

Yi Lu

- CONTACT INFORMATION Institut für Theoretische Physik +49 6221 54 9428
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69120 Heidelberg, Germany
- EDUCATION Max Plack Institut für Festkörperforschung, Stuttgart, Germany
University of Stuttgart, Stuttgart, Germany
- Ph.D. in Physics, Sep. 2017
- Thesis Topic: *X-ray spectroscopy study of transition metal oxides*
 - Advisor: Prof. Bernhard Keimer
 - *summa cum laude*
- M.Sc. in Physics, Nov. 2012
- Topic: *Structural and Electronic Properties of Perovskite Rare-Earth Nickelate Superlattices*
 - Advisor: Prof. Bernhard Keimer
- Peking University, Beijing, China
- B.Sc. in Physics (Yuanpei College), Jul 2010
- RESEARCH EXPERIENCE Doctoral Research, Nov 2012 to Sep 2017
Max Plack Institut für Festkörperforschung
Advisor: Prof. Bernhard Keimer
Experimental and theoretical study of electronic structure of metal-oxide super-conductors
- Visiting Student, Jul 2013 to Jul 2016
Max-Planck-Instituts für Chemische Physik fester Stoffe
Host: Maurits W. Haverkort
Dynamical mean field theory and spectroscopy in multi-orbital systems.
- Visiting Student, Jul 2012 to Sep 2012
Max-Planck-UBC Centre for Quantum Materials,
University of British Columbia
Host: Maurits W. Haverkort
Density functional theory study of nickelates structure and Fermiology.
- Master Research, Oct 2010 to Oct 2012
Max Plack Institut für Festkörperforschung
Advisor: Prof. Bernhard Keimer
Structural and electronic properties of perovskite rare-earth nickelate superlattices studied by X-ray scattering and density functional theory.
- Undergraduate Research, May 2008 to Jul 2010
Nanostructure and Low Dimensional Physics Laboratory
Department of Physics, Peking University
Advisors: Prof. Zhi-Min Liao, Prof. Da-Peng Yu
Transport properties of ZnO nanowires.
- PUBLICATIONS
1. **Y. Lu** and M. W. Haverkort, “Non-perturbative series expansion of Greens functions: The Anatomy of Resonant Inelastic X-Ray Scattering in Doped Hubbard Model”, *Phys. Rev. Lett.* **119**, 256401 (2017).
 2. M. Minola, **Y. Lu**, Y. Y. Peng, G. Dellea, H. Gretarsson, M. W. Haverkort, Y. Ding, X. Sun, X. J. Zhou, D. C. Peets, L. Chauviere, P. Dosanjh, D. A. Bonn, R. Liang, A. Damascelli, M. Dantz, X. Lu, T. Schmitt, L. Braicovich, G. Ghiringhelli, B. Keimer, and M. Le Tacon, “Sharp Crossover from Collective to Incoherent Spin Excitations in Superconducting Cuprates Probed by Detuned Resonant Inelastic X-ray Scattering”, *Phys. Rev. Lett.* **119**, 097001 (2017).
 3. **Y. Lu** and M. W. Haverkort, “Exact diagonalization as an impurity solver in dynamical mean field theory”, *EPJ ST*, **226**, 2549 (2017).

