letters** 108, 241110 (2016).

5. Zhida Song, **Jimin Zhao**, Zhong Fang, Xi Dai, *Detecting the chiral magnetic effect by lattice dynamics in Weyl semimetals*, **Physical Review B** 94, 214306 (2016).

6. YanlingWu, QiongWu, Fei Sun, Cai Cheng, Sheng Meng*, **Jimin Zhao***, *Emergence of electron coherence and two-color all-optical switching in $MoS_2$ based on spatial self-phase modulation*, **Proc. Natl. Acad. Sci.** *USA* 112, 11800 (2015).

7. Yichao Tian, He Tian, Y. L. Wu, L. L. Zhu, L. Q. Tao,W. Zhang, Y. Shu, D. Xie, Y. Yang, Z. Y. Wei, X. H. Lu, Tian-Ling Ren*, Chih-Kang Shih*, **Jimin Zhao***, *Coherent Generation of Photo-Thermo-Acoustic Wave from Graphene Sheets*, **Scientific Reports** 5，10582 (2015).

8. Chandan Setty, **Jimin Zhao**, Jiangping Hu*, *Probing superconductivity and pairing symmetry by coherent phonons in multiorbital superconductors*, **Physical Review B** 92, 140504 (2015).

9. Fei Sun, Rui Wang, C. Aku-Leh, H. X. Yang, Rui He*, and **Jimin Zhao***, *Double Charge Ordering States and Spin Ordering State Observed in a $RFe_2O_4$ System*, **Scientific Reports** 4, 6429 (2014).

10. Shaofeng Ge, Xuefeng Liu, Xiaofen Qiao, Qinsheng Wang, Zhen Xu, Jun Qiu, Ping-Heng Tan, **Jimin Zhao**, Dong Sun, *Coherent Longitudinal Acoustic Phonon Approaching THz Frequency inMultilayer Molybdenum Disulphide*, **Scientific Reports** 4, 5722(2014).

11. L. B. Liao, Q. H. Zhang, Z. H. Su, Z. Z. Zhao, Y. N. Wang, Y. Li, X. X. Lu,D. G. Wei, G. Y. Feng, Q. K. Yu, X. J. Cai, **Jimin Zhao**, Z. F. Ren, H. Fang, F. Robles-Hernandez, S. Baldelli and Jiming Bao, *Efficient solar water-splitting using a nanocrystalline CoO photocatalyst*, **Nature Nanotechnology** 9, 69 (2014).

12. ShizeYang, Xuezeng Tian, Lifen Wang, Jiake Wei, Kuo Qi, Xiaomin Li, Zhi Xu, Wenlong Wang, **Jimin Zhao**, Xuedong Bai, and Enge Wang, *In-situ optical transmission electron microscope study of exciton phonon replicas in ZnO nanowires by cathodoluminescence*, **Appl. Phys. Lett.** 105, 071901 (2014).

13. B. L. Wang, R. Wang, R. J. Liu, X. H. Lu, **Jimin Zhao***, Z. Y. Li*, *Origin of Shape Resonance inSecond-Harmonic Generation fromMetallic Nanohole Arrays*, **Scientific Reports** 3, 2358 (2013).

14. X. D. Guo, L. Dong, Y. Guo, X. Y. Shan, **Jimin Zhao** and Xinghua Lu, *Detecting larmor precession of a single spin with spin-polarized tunneling current*, **Chin. Phys. Lett.** 30, 017601 (2013).

15. Nan Xie, H. Q. Gong, S. C. Yan, **Jimin Zhao**, X. Y. Shan, Y. Guo, Q. Sun and Xinghua Lu, *Tip expansion in a laser assisted scanning tunneling microscope*, **Appl. Phys. Lett.** 101, 213104 (2012).

16. **赵继民***，表面物理的超快光谱学研究，**《现代物理知识》**，第24卷，第1期，44 (2012).

17. R. Wu, Y. L. Zhang, S. C. Yan, F. Bian, Wenlong Wang, Xuedong Bai, Xinghua Lu, **Jimin Zhao***, Enge Wang, *Purely coherent nonlinear optical response in solution dispersions of graphene sheets*, **Nano Letters**11, 5159 (2011).

18. F. Bian, Y. C. Tian, R. Wang, H. X. Yang, H. X. Xu, Sheng Meng, and **Jimin Zhao***, *Ultrasmall Silver Nanopores Fabricated by Femtosecond Laser Pulses*, **Nano Letters**11, 3251 (2011).

