

# CURRICULUM VITAE – ZHIWEI LI

## Contacts

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## Research Interest

Strongly correlated electron materials, such as high transition temperature (high- $T_C$ ) superconductors, topological insulator/superconductors, and exotic magnetic materials. My interests mainly involve with microscopic origin of high- $T_C$  superconductivity, coupling between magnetism, charge and crystal lattice degrees of freedom in these materials.

### Skills:

Crystal growth with floating-zone and flux-growth method etc.  
Neutrons, X-ray scattering.  
Mössbauer spectroscopy.  
Lab. Single crystal & powder X-ray diffractometer, PPMS, SQUID etc.

## Education & Employment

- 2016.06 - current: Associate Professor, Lanzhou University, Lanzhou, China.
- 2013.04 - 2016.04: Research Scientist, Max-Planck-Institute for Chemical Physics of Solids, Dresden, Germany.
- 2012.06 - 2013.04: Postdoc., Max-Planck-Institute for Solid State Research, Stuttgart, Germany.
- 2009.09 - 2012.06: Ph.D. in Condensed Matter Physics, Lanzhou University, Lanzhou, China.  
*Dissertation:* Mössbauer and Magnetometry Study of Iron-based High- $T_C$  Materials.  
*Supervisor:* Prof. Fashen Li and Prof. Hua Pang.
- 2007.09 - 2009.09: M.S. in Condensed Matter Physics, Lanzhou University, Lanzhou, China.
- 2003.09 - 2007.07: B.S. in Physics, Lanzhou University, Lanzhou, China.

## Research Experiences

4. **Postdoctoral research**, with Prof. Dr. Liu Hao Tjeng and Dr. Alexander C. Komarek: Crystal growth of transition metal compounds with high-pressure optical-floating-zone furnace (up to 150 bar) and characterization of the synthesized materials with X-ray diffraction, magnetization, electric transport and specific heat measurements; Conducting neutron scattering experiments on selected samples at European neutron spallation and reactor sources.

## Grown &amp; studied Crystals:

System	x,y,z range
$\text{La}_{2-x}\text{Sr}_x\text{NiO}_{4+\delta}$	0.2 ~ 0.75
$\text{Nd}_{2-x}\text{Sr}_x\text{NiO}_{4+\delta}$	0.8 ~ 1.1
$\text{La}_{2-x}\text{Sr}_x\text{CoO}_{4+\delta}$	1/3 ~ 1.0
$\text{La}_{1\pm x}\text{Sr}_{1\mp x}\text{FeO}_{4+\delta}$	0 ~ 0.3
$\text{La}_{2-x-y}\text{Nd}_x\text{Sr}_y\text{CuO}_{4+\delta}$	$x = 0.4$ and $y = 0.09 \sim 0.15$
$\text{La}_{2-x}(\text{Ba},\text{Sr})_x\text{CuO}_{4+\delta}$	0.09 ~ 0.15
$\text{Sr}_{2-x}\text{La}_x\text{RhO}_{4+\delta}$	$x = 1/3, 1/2$
$\text{Sr}_{2-x}(\text{Ca},\text{Ba})_x\text{RuO}_4$	For Ca $x = 0 \sim 2$ , for Ba with $x = 0 \sim 0.5$
$\text{Sr}_3\text{Ru}_2\text{O}_7$	–
$(\text{Ba},\text{Sr},\text{Ca})_{1-x}(\text{Na},\text{K},\text{Rb})_x\text{Fe}_2\text{As}_2$	0 ~ 1
$(\text{K},\text{Rb},\text{Cs})_{0.8-\delta}\text{Fe}_{2-x}\text{Se}_2$	0 ~ 0.4
$(\text{K},\text{Rb},\text{Cs})\text{Fe}_2\text{As}_2$	–
$\text{K}_{0.8-\delta}(\text{Fe}_{1-z}\text{TM}_z)_{2-y}\text{Se}_2$	$z = 0 \sim 0.03$
$\text{K}_{0.8-\delta}\text{Fe}_{2-y}\text{Se}_{2-z}\text{Te}_z$	$z = 0 \sim 0.3$
$\text{CH}_3\text{NH}_3\text{PbX}_3$	–
$\text{TlCuCl}_3$	–

