



# Jianhui Xu

Chinese, 02. 03. 1987  
Out station at Heinz Maier-Leibnitz Zentrum  
Institute for Crystallography  
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## APPOINTMENTS

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- Instrument scientist, RWTH Aachen Universität** 01. 2022 - Present  
Polarized neutron diffractometer POLI
- Out station at Heinz Maier-Leibnitz Zentrum (MLZ)
  - Advisor: Prof. Dr. Mirjam Zobel
- Instrument scientist, Technische Universität München** 07. 2020 - 12. 2021  
Neutron triple-axis spectrometer MIRA
- Heinz Maier-Leibnitz Zentrum
  - Advisor: Dr. Robert Georgii
- Instrument scientist, Helmholtz Zentrum Berlin** 03. 2018 - 06. 2020  
Neutron triple-axis spectrometer FLEXX
- Department: Methods for Characterization of Transport Phenomena in Energy Materials
  - Advisor: Priv.-Doz. Dr. Klaus Habicht
- Postdoctoral fellow, Helmholtz Zentrum Berlin** 08. 2017 - 02. 2018  
Research in magnetic minerals of novel lattice topology
- Department: Quantum Phenomena in Novel Materials
  - Advisor: Prof. Dr. Bella Lake

## EDUCATION

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- PhD in solid state physics** 10. 2013 - 07. 2017  
*Helmholtz Zentrum Berlin & Technische Universität Berlin*
- Thesis: Magnetic properties of rare earth zirconate pyrochlores (magna cum laude)
  - Department: Quantum Phenomena in Novel Materials
  - Advisor: Prof. Dr. Bella Lake
- Master in condensed matter physics** 09. 2010 - 07. 2013  
*School of Physics, Peking University*
- Thesis: Study on Mn-based intermetallic magnetocaloric materials
  - Advisor: Associate Prof. Honglin Du
- Bachelor in physics** 09. 2006 - 07. 2010  
*School of Physical Science and Electronics, Shanxi Datong University*

## RESEARCH EXPERIENCES & INTERESTS

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My research interests are in novel magnetic structure and dynamics in quantum materials, especially strongly correlated transition-metal and rare-earth compounds, studied using neutron scattering methods, e.g. powder and single crystal diffraction and inelastic neutron scattering.

I am familiar with several types of neutron scattering instruments and responsible for neutron triple-axis spectrometers for more than three years. I am so experienced in neutron instrumentation used Monte-Carlo ray-tracing simulations.

## EXPERIMENTAL AND CALCULATION SKILLS

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Material synthesis	Arc melting, Solid state reaction, Optic floating zone furnace
Structural analysis	Lab and synchrotron x-ray powder diffraction, X-ray Laue diffraction, Neutron diffraction (powder & single crystal), Neutron diffuse scattering (with polarized & unpolarized neutrons), Rietveld refinement (magnetic & lattice), Magnetic reverse Monte Carlo refinement (short-range correlations)
Lattice and magnetic dynamics	Neutron triple-axis & time-of-flight spectrometers, Muon spin relaxation, including measurements under extreme conditions (sub-kelvin temperature, high magnetic field $\sim 17\text{T}$ ).
Property measurement	DC and AC susceptibility, Specific heat (using PPMS and MPMS)
Theory calculation	Mean field, Linear spinwave, Monte Carlo, Molecular dynamics, Crystal field
Instrumentation	Instrument optimisation using McStas
Programming	Python, Matlab, Mathematica (frequently used) C language (basic knowledge)
Languages	Chinese (native proficiency) English (professional working proficiency) German (elementary)

## AWARDS & OTHER EXPERIENCES

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### Honors and awards

2012	Chenhuxiong scholarship (first 20%)	School of Physics, Peking University
2008	National scholarship	Shanxi Datong University
2007	Excellent student award	Shanxi Datong University
Currently referee for Phys. Rev. Lett. and Phys. Rev. B		

### Teaching experiences

01.2023	Polarized neutron diffraction for Master students	RWTH Aachen University
09. 2012 - 01. 2013	Teaching Assistant	Peking University
12. 2010 - 01. 2012	Part-time high-school physics teacher	Xueersi Education Group, Beijing
Qualification certificate for teaching in high school in China		

