

EDUCATION

- Applied Physics, **PhD, Stanford University**, USA 2004-2010
 Applied Physics, **MS, Stanford University**, USA 2004-2007
- Dissertation: “*Experimental studies of high-Tc cuprate superconductors with density wave correlations*”
- Physics, **MS, Fudan University**, China 2001-2004
- Dissertation: “*Magnetism and superconductivity in low dimensional systems*”
- Illuminating Engineering, **BS (with distinction), Fudan University**, China 1997-2001
- Dissertation: “*Construction and optimization of vibrating sample magnetometer*”

RESEARCH EXPERIENCE

- Postdoctoral fellow, Advanced Light Source, **Lawrence Berkeley National Laboratory** 2010-present
 Principle Investigator: Dr. Zahid Hussain
- Studied cuprates (La214, Bi2201, Bi2212) using ARPES (mainly), PEEM, STXM and, in collaboration, neutron and X-ray scatterings.
Accomplishments (as a lead author):
 - ◆ Found the first example for the long-sought itinerant-spin extreme of the cuprate spin physics (also with neutron scattering, in Fe-LSCO) [published in *Phys. Rev. Lett.*, 2011b].
 - ◆ Found the first example for the strong- to weak-coupling crossover of the cuprate spin physics (also with neutron scattering, in La214) [in preparation].
 - ◆ Challenged the high-Tc infrastructure based exclusively on the Zhang-Rice singlets by observing distinct c-axis symmetry states in the ground state of the La214 family [in preparation].
 - ◆ Found a novel unidirectional bond-direction order in La214, resolved two important puzzles left by early ARPES and neutron experiments (also with resonant soft X-ray scattering) [in preparation].Accomplishment (as a major author): Observed three phenomenologically-distinct superconducting ground states inside a single superconducting dome in Bi2212; proposed the existence of a reentrant pseudogap phase [submitted to *Nature Mat.*].
 - Studied, in collaboration, SrTiO₃, KTaO₃ using ARPES, Hg1201 using torque magnetometry.
Accomplishments (as a major author):
 - ◆ Demonstrated firstly the creation of a 2D electron liquid on the surface of the technologically-important compound SrTiO₃ without the need of interfacing [published in *Nature Mat.*, 2011].
 - ◆ Demonstrated firstly the creation of a 2D electron liquid on the surface of the strong spin-orbit - coupled 5d-transition-metal perovskite KTaO₃ [submitted to *Phys. Rev. Lett.*].
 - Studied TiSe₂ and TaS₂ with ARPES and, in collaboration, TRR and PKE.
 - Studied energy-related materials (3d TM phthalocyanine, BaZrTiO₃) using XAS, XES and RIXS.
- Research assistant, Geballe Lab for Advanced Materials, **Stanford University** 2004-2010
 Principle Investigator: Prof. Zhi-Xun Shen
- Studied cuprates (La214, Bi2201) using ARPES (mainly) and, in collaboration, PKE and TRR.
Accomplishments (as a lead author):

- ◆ Found the first case for the coexistence of two types of pseudogaps (in LBCO) [published in *Nature Phys.*, 2009].
- ◆ Uncovered the broken particle-hole symmetry nature of the pseudogap (in Bi2201) [published in *Nature Phys.*, 2010].
- ◆ Led an unprecedented joint effort to present the strongest evidence so far for the pseudogap phase transition (also with PKE and TRR, in Bi2201) [published in *Science*, 2011].
- ◆ Conducted a systematic doping dependence study of the (π, π) shadow band in La214 and clarified a prior controversy [published in *New J. Phys.*, 2011].

Accomplishment (as a major author): Resolved a major puzzle about the difference in the gap functions obtained by two leading probes (ARPES and STM) for cuprates [published in *Phys. Rev. Lett.*, 2011a].

- Studied, in collaboration, BaFe2As2, FeTe1-xSex, SrTiO3, RTe3, R2Te5, NaTaS2, using ARPES.
Accomplishment (as a major author): Reported the first evidence of polarons in Fe1.02Te, as a key signature of the strong-coupling physics in iron-based superconductors [submitted to *Phys. Rev. Lett.*].
- Participated in the ARPES endstation upgrade at BL 5-4 of SSRL.

Research assistant, Lab of Advanced Materials, **Fudan University** 2000-2004

Principle Investigators: Prof. Xiaofeng Jin, Prof. Donglai Feng

- Studied magnetic ultrathin films using RHEED, LEED, XRD, XPS, VSM and MOKE.
Accomplishment (as a major author): Achieved the first epitaxial growth of bulk-like bcc Nickel film on GaAs(001); characterized the structural, electronic and magnetic properties of this novel Nickel phase which has never existed in nature before [published in *Phys. Rev. Lett.*, 2005].
- Studied Bi2212 using ARPES [published in *Phys. Rev. B (rapid comm.)*, 2004].
- Performed spin dynamics simulations for a quasi-2D magnetic dipolar system [arXiv].
- Constructed and optimized a time-resolved MOKE system.
- Constructed and automated a home-made VSM.