3. **Postdoctoral research**, with Dr. C.T. Lin: Flux and optical-floating-zone crystal growth of various compounds with unusual structural, magnetic and superconducting properties. Conducting transport and magnetic measurements to investigate the physical properties of these compounds., including the iron based high- $T_c$  compounds ( $\text{Ba}_{1-x}\text{K}_x\text{Fe}_2\text{As}_2$ ,  $(\text{K},\text{Rb},\text{Cs})\text{Fe}_2\text{As}_2$ ,  $(\text{K},\text{Rb},\text{Cs})_{0.8+x}\text{Fe}_{2-y}\text{Se}_2$ ) and other strongly correlated materials  $\text{CH}_3\text{NH}_3\text{PbX}_3$ ,  $\text{TlCuCl}_3$ ,  $\text{Li}_7\text{La}_3\text{Zr}_2\text{O}_{12}$ .
2. **M.S. and Ph.D.**, with Prof. Fashen Li and Hua Pang: Synthesis and characterization of Iron-based High- $T_c$  materials using Mössbauer spectroscopy and other characterization techniques when necessary. The samples ( $\text{SrFeAsF}$ ,  $\text{AeFe}_2\text{As}_2$  ( $\text{Ae}=\text{Ca}, \text{Sr}$  and  $\text{Ba}$ ),  $\text{Ca}_{1-x}\text{Re}_x\text{Fe}_2\text{As}_2$  ( $\text{Re}=\text{Rare earth metal}$ ),  $\text{K}_{0.8+x}\text{Fe}_{2-y}\text{Se}_2$ ) have been extensively studied by Mössbauer spectroscopy, X-ray diffraction, SQUID PPMS and VSM, and other techniques such as: SEM/TEM, ESR, TG/DTA, etc..
1. **B.S.** with Prof. Fashen Li: Preparation of magnetic nano-particles at relatively low temperatures and their characterization.

## Publications

22. H. Guo\*, Z. W. Li\*, L. Zhao, Z. Hu, C. F. Chang, C.-Y. Kuo, W. Schmidt, A. Piovano, T. W. Pi, O. Sobolev, D. I. Khomskii, L. H. Tjeng, and A. C. Komarek, (2017) [accepted for publication in Nat. Commun.](#) *Antiferromagnetic correlations in the metallic strongly correlated transition metal oxide  $\text{LaNiO}_3$ .*  
\*These authors contributed equally to this work.
21. Z. W. Li, H. Guo, Z. Hu, T. S. Chan, K. Nemkovskiy, and A. C. Komarek, (2017) *Phys. Rev. Mater.* **1**, 044005 *Single crystal growth and physical properties of 50% electron-doped rhodate  $\text{Sr}_{1.5}\text{La}_{0.5}\text{RhO}_4$ .*
20. Z. W. Li, H. Guo, C.-F. Liu, F. Bourdarot, W. Schmidt, M. Skoulatos, L. H. Tjeng, and A. C. Komarek, (2017) *Phys. Rev. B* **95**, 045105 *Spin fluctuations in  $\text{Sr}_{1.6}\text{Ba}_{0.4}\text{RuO}_4$ : an inelastic neutron scattering study with polarization analysis.*
19. Z. W. Li, Y. Drees, C. Y. Kuo, H. Guo, A. Ricci, D. Lamago, O. Sobolev, U. Rütt, O. Gutowski, T. W. Pi, A. Piovano, W. Schmidt, K. Mogare, Z. Hu, L. H. Tjeng, and A. C. Komarek, (2016) *Scientific Reports* **6**, 25117 *Incommensurate spin correlations in highly oxidized cobaltates  $\text{La}_{2-x}\text{Sr}_x\text{CoO}_4$ .*
18. Z. W. Li, Y. Drees, A. Ricci, D. Lamago, A. Piovano, M. Rotter, W. Schmidt, O. Sobolev, U. Rütt, O. Gutowski, M. Sprung, J. P. Castellan, L.H. Tjeng, and A. C. Komarek, (2016) *J. Supercond. Nov. Magn.* **29**, 727 *Electronic and Magnetic Nano Phase Separation in Cobaltates  $\text{La}_{2-x}\text{Sr}_x\text{CoO}_4$ .*