## PUBLICATIONS (GOOGLE SCHOLAR PROFILE)

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29. X. Wang, F. Zhu, X. Yang, M. Meven, X. Mi, C. Yi, J. Song, T. Mller, W. Schmidt, K. Schmalzl, E. Ressouche, **J. Xu**, M. He, Y. Shi, W. Feng, Y. Mokrousov, S. Blgel, G. Roth, T. Brckel, and Y. Su, *Flat band-engineered spin-density wave in the correlated topological semimetal  $\text{Mn}_3\text{Sn}$* , [arXiv:2306.04312](#).
28. E. Babcock, Z. Salhi, A. Feoktystov, L. J. Bannenberg, S. R. Parnell, D. Alba Venero, V. Hutanu, H. Thoma, **J. Xu**, P. Pistel, J. Damean, A. Ioffe, S. Mattauch, *In-situ  $^3\text{He}$  neutron spin filters at JCNS, status and updates*, *J. Phys.: Conf. Ser.* **2481** 012009 (2022).
27. A. Samartzis, **J. Xu**, V. K. Anand, A. T. M. N. Islam, J. Ollivier, Y. Su, B. Lake, *Pinch points and half-moons in dipolar-octupolar  $\text{Nd}_2\text{Hf}_2\text{O}_7$* , *Phys. Rev. B* **106**, L100401(2022).
26. H. Trepka, T. Keller, M. Krautloher, **J. Xu**, K. Habicht, M. Bhm, B. Keimer, and M. Hepting, *Critical magnetic fluctuations in the layered ruthenates  $\text{Ca}_2\text{RuO}_4$  and  $\text{Ca}_3\text{Ru}_2\text{O}_7$* , *Phys. Rev. Research* **4**, 023181 (2022).
25. **J. Xu**, M. Atterving, M. Skoulatos, A. Ostermann, R. Georgii, T. Keller, and P. Böni, *Design of a Neutron Polarizing Bender for a Cold Triple-Axis Spectrometer*, *Nuc. Inst. Methods A* **1031**, 166526 (2022).