TEACHING EXPERIENCE

Student advisor for new Applied Physics graduate students, Stanford University 2005-2006

Teaching assistant for Group Theory I (grad level), Fudan University 2002

Honorary Lecturer of the University Student Forum, Fudan University 2000-2001

PROFESSIONAL ACTIVITIES

Academic editor of the open-access journal **PLoS ONE** (IF: 4.411; handled 2 submissions) 2011-present

Invited reviewer for the following peer-review journals (22 times) 2009-present

Europhysics Letters, Journal of Physics and Chemistry of Solids, Journal of Physics: Condensed Matter, New Journal of Physics, Physica B, Physics Letters A, Physica Status Solidi - Rapid Research Letters, Superconductor Science and Technology.

Invited reviewer for 1 new book proposal by **Wiley-VCH** 2011

Invited reviewer for 1 beamtime proposal by Stanford Synchrotron Radiation Lightsource (SSRL) 2011

Local committee of the International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy, Berkeley, California (CORPES11) 2011

Invited reviewer for 5 submissions to the proceedings of the 9th International Conference on Spectroscopies in Novel Superconductors, Shanghai, China (SNS2010) 2010

HONORS AND AWARDS

ALS Postdoctoral Fellow (link)	2010-present
1st prize group presentation award of the SLAC-Stanford-NREL Energy Summer School (link)	2009
Benchmark Fellow, Stanford Graduate Fellowship (link)	2004-2007
Outstanding Graduate of Shanghai (top 5%) (link)	2001
Top-10 Scholastic Star of Fudan (top 0.2%) (link)	2000

ORAL PRESENTATIONS

6. APS March meeting, Dallas, TX, USA, 2011
“Hidden itinerant-spin extreme in heavily-overdoped LSCO revealed by dilute Fe doping: A combined neutron scattering and ARPES study”
5. APS March meeting, Portland, OR, USA, 2010
“Towards a more complex superconducting state of cuprates”
4. APS March meeting, Pittsburgh, PA, USA, 2009
“Incommensurate density wave instability by nodal Fermi arc nesting in LBCO-1/8”
3. APS March meeting, New Orleans, LA, USA, 2008
“Energy gaps in failed superconductor La_{1.875}Ba_{0.125}CuO₄”
2. American Physical Society (APS) March meeting, Denver, CO, USA, 2007
“ARPES study of a complex charge density wave material Gd₂Te₅”
1. The 3rd national conference of magnetic ultrathin film and nanomagnetism, Lanzhou, China, 2001
“System optimization of the vibrating sample magnetometer”

INVITED PRESENTATIONS

6. ALS Science Café, Lawrence Berkeley National Laboratory, Berkeley, CA, USA, 2011
“What’s new about high-T_c?”
5. Festworkshop in honor of Prof. Shigeji Fujita, SUNY at Buffalo, Buffalo, NY, USA, 2010
“Recent developments on pseudogaps in high-T_c superconductors”
4. School of Physics and Astronomy, University of Minnesota, Minneapolis, MN, USA, 2010
“Experimental studies of high-T_c cuprate superconductors with density wave correlations”
3. Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, CA, USA, 2010

“Experimental studies of high-Tc cuprate superconductors with density wave correlations”

2. The 3rd Stanford-Yonsei workshop, SLAC National Accelerator Laboratory, Menlo Park, CA, USA, 2009
“Energy gaps in the failed superconductor La_{1.875}Ba_{0.125}CuO₄”
1. Workshop on Gd doping as a basis for dilute magnetic semiconductors, Gainesville, FL, USA, 2006
“Possible characterization of GaGdN using synchrotron radiation”