19. **赵继民***，超快光谱技术及其在凝聚态物理研究中的应用，**《物理》**，第 40 卷，第 3 期，184 (2011).

20. R. Wang, H. X. Yang, Y. Qin, B. Dong, J. Q. Li, and **Jimin Zhao***, *Photoluminescence in electronic ferroelectric* $Er_{1-x}Yb_xFe_2O_4$,**J. Appl. Phys.** 108, 073507 (2010).

21. Fei Bian, R. Wang, H. X. Yang, X. Z. Zhang, J. Q. Li, H. X. Xu, J. J. Xu, **Jimin Zhao***, *Laser-Driven Silver Nanowire Formation: The Effect of Femtosecond Laser Pulse Polarization,* **Chin. Phys. Lett.** 27, 088101 (2010).

22. Zhanglong Liu, Zengxia Mei, Rui Wang, **Jimin Zhao**, Huili Liang, Yang Guo, Andrej Yu Kuznetsov and Xiaolong Du, *Alloy-fluctuation-induced exciton localization in high-Mg-content (0.27≤x≤0.55) wurtzite* $Mg_xZn_{1-x}O$ *epilayers,* **J. Phys. D: Appl. Phys.** 43, 285402 (2010).

23. X.F.Han, Y. X. Weng, R. Wang, X. H. Chen, K. H. Luo, L.-A. Wu, and **Jimin Zhao***, *Single-photon level ultrafast all-optical switching,* **Appl. Phys. Lett.** 92, 151109 (2008). *See also***Nature Photonics** 2, 331 (2008).

24. N. Cao, Y.B. Long, Z.G. Zhang, J. Yuan, L.J. Gao, B.R. Zhao, S.P. Zhao, Q.S. Yang, **Jimin Zhao**, and Panming Fu, *Quasiparticle relaxation dynamics in n-type superconductor* $La_{2-x}Ce_xCuO_4$, **Physica C**468,894-897 (2008).

25. N. Cao, Y. F. Wei, **Jimin Zhao**, S. P. Zhao, Q. S. Yang, Z. G. Zhang, P. M. Fu, *Femtosecond Optical Detection of Quasiparticle Dynamics in Single-Crystal*$Bi_2Sr_2CaCu_2O_{8+\delta}$,**Chin. Phys. Lett.** 25, 2257 (2008).

26. 曹宁，龙拥兵，张治国，高丽娟，袁洁，赵伯儒，赵士平，杨乾生，**赵继民，**傅盘铭，电子型掺杂高温超导体 $La_{2-x}Ce_xCuO_4$ 飞秒时间分辨动力学研究，**《物理学报》**57, 2543 (2008).

27. **Jimin Zhao**, A. V. Bragas, R. Merlin, and D. J. Lockwood, *Magnon squeezing in antiferromagnetic* $MnF_2$ *and* $FeF_2$,**Physical Review B**, 73, 184434 (2006).

28. J. P. Prineas, W. J. Johnston, M. Yildirim, **J. Zhao**, and A. L. Smirl, *Tunable slow light in Bragg-spaced quantum wells*. **Appl. Phys. Lett.**89, 241106 (2006).

29. C. Aku-Leh, **Jimin Zhao**, R. Merlin, J. Menéndez, and M. Cardona, *Long-lived optical phonons in ZnO studied with impulsive stimulated Raman scattering*,**Physical Review B**, 71, 205211 (2005).

30. **Jimin Zhao**, A. V. Bragas, D. J. Lockwood, and R. Merlin, *Magnon squeezing in an antiferromagnet: reducing the spin noise below the standard quantum limit*,**Physical Review Letters**, 93, 107203 (2004).

31. A. V. Bragas, C. Aku-Leh, S. Costantino, Alka Ingale, **J. Zhao**, and R. Merlin, *Ultrafast optical generation of coherent phonons in $CdTe_{1-x}Se_x$ quantum dots*, **Physical Review B**, 69, 205306 (2004).

32. **Jimin Zhao**, Jun Ni, Hui Hu, Jiajiong Xiong, Jialin Zhu, *Effects of inhomogeneous strain of quantum-well structures on the band-structure and gain*, **Journal of Tsinghua University (Science and Technology)**, 39, 11-14 (1999).