24. Yayuan Qin, Yao Shen, Changle Liu, Hongliang Wo, Yonghao Gao, Yu Feng, Xiaowen Zhang, Gaofeng Ding, Yiqing Gu, Qisi Wang, Shoudong Shen, Helen C. Walker, Robert Bewley, **Jianhui Xu**, Martin Boehm, Paul Steffens, Seiko Ohira-Kawamura, Naoki Murai, Astrid Schneidewind, Xin Tong, Gang Chen, Jun Zhao, *Field-Tuned Quantum Effects in a Triangular-Lattice Ising Magnet*, [Science bulletin](#), **67**(1),38-44(2022).
23. Florian Landolt, Zewu Yan, Severian Gvasaliya, Ketty Beauvois, Eric Ressouche, **Jianhui Xu**, Andrey Zheludev, *Phase diagram and spin waves in the frustrated ferro-antiferromagnet  $\text{SrZnVO}(\text{PO}_4)_2$* , [Phys. Rev. B](#) **104**, 224435(2021).
22. S. E. Nikitin, A. Podlesnyak, **J. Xu**, D. Voneshen, M. Duc Le, S. L. Bud'ko, P. C. Canfield, D. A. Sokolov, *Magnetic field-induced softening of spin waves and hard-axis order in Kondo-lattice ferromagnet  $\text{CeAgSb}_2$* , [Phys. Rev. B](#) **104** (11), 115169(2021).
21. Fengfeng Zhu, Lichuan Zhang, Xiao Wang, Flaviano Jos dos Santos, Junda Song, Thomas Mueller, Karin Schmalzl, Wolfgang F. Schmidt, Alexandre Ivanov, Jitae T. Park, **Jianhui Xu**, Jie Ma, Samir Lounis, Stefan Blgel, Yuriy Mokrousov, Yixi Su, Thomas Brckel, *Topological magnon insulators in two-dimensional van der Waals ferromagnets  $\text{CrSiTe}_3$  and  $\text{CrGeTe}_3$ : towards intrinsic gap-tunability*, [Sci. Adv.](#) **7**, eabi7532(2021).
20. S. E. Nikitin, S. Nishimoto, Y. Fan, J. Wu, L. S. Wu, A. S. Sukhanov, M. Brando, N. S. Pavlovskii, **J. Xu**, L. Vasylichko, R. Yu, A. Podlesnyak, *Multiple fermion scattering in the weakly coupled spin-chain compound  $\text{YbAlO}_3$* , [Nat. Commun.](#) **12**, 3599 (2021).
19. Anup Kumar Bera, Jianda Wu, Wang Yang, Robert Bewley, Martin Boehm, **Jianhui Xu**, Maciej Bartkowiak, Oleksandr Prokhnenko, Bastian Klemke, A. T. M. Nazmul Islam, Joseph Mathew Law, Zhe Wang and Bella Lake, *Dispersions of Many-Body Bethe Strings*, [Nature Physics](#), 1-6 (2020).
18. P. Y. Portnichenko, A. Akbari, S. E. Nikitin, A. S. Cameron, A. V. Dukhnenko, V. B. Filipov, N. Yu. Shitsevalova, P. Cermak, I. Radelytskyi, A. Schneidewind, J. Ollivier, A. Podlesnyak, Z. Huesges, **J. Xu**, A. Ivanov, Y. Sidis, S. Petit, J.-M. Mignot, P. Thalmeier, D. S. Inosov, *Field-angle resolved magnetic excitations as a probe of hidden-order symmetry in  $\text{CeB}_6$* , [Phys. Rev. X](#) **10**, 021010 (2020).
17. **J. Xu**, Owen Benton, V. K. Anand, A. T. M. N. Islam, T. Guidi, G. Ehlers, and B. Lake, *Order out of Coulomb phase and Higgs transition: frustrated transverse interactions of  $\text{Nd}_2\text{Zr}_2\text{O}_7$* , [Phys. Rev. Lett.](#) **124**, 097203 (2020).
16. V. K. Bhartiya, K. Yu. Povarov, D. Blosser, S. Bettler, Z. Yan, S. Gvasaliya, S. Raymond, E. Ressouche, K. Beauvois, **J. Xu**, F. Yokaichiya, A. Zheludev *Presaturation phase with no dipolar order in a quantum ferro-antiferromagnet*, [Phys. Rev. Res.](#), **1**, 033078 (2019).
15. **J. Xu**, Owen Benton, V. K. Anand, A. T. M. N. Islam, T. Guidi, G. Ehlers, E. Feng, Y. Su, A. Sakai, P. Gegenwart, and B. Lake, *Anisotropic exchange Hamiltonian, magnetic phase diagram and domain inversion of  $\text{Nd}_2\text{Zr}_2\text{O}_7$* , [Phys. Rev. B](#) **99**, 144420 (2019).
14. T. Watanabe, S. Kobayashi, Y. Hara, **J. Xu**, B. Lake, J-Q Yan, A. Niazi, D.C. Johnston, *Orbital- and spin-driven lattice instabilities in quasi-one-dimensional  $\text{CaV}_2\text{O}_4$* , [Phys. Rev. B](#) **98**, 094427 (2018)
13. V. K. Anand, L. Opherden, **J. Xu**, D. T. Adroja, A. D. Hillier, P. K. Biswas, T. Herrmannsdörfer, M. Uhlarz, J. Hornung, J. Wosnitza, E. Canévet, and B. Lake, *Evidence for a dynamical ground state in the frustrated pyrochafnate  $\text{Tb}_2\text{Hf}_2\text{O}_7$* , [Phys. Rev. B](#) **97**, 094402 (2018).
12. **J. Xu**, A. T. M. N. Islam, I. N. Glavatsky, M. Reehuis, Jens-Uwe Hoffmann, and B. Lake, *Field-induced quantum spin-1/2 chains and disorder in  $\text{Nd}_2\text{Zr}_2\text{O}_7$* , [Phys. Rev. B](#) **98**(R), 060408 (2018).
11. V. K. Anand, A. T. M. N. Islam, A. Samartzis, **J. Xu**, N. Casati, B. Lake, *Optimization of single crystal growth of candidate quantum spin-ice  $\text{Pr}_2\text{Hf}_2\text{O}_7$  by optical floating-zone method*, [Journal of Crystal Growth](#) **498**, 124 (2018).
10. L. Opherden, J. Hornung, T. Herrmannsdörfer, **J. Xu**, A. T. M. N. Islam, B. Lake, and J. Wosnitza,

*Evolution of antiferromagnetic domains in the all-in-all-out ordered pyrochlore  $\text{Nd}_2\text{Zr}_2\text{O}_7$* , [Phys. Rev. B 95, 184418 \(2017\)](#).