17. Xiaoxing Liu, Yang Li, Jianmei Wan, **Zhiwei Li**, Pang hua, (2015) *J. Phys.: Condens. Matter* **28**, 125701 *Phase separation in  $\text{Ca}_{1-x}\text{La}_x\text{Fe}_2\text{As}_2$  superconductors: a  $^{57}\text{Fe}$  Mössbauer study.*
16. **Z. W. Li**, C.-F. Liu, M. Skoulatos, L. H. Tjeng, and A. C. Komarek, (2015) *J. Cryst. Growth* **427**, 94 *Floating zone growth of Ba-doped Ruthenate  $\text{Sr}_{2-x}\text{Ba}_x\text{RuO}_4$ .*
15. Y. Drees\*, **Z. W. Li\***, A. Ricci\*, M. Rotter, W. Schmidt, D. Lamago, O. Sobolev, U. Rütt, O. Gutowski, M. Sprung, A. Piovano, J. P. Castellan, and A. C. Komarek, (2014) *Nature Commun.* **5**, 5731 *Hour-glass magnetic excitations induced by nanoscopic phase separation in cobalt oxides.* \*These authors contributed equally to this work.
14. C.-Y. Kuo, Y. Drees, M. T. Fernández-Díaz, L. Zhao, L. Vasylechko, D. Sheptyakov, A. M. T. Bell, T. W. Pi, H.-J. Lin, M.-K. Wu, E. Pellegrin, S. M. Valvidares, **Z. W. Li**, P. Adler, A. Todorova, R. Kuchler, A. Steppke, L. H. Tjeng, Z. Hu, and A. C. Komarek, (2014) *Phys. Rev. Lett.* **113**, 217203.  *$k=0$  Magnetic Structure and Absence of Ferroelectricity in  $\text{SmFeO}_3$ .*
13. A. Charnukha, D. Präpper, T. I. Larkin, D. L. Sun, **Z. W. Li**, C. T. Lin, T. Wolf, B. Keimer, and A. V. Boris, (2013) *Phys. Rev. B* **88**, 184511. *Spin-density-wave-induced anomalies in the optical conductivity of  $A\text{Fe}_2\text{As}_2$ , ( $A = \text{Ca}, \text{Sr}, \text{Ba}$ ) single-crystalline iron pnictides.*
12. M. T. Li, L. Chen, **Z. W. Li**, G. H. Ryu, C. T. Lin, and J. C. Zhang, (2013) *J. Phys.: Condens. Matter* **25**, 335701. *Enhancement of phase separation and superconductivity in Mn-doped  $\text{K}_{0.8}\text{Fe}_{2-y}\text{Mn}_y\text{Se}_2$  crystals.*
11. Xiaoming Ma, Jiangwei Bai, **Zhiwei Li**, Jianmei Wan, Hua Pang, and Fashen Li, (2013) *J. Phys.: Condens. Matter* **25**, 135703. *Magnetic properties and spin dynamics in  $\text{Ba}(\text{Fe}_{1-x}\text{Mn}_x)_2\text{As}_2$  compounds studied by  $^{57}\text{Fe}$  Mössbauer spectroscopy.*
10. Yang Yang, Xiao Liu, Yong Yang, Wen Xiao, **Zhiwei Li**, Desheng Xue, Fashen Li, and Jun Ding, (2013) *J. Mater. Chem. C*, **1**, 2875. *Synthesis of nonstoichiometric zinc ferrite nanoparticles with extraordinary room temperature magnetism and their diverse applications.*
9. **Zhiwei Li**, Xiaoming Ma, Hua Pang, and Fashen Li, (2012) *Hyperfine Interactions* **207**, 41-44. *A Mössbauer study of the magneto-structural coupling effect in  $\text{SrFe}_2\text{As}_2$  and  $\text{SrFeAsF}$ .*
8. Xiaoming Ma, **Zhiwei Li**, Jiangwei Bai, Hua Pang, and Fashen Li, (2012) *Hyperfine Interactions* **207**, 45-48. *A Mössbauer study of  $\text{Ba}(\text{Fe}_{1-x}\text{Mn}_x)_2\text{As}_2$  single crystals.*
7. **Zhiwei Li**, Xiaoming Ma, Hua Pang, and Fashen Li, (2012) *Chin. Phys. B* **21**, 047601. *Spin excitations in  $\text{K}_{0.84}\text{Fe}_{1.99}\text{Se}_2$  superconductor as studied by Mössbauer spectroscopy.*
6. **Zhiwei Li**, Yang Fang, Xiaoming Ma, Hua Pang, and Fashen Li, (2011) *Phys. Rev. B* **84**, 134509. *Charge redistribution at the antiferromagnetic phase transition in  $\text{SrFeAsF}$  compound.*
5. **Zhiwei Li**, Xiaoming Ma, Hua Pang, and Fashen Li, (2011) *J. Phys.: Condens. Matter* **23**, 255701. *Magneto-structural coupling and harmonic lattice dynamics in  $\text{CaFe}_2\text{As}_2$  probed by Mössbauer spectroscopy.*
4. **Zhiwei Li**, Weiwei Pan, Junli Zhang, and Haibo Yi, (2011) *J. Phys. D: Appl. Phys.* **44**, 445304. *Microstructure and magnetic anisotropy of electrospun  $\text{Cu}_{1-x}\text{Zn}_x\text{Fe}_2\text{O}_4$  nanofibers: A local probe study.*
3. Xiaoming Ma, **Zhiwei Li**, Jianqiang Wei, Tao Wang, and Fashen Li, (2010) *Chin. Phys. B* **19**, 097401. *High frequency behaviours and Mössbauer study of field annealed  $\text{FeCuNbSiB}$  alloy ribbons.*
2. **Zhiwei Li**, Xu Yang, Haibo Wang, Xin Liu, and Fashen Li, (2009) *Chin. Phys. B* **18**, 4829. *Mössbauer study of the field induced uniaxial anisotropy in electro-deposited  $\text{FeCo}$  alloy films.*
1. Dong Zhou, **Zhiwei Li**, Xu Yang, Fusheng Wen, and Fashen Li, (2008) *Chin. Phys. Lett.* **25**, 1865. *Fabrication and Mössbauer study of  $\text{FeCo}$  alloy nanotube array.*