4. **Y. Lu**, Z. Zhong, M. W. Haverkort, and P. Hansmann, “Origins of bond and spin order in rare-earth nickelate bulk and heterostructures”, *Phys. Rev. B* **95**, 195117 (2017).
5. Y. X. Zhao and **Y. Lu**, “*PT*-Symmetric Real Dirac Fermions and Semimetals”, *Phys. Rev. Lett.* **118**, 056401 (2017).
6. A. Frano, S. Blanco-Canosa, E. Schierle, **Y. Lu**, M. Wu, M. Bluschke, M. Minola, G. Christiani, H. U. Habermeier, G. Logvenov, Y. Wang, P. A. van Aken, E. Benckiser, E. Weschke, M. Le Tacon, and B. Keimer, “Long-range charge-density-wave proximity effect at cuprate/manganate interfaces”, *Nat. Mater.* **15**, 831 (2016).
7. **Y. Lu**, A. Frano, M. Bluschke, M. Hepting, S. Macke, J. Stempffer, P. Wochner, G. Christiani, G. Logvenov, H. U. Habermeier, M. W. Haverkort, B. Keimer, and E. Benckiser, “Quantitative determination of bond order and lattice distortions in nickel oxide heterostructures by resonant x-ray scattering”, *Phys. Rev. B* **93**, 165121 (2016).
8. M. Minola, G. Dellea, H. Gretarsson, Y. Y. Peng, **Y. Lu**, J. Porras, T. Loew, F. Yakhov, N. B. Brookes, Y. B. Huang, J. Pelliciani, T. Schmitt, G. Ghiringhelli, B. Keimer, L. Braicovich, and M. Le Tacon, “Collective nature of spin excitations in superconducting cuprates probed by resonant inelastic x-ray scattering”, *Phys. Rev. Lett.* **114**, 217003 (2016).
9. M. W. Haverkort, G. Sangiovanni, P. Hansmann, A. Toschi, **Y. Lu**, S. Macke, “Bands, resonances, edge singularities and excitons in core level spectroscopy investigated within the dynamical mean field theory”, *EPL* **108**, 57004 (2014).
10. N. Gauquelin, E. Benckiser, M. K. Kinyanjui, M. Wu, **Y. Lu**, G. Christiani, G. Logvenov, H. U. Habermeier, U. Kaiser, B. Keimer, and G. A. Botton, “Atomically resolved EELS mapping of the interfacial structure of epitaxially strained $\text{LaNiO}_3/\text{LaAlO}_3$ superlattices”, *Phys. Rev. B* **90**, 195140 (2014).
11. **Y. Lu**, M. Höppner, O. Gunnarsson, M. W. Haverkort, “Efficient real frequency solver for dynamical mean field theory”, *Phys. Rev. B* **90**, 085102 (2014).
12. M. K. Kinyanjui, **Y. Lu**, N. Gauquelin, M. Wu, A. Frano, P. Wochner, M. Reehuis, G. Christiani, G. Logvenov, H. U. Habermeier, G. A. Botton, U. Kaiser, B. Keimer, and E. Benckiser, “Lattice distortions and octahedral rotations in epitaxially strained $\text{LaNiO}_3/\text{LaAlO}_3$ superlattices”, *Appl. Phys. Lett.* **104**, 221909 (2014).
13. A. Frano, E. Benckiser, **Y. Lu**, M. Wu, M. Castro-Colin, M. Reehuis, A. V. Boris, E. Detemple, W. Sigle, P. van Aken, G. Christiani, G. Logvenov, H. U. Habermeier, P. Wochner, B. Keimer, and V. Hinkov, “Layer selective control of the lattice structure in oxide superlattices”, *Adv. Mater.* **26**, 258 (2014).
14. M. Wu, E. Benckiser, M. W. Haverkort, A. Frano, **Y. Lu**, U. Nwankwo, S. Bruck, P. Audehm, E. Goering, S. Macke, V. Hinkov, P. Wochner, G. Christiani, S. Heinze, G. Logvenov, H. U. Habermeier, and B. Keimer, “Strain and composition dependence of orbital polarization in nickel oxide superlattices”, *Phys. Rev. B* **88**, 125124 (2013).
15. A. Frano, E. Schierle, M. W. Haverkort, **Y. Lu**, M. Wu, S. Blanco-Canosa, U. Nwankwo, A. V. Boris, P. Wochner, G. Christiani, H. U. Habermeier, G. Logvenov, V. Hinkov, E. Benckiser, E. Weschke, B. Keimer, “Orbital control of noncollinear magnetic order in nickel oxide heterostructures”, *Phys. Rev. Lett.* **111**, 106804 (2013).
16. J. A. Rosen, R. Comin, G. Levy, D. Fournier, Z.-H. Zhu, B. Ludbrook, C. N. Veenstra, A. Nicolaou, D. Wong, P. Dosanjh, Y. Yoshida, H. Eisaki, G. R. Blake, F. White, T. T. M. Palstra, R. Sutarto, F. He, A. Frano, **Y. Lu**, B. Keimer, G.