**Services**

Editorial Board Member for: Scientific Reports

Reviewer for: *Physical Review Letters, Nature Materials, Nature Communications, Nano Letters, Scientific Reports, Applied Physics Letters, ACS Nano, Nanoscale, Laser&Photonics Review, J. Physical Chemistry, Chinese Physics Letters, Journal of Nanomaterials*

**Invited Talks**

1. **Jimin Zhao,** *Laser-induced electron coherence in 2D quantum materials*, The 38th PIERS Conference in St Petersburg, Russia, May 22-25 (2017).
2. **Jimin Zhao,** *Ultrafast dynamics evidence of high temperature superconductivity in single unit cell FeSe on $SrTiO_3$*, 10th International Conference on Computation Physics, Macao SAR China, January 16-20 (2017).
3. **Jimin Zhao,** *Ultrafast dynamics evidence of high temperature superconductivity in single unit cell FeSe on $SrTiO_3$*, IOP-PSI Joint Workshop, 北京雁栖湖, October 30-November 1 (2016).
4. **Jimin Zhao,** *单层 FeSe/$SrTiO_3$ 界面超导的超快动力学研究*，中国科学院高能物理研究所. 2016 年 9 月 13 日。
5. **Jimin Zhao,** *Ultrafast dynamics evidence of high temperature superconductivity in single unit cell FeSe on $SrTiO_3$*，中国物理学会 2016 年秋季学术会议. 北京工业大学. 2016 年 9 月 2-4 日。
6. **Jimin Zhao,** *二维量子材料中激光诱导的电子相干性*，中国物理学会 2016 年秋季学术会议. 北京工业大学. 2016 年 9 月 2-4 日。
7. **Jimin Zhao,** *Ultrafast dynamics evidence of high temperature superconductivity in single unit cell FeSe on $SrTiO_3$*, 第三届全国超快光谱研讨会，合肥，2016 年 8 月 19-21 日。
8. **Jimin Zhao,** *Ultrafast dynamics evidence of high temperature superconductivity in single unit cell FeSe on $SrTiO_3$*, 6th Joint ICQs Annual Workshop, Institute of Physics, Chinese Academy of Sciences, Beijing, June 12-14 (2016).

9. **Jimin Zhao,** *Ultrafast dynamics evidence of high temperature superconductivity in single unit cell FeSe on $SrTiO_3$,* 14th Beijing Forum on High-Temperature Superconductivity (BFHTS), Dali, Yunnan , May 30-June 3 (2016).
10. **Jimin Zhao,** *单层 FeSe/$SrTiO_3$ 界面超导的超快动力学研究*，四川大学物理学院. 2016 年 4 月 23 日。
11. **Jimin Zhao,** *量子材料的超快动力学*，重庆大学物理系，2016 年 4 月 21 日。
12. **Jimin Zhao,** *单层 FeSe/$SrTiO_3$ 界面超导的超快动力学研究*，清华大学低维量子物理国家重点实验室，2016 年 4 月 19 日。
13. **Jimin Zhao,** *The cool physics of surfing ultrafastly in the Fermi sea, Lecture series on frontiers of condensed matter physics,* Institute of Physics, Chinese Academy of Sciences, Dec. 22 (2015).
14. **Jimin Zhao,** *Emergence of electron coherence in $MoS_2$ induced by spatial self-phase modulation,* 北京计算科学研究中心，2015 年 11 月 3 日。
15. **Jimin Zhao,** *Emergence of Electron Coherence in $MoS_2$ Induced by SSPM,* Peking University, Oct. (2015)
16. **Jimin Zhao,** *Coherent Generation of Photo-Thermo-Acoustic Wave from Graphene Sheets,* 第十八届全国光散射学术会议，四川大学，2015 年 10 月 23-25 日。
17. **Jimin Zhao,** *Ultrafast spectroscopy toward generating coherence in a few quantum materials,* SPIE Optics and Photonics 2014, San Diego, California, 17-21th Aug, USA (2014).
18. **Jimin Zhao,** *Ultrafast Optical Generation of Coherence in Layered Quantum Materials,* Nanotechnology Conference, Trinity College Dublin, 12-14th May, Ireland (2014).
19. **Jimin Zhao,** *Purely coherent nonlinear optical response in graphene sheets: Spatial self phase modulation,* The 7th International conference on materials for advanced technologies, June 30-July 5, Suntec Singapore (2013).
20. **Jimin Zhao,** *Purely coherent nonlinear optical response in graphene sheets--Spatial self-phase modulation,* The 1st Germany-China young scientist symposium on ultrafast light sources and spectroscopy applications, June 24-26, DESY, Hamburg Germany (2013).
21. **赵继民,** *Purely Coherent Nonlinear Optical Response from Graphene Sheets: Spatial Self-Phase Modulation,* 第十七届全国光散射学术会议，西安， 2013 年 10 月 19-22 日。
22. **赵继民,** *Spatial Self-Phase Modulation in Graphene-related Materials: Coherent Response & Remarkably Large $\chi^{(3)}$,*第十九届全国半导体物理学术会议（威海），2013 年 7 月。
23. **Jimin Zhao**, *Spatial self-phase modulation in graphene: purely coherent nonlinear optical response,* CPS Fall meeting (Guangzhou, Sun Yat-Sen University), Sept. 2012.
24. **Jimin Zhao**, *Unusually strong Stark effect in electronic ferroelectric $Er_{1-x}Yb_xFe_2O_4$,* SKLSM, Institute of Semiconductors, Chinese Academy of Sciences, April 2012.
25. **Jimin Zhao**, *Ultrasmall Silver Nanopores Fabricated by Femtosecond Laser Pulses,* Lectures on cutting-edge research in condensed matter physics, Institute of Physics, Chinese Academy of Sciences, Nov. 2011.
26. **Jimin Zhao**, *Ultrasmall Silver Nanopores Fabricated by Femtosecond Laser Pulses,* International Symposium on Nanoscale Science and Technology by China (Hangzhou), Oral