## Conference and Seminar Presentations

### Incommensurate spin correlations in the highly hole-doped regime of $\text{La}_{2-x}\text{Sr}_x\text{CoO}_4$

Max-Planck-Institute for Chemical Physics of Solids, Nov. 12, 2014.

### Mössbauer study of iron-based high- $T_C$ materials

Max-Planck-Institute for Solid State Research, Jun. 13, 2012.

Max-Planck-Institute for Chemical Physics of Solids, Mar. 08, 2013.

### ICAME2011 - Overview and Concluding Remarks

Institute of Applied Magnetism, Lanzhou University - Oral Presentation, Oct. 14, 2011.

### Mössbauer Study of Magneto-Structural Coupling Effect in $\text{SrFe}_2\text{As}_2$ and $\text{SrFeAsF}$

International Conference on the Applications of the Mössbauer Effect (ICAME2011) - Poster Presentation, Sept. 25–30, 2011.

### Charge Redistribution at the AFM Phase Transition in $\text{SrFeAsF}$ compound

Fudan Summer School for Condensed Matter Physics - Poster Presentation, Jul. 13–Aug. 7, 2011.

The 11th National Conference on Mössbauer Spectroscopy - Oral Presentation, Jun. 25, 2011.

### Mössbauer Study of Phase Transitions in $\text{AeFe}_2\text{As}_2$ ( $\text{Ae}=\text{Ca},\text{Ba}$ ) Compound

Chinese Physical Society Fall Meeting 2010 (CPS2010) - Poster Presentation, Sept. 16–19, 2010.