9. V. K. Anand, L. Opherden, **J. Xu**, D. T. Adroja, A. T. M. N. Islam, T. Herrmannsdörfer, J. Hornung, R. Schönemann, M. Uhlarz, H. C. Walker, N. Casati, and B. Lake, *Physical properties of the candidate quantum spin-ice system  $\text{Pr}_2\text{Hf}_2\text{O}_7$* , [Phys. Rev. B 94, 144415 \(2016\)](#).
8. **J. Xu**, C. Balz, C. Baines, H. Luetkens, and B. Lake, *Spin dynamics of the ordered dipolar-octupolar pseudospin-1/2 pyrochlore  $\text{Nd}_2\text{Zr}_2\text{O}_7$  probed by muon spin relaxation*, [Phys. Rev. B 94, 064425 \(2016\)](#).
7. **J. Xu**, V. K. Anand, A. K. Bera, M. Frontzek, D. L. Abernathy, N. Casati, K. Siemensmeyer, and B. Lake, *Magnetic structure and crystal-field states of the pyrochlore antiferromagnet  $\text{Nd}_2\text{Zr}_2\text{O}_7$* , [Phys. Rev. B 92, 224430 \(2015\)](#).
6. V. K. Anand, A. K. Bera, **J. Xu**, T. Herrmannsdörfer, C. Ritter, and B. Lake, *Observation of long-range magnetic ordering in pyrochlore  $\text{Nd}_2\text{Hf}_2\text{O}_7$ : A neutron diffraction study*, [Phys. Rev. B 92, 184418 \(2015\)](#).
5. **J. Xu**, W. Yang, Q. Du, Y. Xia, H. Du, J. Yang, C. Wang, J. Han, S. Liu, Y. Zhang and Y. Yang, *Wide temperature span of entropy change in first-order metamagnetic  $\text{MnCo}_{1-x}\text{Fe}_x\text{Si}$* , [J. Phys. D: Appl. Phys. 47, 065003 \(2014\)](#).
4. **J. Xu**, Y. Xia, W. Yang, H. Du, J. Yang, C. Wang, J. Han, S. Liu, Y. Yang, *The evolution of the magnetic phases of Sb-doped  $\text{Mn}_5\text{Sn}_3$  compounds*, [J. Appl. Phys., 113, 17E111 \(2013\)](#).
3. **J. Xu**, X. Liu, Y. Xia, W. Yang, H. Du, J. Yang, Y. Zhang, Y. Yang, *Magnetic properties and magnetocaloric effect of  $(\text{Mn}_{1-x}\text{Fe}_x)_5\text{Sn}_3$  ( $x = 0.5$ ) compounds*, [J. Appl. Phys. 113, 17A921 \(2013\)](#).
2. Yuanhua Xia, Honglin Du, **Jianhui Xu**, Yan Zhang, Changsheng Wang, Jingzhi Han, Shunquan Liu, Qing Xu, Jinbo Yang, *The magnetic and magnetocaloric properties of  $\text{NdFe}_{12-x}\text{Mo}_x$  compounds*, [J. Appl. Phys., 111\(7\), 07A949 \(2012\)](#).
1. Yuanhua Xia, Honglin Du, **Jianhui Xu**, Yan Zhang, Changsheng Wang, Jinbo Yang, Xiangzhen Han, Kai Sun, *Crystal structure and magnetic properties of  $\text{DyCu}_x\text{Ga}_{2-x}$  ( $x = 0-2$ ) antiferromagnetic compounds*, [J. Alloys Compd., 512\(1\), 212 \(2012\)](#).

## ATTENDED CONFERENCES AND WORKSHOPS

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### Conferences:

2023	Talk and Poster	MLZ user Meetings, Munich, Germany.
2023	Talk	The Joint European Magnetic Symposia (JEMS), Madrid, Spain.
2023	Poster	European Conference on Neutron Scattering, Munich, Germany.
2022	Poster	MLZ user Meetings, Munich, Germany.
2021	Talk (invited)	Neutron optics group at Heinz Maier-Leibnitz Zentrum, Garching, Germany.
2021	Poster	Polarized Neutrons for Condensed Matter Investigations 2021, NIST (USA).
2020	Talk	MLZ user Meetings 2020 (online), Garching, Germany.
2019	Talk (invited)	Heinz Maier-Leibnitz Zentrum, Garching, Germany.
2018	Talk	DPG Spring Meetings 2018, Berlin, Germany.
2016	Poster	25 <sup>th</sup> International Conference on Magnetism, Barcelona, Spain.
2015	Talk (invited)	Applied magnetism group, Peking University, Beijing, China.
2015	Poster	14 <sup>th</sup> International Conference on Quasielastic Neutron Scattering, Potsdam, Germany.
2013	Poster	12 <sup>th</sup> Joint MMM/INTERMAG Conference, Chicago, Illinois, USA.
2012	Talk	12 <sup>th</sup> Panalytical China User Club Meeting, Hangzhou, China.

### Workshops:

2016	Talk	Helmholtz Virtue Institute PhD retreat, Würzburg, Germany.
2015	Talk	Helmholtz Virtue Institute PhD Retreat, Munich, Germany.
2015	Poster	Helmholtz Virtue Institute Workshop, Berlin, Germany.
2014	Poster	Helmholtz Virtue Institute Workshop, Dresden, Germany.
2014	Poster	34 <sup>th</sup> Berlin Neutron School, Berlin, Germany.