A. Sawatzky, L. Petaccia, A. Damascelli, “Surface-enhanced charge-density-wave instability in underdoped Bi2201”, *Nat. Commun.* **4**, 1977 (2013).

17. S. Blanco-Canosa, A. Frano, T. Loew, **Y. Lu**, J. Porras, G. Ghiringhelli, M. Minola, C. Mazzoli, L. Braicovich, E. Schierle, E. Weschke, M. Le Tacon, B. Keimer, “Momentum-Dependent Charge Correlations in $\text{YBa}_2\text{Cu}_3\text{O}_{6+\delta}$ Superconductors Probed by Resonant X-ray Scattering: Evidence for Three Competing Phases”, *Phys. Rev. Lett.* **110**, 187001 (2013).
18. M. Rössle, K. W. Kim, A. Dubroka, P. Marsik, C. N. Wang, R. Jany, C. Richter, J. Mannhart, C. W. Schneider, A. Frano, P. Wochner, **Y. Lu**, B. Keimer, D. K. Shukla, J. Stempfer, C. Bernhard, “Electric-Field-Induced Polar Order and Localization of the Confined Electrons in $\text{LaAlO}_3/\text{SrTiO}_3$ Heterostructures”, *Phys. Rev. Lett.* **110**, 136805 (2013).
19. Z. Liao, **Y. Lu**, H. Wu, Y. Bie, Y. Zhou, and D. Yu, “Improved performance of ZnO nanowire field-effect transistors via focused ion beam treatment”, *Nanotechnology* **22**, 375201 (2011).
20. Z. Liao, **Y. Lu**, H. Zhang, D. Yu, “Hysteresis Magnetoresistance and Micro-magnetic Modeling of Ni Microbelts”, *JMMM* **322**, 2231 (2010).
21. Z. Liao, **Y. Lu**, J. Xu, J. Zhang, D. Yu, “Temperature dependence of photoconductivity and persistent photoconductivity of single ZnO nanowires”, *Appl. Phys. A* **95**, 363 (2009).

TALKS

- “Dynamical mean field theory of nickelate superlattices”, Nov 2013
Workshop on strongly correlated systems, Schloss Ringberg, Kreuth
- “Efficient real frequency solver for dynamical mean field theory”, Apr 2014
DPG spring meeting, Dresden
- “Efficient real frequency impurity solver and application in spectroscopy”, Jan 2015
University of Geneva, Geneva, Switzerland
- “X-ray spectroscopy of transition metal oxides”, Feb 2015
FOR1346 meeting, Würzburg
- “Resonant inelastic x-ray scattering of high- T_c cuprates”, Mar 2015
DPG spring meeting, Berlin
- “Efficient real frequency solver for dynamical mean field theory”, Jun 2015
Many Electron Summer School, SUNY Stony Brook, New York, NY, USA
- “Charge order in nickelate superlattices”, Oct 2015
Symposium on High Temperature Superconductivity, Schloss Ringberg, Kreuth
- “Anatomy of resonant inelastic x-ray scattering in Hubbard model”, Jul 2016
RIXS-REXS workshop, Dresden
- “Resonant inelastic x-ray scattering in cuprate superconductors”, Nov 2016
IMPRS-PKU workshop, ICQM Peking University, Beijing

TEACHING

Teaching assistant

- Advanced Experimental Physics I, University of Stuttgart Winter 2014
- Advanced Experimental Physics II, University of Stuttgart Summer 2015
- Theoretical Statistical Physics, University of Heidelberg Winter 2017

HONORS AND AWARDS

- Fellowship from Max Planck Exzellenzstiftung 2010 - 2012
- Excellent Achievements of Undergraduate Research, Department of Physics, Peking University Dec 2009
- President Fund for Undergraduates’ Academic and Scientific Research, Peking University 2008 - 2009
- Mingde Scholarship (*top tier*), Peking University 2006 - 2010

PROGRAMMING SKILLS

- C, C++, Python, Matlab, and Mathematica