invited, Oct. 2011.

27. **Jimin Zhao**, *Ultrasmall Silver Nanopores Fabricated by Femtosecond Laser Pulses*, International Center of Quantum Materials, Beijing University, Sept. 2011.
28. **Jimin Zhao**, *Coherent generation of quantum squeezed states of magnons (spin waves) through impulsive stimulated Raman scattering*, The 6th International Workshop on Surfaces Focused on Plasmonics, Institute of Physics, Beijing (2007).
29. **Jimin Zhao**, *Coherent generation of spin waves and lattice waves using femtosecond optical pulses: Driving and tracing the ultrafast oscillations*, China-Italy Joint Workshop on Guided Self-assembly of Nanostructures, Institute of Physics, Beijing (2007).
30. **Jimin Zhao** *et al., Magnon Squeezing in an antiferromagnet: reducing the spin noise below the standard quantum limit.* (oral invited) SPIE Third International Symposium on Fluctuations and Noise, SPIE, Austin, Texas, May 24 (2005).

**Awards**

1. Jimin Zhao, *Spatial self-phase modulation in graphene: purely coherent nonlinear optical response*, The 4th International Conference of Recent Progress in Graphene Research, Beijing, Oct. 3- 6, 2012. **Best Poster Prize.**
2. 赵继民等，*多铁 $Er_{1-x}Yb_xFe_2O_4$ 的荧光光谱研究*,中国物理学会秋季学术会议，浙江大学，2011 年 9 月。**Best Poster Prize.**
3. C. Aku-Leh, Jimin Zhao, R. Merlin, L. Shi, J. Menéndez, and M. Cardona, *Long-lived optical phonons in ZnO studied with impulsive stimulated Raman Scattering*, 27thInternational Conference on the Physics of Semiconductors, Flagstaff, Arizona, July 2004. **Second Best Paper Prize.**

**Contributed Presentations at International Conferences**

1. Jimin Zhao, *Ultrafast Photo-Carrier Dynamics and Coherent Phonon Excitations in Topological Dirac Semimetal $Cd_3As_2$*, American Physical Society (APS) March Meeting, Baltimore, Maryland, USA, March 2016.
2. Jimin Zhao, *Coherent Generation of Photo-Thermo-Acoustic Wave from Graphene Sheets*, American Physical Society (APS) March Meeting, Baltimore, Maryland, USA, March 2016.
3. Jimin Zhao, *Nonlocal Electron Coherence in $MoS_2$ Flakes Correlated through Spatial Self Phase Modulation*, American Physical Society (APS) March Meeting, San Antonio, USA, March 2015.
4. Jimin Zhao, *Double Charge Ordering States and Spin Ordering State Observed in a $RFe_2O_4$ system*, American Physical Society (APS) March Meeting, San Antonio, USA, March 2015.
5. Jimin Zhao, *Coherent $A_{1g}$ Phonon in $FeSe_{0.5}Te_{0.5}$: $\pi/2$ Phase Difference across Superconducting Phase Transition*, American Physical Society (APS) March Meeting, Denvor, USA, March 2014.
6. Jimin Zhao, *Critical Role of Modal Spatial Overlap in Nanoscale Nonlinear Optics*, American Physical Society (APS) March Meeting, Baltimore, USA, March 2013.