### Fabrication and Mössbauer Characterization of $\text{MgFe}_2\text{O}_4/\text{Fe}_3\text{O}_4$ Composite Nanoparticles

Asian Magnetic Conference 2008 (AMC2008) - Poster Presentation, Dec. 10–13, 2008.

13th Chinese Conference of Magnetism and Magnetic Materials - Oral Presentation, Nov. 1, 2008.

## Honors, Awards, & Fellowships

Max-Planck-Institute fellowship, Max-Planck-Institute for Chemical Physics of Solids, 2013-2015

Max-Planck-Institute fellowship, Max-Planck-Institute for Solid State Research, 2012-2013

First Grade Graduate Student Scholarship, Lanzhou University, 2009-2011

Graduate Student Entrance Scholarship, Lanzhou University, 2007

Second Grade Scholarship, Lanzhou University, 2005-2006.

Third Grade Scholarship, Lanzhou University, 2002-2005.

## Conferences and Workshops

### Conferences:

Superstripes 2015 International Conference, Ischia, Italy, June. 13–18, 2015.

International Conference on the Applications of the Mössbauer Effect (ICAME2011), Kobe, Japan, Sept. 25–30, 2011.

The 11th National Conference on Mössbauer Spectroscopy, Lanzhou University, Lanzhou, China, Jun. 25–27, 2011.

Chinese Physical Society Fall Meeting 2010 (CPS2010), Nankai University, TianJin, China, Sept. 16–19, 2010.

The German–China Bi-lateral Forum on Frontier of Nanotechnology and Nanostandardization, Lanzhou University, Lanzhou, China, Sept. 5–7, 2009.

The 6th Joint Meeting of Chinese Physicists Worldwide (OCPA6), Lanzhou University, Lanzhou, China, Aug. 3–7, 2009.

Asian Magnetic Conference 2008 (AMC2008), Busan, Korea, Dec. 10–13, 2008.

The 13th National Conference on Magnetism and Magnetic Materials, YiChang, China, Oct. 31–Nov. 5, 2008.

#### Workshops:

Powder x-ray diffraction in materials science, Max-Planck-Institute for Chemical Physics of Solids, Dresden, Germany, Oct. 6–Oct. 10, 2014.

Fudan Summer School for Condensed Matter Physics, Fudan University, ShangHai, China, Jul. 13–Aug. 7, 2011.

## Neutron and Synchrotron X-ray Experiments

### Experienced Neutron & Synchrotron Instruments:

1. Triple-axis-spectrometer: IN8, IN20, IN12, Thales, IN22, and IN3 at ILL, Grenoble, France. PUMA at FRM II, Garching/München, Germany. 4F1, 1T, 2T, 3T at LLB, Paris, France. HB-1 at ORNL, Oak ridge, USA. RITA II at PSI, Villigen, Switzerland. V2-FLEXX at HZB-BER II, Berlin, Germany.
2. Time of flight: MERLIN at ISIS, Didcot, UK.
3. Single crystal diffractometer: D23, D10 at ILL, Grenoble, France. Heidi at FRM II, Garching/München, Germany. Trics at PSI, Villigen, Switzerland.
4. Powder diffractometer: Spodi at FRM II, Garching/München, Germany.
5. Po7 (Hard X-ray diffraction) and P10 (Micro-focusing beam diffraction) at DESY, Hamburg, Germany. 6-ID-D (Hard X-ray diffraction) at ANL-APS, Argonne, USA.
6. UE46 (Soft X-ray diffraction) at BESSY, Berlin, Germany.
7. ID13 (Nano-focusing beam X-ray diffraction), ID28 (RIXS) at ESRF, Grenoble, France

### Neutron beamtime:

31. LLB: 4F1 and 3T1. Saclay/Paris, France. 07.12.2015 - 14.12.2015.
30. ILL: IN8 and IN3. Grenoble, France. 12.11.2015 - 16.11.2015.
29. ILL: IN22 and IN3. Grenoble, France. 05.11.2015 - 12.11.2015.
28. ILL: IN12 and D23. Grenoble, France. 19.10.2015 - 26.10.2015.
27. ILL: IN8 and IN3. Grenoble, France. 08.09.2015 - 18.09.2015.
26. ILL: D23. Grenoble, France. 29.07.2015 - 02.08.2015.
25. ILL: Thales. Grenoble, France. 21.06.2015 - 28.07.2015.
24. ILL: IN20. Grenoble, France. 29.06.2015 - 06.07.2015.
23. LLB: 1T1 and 3T1. Saclay/Paris, France. 16.03.2015 - 26.03.2015.
22. FRM II: PUMA. Garching/München, Germany. 21.01.2015 - 26.01.2015.
21. FRM II: PUMA. Garching/München, Germany. 17.12.2014 - 19.12.2014.
20. FRM II: Heidi, Spodi and PUMA. Garching/München, Germany. 27.11.2014 - 10.12.2014.

19. ILL: IN8 and IN3 Grenoble, France. 17.11.2014 - 24.11.2014.
18. ILL: D10 and IN3 Grenoble, France. 03.11.2014 - 10.11.2014.
17. ORNL: HB-1. Oak Ridge, USA. 16.10.2014 - 21.10.2014.
16. ILL: D23 and IN3 Grenoble, France. 14.09.2014 - 22.09.2014.
15. PSI: RITA II. Villigen, Switzerland. 25.08.2014 - 10.09.2014.
14. PSI: Trics. Villigen, Switzerland. 04.07.2014 - 10.07.2014.
13. ORNL: HB-1. Oak Ridge, USA. 21.05.2014 - 26.05.2014.
12. LLB: 1T1. Saclay/Paris, France. 24.02.2014 - 03.03.2014.
11. FRM II: PUMA. Garching/München, Germany. 21.01.2014 - 24.01.2014.
10. LLB: 1T1 and 3T1. Saclay/Paris, France. 09.12.2013 - 17.12.2013.
9. FRM II: PUMA. Garching/München, Germany. 06.11.2013 - 14.11.2013.
8. ISIS: MERLIN. Didcot, UK. 02.10.2013 - 05.10.2013.
7. PSI: RITA II. Villigen, Switzerland. 23.09.2013 - 30.09.2013.
6. LLB: 2T1. Saclay/Paris, France. 16.09.2013 - 23.09.2013.
5. HZB-BER II: V2-FLEXX. Berlin, Germany. 22.08.2013 - 27.08.2013.
4. ILL: IN8, IN22, IN12 and IN3 Grenoble, France. 29.06.2013 - 23.07.2013.
3. HZB-BER II: V2-FLEXX. Berlin, Germany. 21.06.2013 - 29.06.2013.
2. LLB: 1T1 and 3T1. Saclay/Paris, France. 27.05.2013 - 03.06.2013.
1. ILL: IN8, IN22 and IN3 Grenoble, France. 29.04.2013 - 07.05.2013.

Synchrotron beamtime:

8. ESRF: ID28. Grenoble, France. 22.07.2015 - 26.07.2015.
7. DESY: P10. Hamburg, Germany. 15.07.2015 - 20.05.2015.
6. DESY: Po7. Hamburg, Germany. 07.05.2015 - 13.05.2015.
5. ESRF: ID13. Grenoble, France. 08.04.2015 - 13.04.2015.
4. ANL-APS: 6-ID-D. Argonne, USA. 11.06.2014 - 16.06.2014.
3. BESSY II: UE46. Berlin, Germany. 22.04.2014 - 27.04.2014.
2. DESY: P10. Hamburg, Germany. 26.01.2014 - 28.01.2014.
1. DESY: Po7. Hamburg, Germany. 09.06.2013 - 12.06.2013.

## Miscellaneous

*Personal:*

Born on Jul. 28, 1982. Male. Height: 187 cm. Weight: 80 kg.

Birth place: Shijiazhuang, Hebei, P.R. China

*Languages:*

Home Language: Chinese

Foreign Language: 1) English, Fluent in conversation and listening;  
Proficient in reading and writing;

Grade 446 in Collage English Test 6.

2) German, Level A, Understand and speak only a little bit.

*Hobbies:*

Basketball, Running, Swimming,

Chinese Kong-fu, Reading and Surfing on the net.

*References available upon request:* ([✉](#))

Last updated: November 23, 2017