7. Jimin Zhao, *Spatial Self-Phase Modulation in Graphene Sheets: Purely Coherent Nonlinear Optical Response*, The 4th International Conference on Recent Progress in Graphene ResearchOct. 3-6, Beijing, China (2012).
8. Jimin Zhao, *Ultrasmall Silver Nanopores Fabricated by Femtosecond Laser Pulses*, American Physical Society (APS) March Meeting, Boston, USA, March 2012.
9. Jimin Zhao, *Spatial Self-Phase Modulation in Graphene Sheets and Related Material: Purely Coherent Nonlinear Optical Response*, 6th International Conference on Nanophotonics, May 28-30, Peking University (2012).
10. Y. C. Tian, F. Bian, R. Wang, H. X. Yang, Hongxing Xu, Sheng Meng, and Jimin Zhao, *Ultrasmall Silver Nanopores Fabricated by Femtosecond Laser Pulses*, 6th International Conference on Nanophotonics, May 28-30, Peking University (2012).
11. Jimin Zhao *et al.*, *Unusually strong Stark effect in electronic ferroelectric* $Er_{1-x}Yb_xFe_2O_4$, American Physical Society (APS) March Meeting, Dallas, USA, March 2011.
12. Rui Wu , Yingli Zhang , Fei Bian , Shichao Yan , Rui Wang , Wenlong Wang , Xuedong Bai , Xinghua Lu , Jimin Zhao, *Broadband spatial self-phase modulation of few-layer graphene sheet insolution*, American Physical Society (APS) March Meeting, Dallas, USA, March 2011.
13. Jimin Zhao *et al.*, *Coherent generation of quantum squeezed states of magnons (spin waves) through impulsive stimulated Raman scattering*, The 6th International Workshop on Surfaces Focused on Plasmonics, Beijing, 2007.
14. Jimin Zhao *et al.*, *Coherent generation of spin waves and lattice waves using femtosecond optical pulses: Driving and tracing the ultrafast oscillations*, China-Italy Joint Workshop on Guided Self-assembly of Nanostructures, Beijing, 2007.
15. Jimin Zhao, D. J. Lockwood, R. Merlin, *Magnon Squeezing in* $FeF_2$, Conference on Lasers and Electro-Optics/International Quantum Electronics Conference (CLEO/IQEC), San Francisco, California, May 2004.
16. Jimin Zhao, D. J. Lockwood, R. Merlin, *Magnon Squeezing in* $FeF_2$. American Physical Society (APS) March Meeting, Montreal, Canada, March 2004.
17. Jimin Zhao, A. V. Bragas, D. J. Lockwood, R. Merlin, *Observation of spin squeezing in* $MnF_2$. Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference (CLEO/QELS), Baltimore, Maryland, May 2003.
18. Jimin Zhao, A. V. Bragas, D. J. Lockwood, R. Merlin, *Magnon Squeezing in* $MnF_2$. American Physical Society (APS) March Meeting, Austin, Texas, March 2003.
19. C. Aku-Leh, Jimin Zhao, R. Merlin, L. Shi, J. Menéndez, and M. Cardona, *Anharmonic interactions and the lattice dynamics of wurtzite semiconductors*, March Meeting of the American Physical Society, Montreal, Canada, March 2004.
20. C. Aku-Leh, Jimin Zhao, R. Merlin, and J. Menéndez,*Coherent optical phonons with very large quality factors: the* $E_2$*-low mode in ZnO*, Conference on Lasers and Electro-Optics/International Quantum Electronics Conference (CLEO/IQEC), San Francisco, California, May 2004.
21. C. Aku-Leh, Jimin Zhao, R. Merlin, L. Shi, J. Menéndez, and M. Cardona, *Long-lived*

*optical phonons in ZnO studied with impulsive stimulated Raman Scattering*, 27th International Conference on the Physics of Semiconductors, Flagstaff, Arizona, July 2004.

22. Andrea V. Bragas, Cynthia Aku-Leh, Jimin Zhao, and Roberto Merlin, *Size-selective generation of coherent acoustic phonons in semiconductor nanocrystals*, March Meeting of the American Physical Society, Indianapolis, Indiana, March 2002.

**Professional Memberships**

American Physical Society, Optical Society of America, Chinese Physical Society, Chinese Optical Society