PUBLICATIONS

20. **R.-H. He**, W. L. Yang, Z. Liu, J. H. Guo, S.-K. Mo, Z. Hussain
“Scientific opportunities with accelerator based light sources for renewable energy”
to appear in *the proceedings of IAEA Technical Meeting*
19. **R.-H. He**, M. Fujita, M. Enoki, M. Hashimoto, S. Iikubo, S.-K. Mo, H. Yao, T. Adachi, Y. Koike, Z. Hussain, Z.-X. Shen, K. Yamada
“Hidden itinerant-spin phase in heavily overdoped La_{2-x}Sr_xCuO₄ superconductors revealed by dilute Fe doping: A combined neutron scattering and angle-resolved photoemission study”
Phys. Rev. Lett. 107, 127002 (2011)
18. M. Hashimoto, **R.-H. He**, J. P. Testaud, W. Meevasana, R. G. Moore, D. H. Lu, Y. Yoshida, H. Eisaki, T. P. Devereaux, Z. Hussain, Z.-X. Shen
“Reaffirming the dx₂-y₂ superconducting gap using the autocorrelation angle-resolved photoemission spectroscopy of Bi_{1.5}Pb_{0.55}Sr_{1.6}La_{0.4}CuO_{6+d}”
Phys. Rev. Lett. 106, 167003 (2011)
17. **R.-H. He**^{*}, M. Hashimoto^{*}, H. Karapetyan, J. D. Koralek, J. P. Hinton, J. P. Testaud, V. Nathan, Y. Yoshida, H. Yao, K. Tanaka, W. Meevasana, R. G. Moore, D. H. Lu, S.-K. Mo, M. Ishikado, H. Eisaki, Z. Hussain, T. P. Devereaux, S. A. Kivelson, J. Orenstein, A. Kapitulnik, Z.-X. Shen
“From a single-band metal to a high-temperature superconductor via two thermal phase transitions”
Science 331, 1579-1583 (2011)
Media reports: [[Nature News & Views](#)] [[SLAC & LBNL joint press releases](#)] [[The Stanford Daily](#)] [[Berkeley Research](#)] [[SSRL Headlines](#) & [Science Highlight](#)] [[LightSources press releases #1 & #2](#)] [[EurekAlert! press releases #1 & #2](#)] [[MRS News & Publications](#)] [[IEEE-USA Today's Engineer](#)] [[ScienceDaily](#)] [[Popsci](#)] [[PhysOrg](#)] [[RedOrbit](#)] [[Energy Daily](#)] [[R&D Magazine](#)] [[New Electronics](#)] [EE Times [USA](#) & [Europe](#) & [Asia](#) & [China](#) & [Taiwan](#) & [India](#)] [[Tom's Hardware Guide](#)] [[Popular Mechanics](#)] [[Futurity](#)] [[Sify](#)] [[ELPort.News](#)] [[Newmaker](#)] [[Product Design & Development](#)] [[Chem.Info](#)] [[Gyeonggi Technopark](#)] [[CNtronics](#)] [HighBeam [Research](#) & [Business](#)] [[Domain-b](#)] [[Cheminfo.CN](#)] [[ChemEurope](#)] [[Targeted News Service](#)] [[ResearchSEA](#)] [[FirstScience](#)] [[Indian Mirror](#)] [[VerticalNews](#)] [[IndiaVision](#)] [[Yahoo! News India](#)] [Niuzer [#1](#) & [#2](#)] [[Materials for Energy](#)] [[Stock Market Review](#)] [[Business Magazine](#)] [[DailyTech](#)] [[LabSpaces](#)] [[Ceramic Tech Today](#)] [[ZeitNews](#)] [[TG Daily](#)] [e! Science News [#1](#) & [#2](#)] [[BioScholar](#)] [[Babelation](#)] [[Net World Directory](#)] [[SouthAsiaNews](#)] [[Innovations Report](#)] [[Machines Like Us](#)] [[Noodls](#)] [[TruthDrive](#)] [[newKerala](#)] [[Newstrack India](#)] [[Btechguru](#)] [[Engineers Edge](#)] [[Softpedia](#)] [[Alltop](#)] [[The Cutting Edge](#)] [[SlashGear](#)] [[ScienceNewsline](#)] [[Chemistry Times](#)] [[SciGuru](#)]

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16. **R.-H. He**, X. J. Zhou, M. Hashimoto, T. Yoshida, K. Tanaka, S.-K. Mo, T. Sasagawa, N. Mannella, W. Meevasana, H. Yao, M. Fujita, T. Adachi, S. Komiya, S. Uchida, Y. Ando, F. Zhou, Z. X. Zhao, A. Fujimori, Y. Koike, K. Yamada, Z. Hussain and Z.-X. Shen
“Doping dependence of the (π , π) shadow band in La-based cuprates studied by angle-resolved photoemission spectroscopy”
New J. Phys. 13, 013031 (2011) ([IoP Select, 2011 monthly highlights](#))
 15. W. Meevasana*, P. D. C. King*, **R. H. He**, S.-K. Mo, M. Hashimoto, F. Baumberger and Z.-X. Shen
“Creation and control of a two-dimensional electron liquid at the bare SrTiO₃ surface”
Nature Mat. 10, 114-118 (2011)
Media report: [[SLAC Today](#)]
 14. I. M. Vishik, W. S. Lee, **R.-H. He**, M. Hashimoto, Z. Hussain, T. P. Devereaux and Z.-X. Shen
“ARPES studies of cuprate Fermiology: superconductivity, pseudogap and quasiparticle dynamics”
New J. Phys. 12, 105008 (2010)
Media reports: [[Superconductor Week No. 2505](#)] [[VerticalNews](#)]
 13. M. Hashimoto*, **R.-H. He***, K. Tanaka, J. P. Testaud, W. Meevasana, R. G. Moore, D. H. Lu, H. Yao, Y. Yoshida, H. Eisaki, T. P. Devereaux, Z. Hussain and Z.-X. Shen
“Particle-hole symmetry breaking in the pseudogap state of Bi2201”
Nature Phys. 6, 414-418 (2010)
Media reports: [[Nature Physics News & Views](#)] [[SSRL Headlines & Science Highlight](#)] [[SLAC Today](#)] [[Superconductor Week No. 2414](#)] [[Next Big Future](#)] [[Science Policy Today](#)] [[VerticalNews](#)]
 12. W. Meevasana, B. Moritz, C. -C. Chen, S. Fujimori, **R. H. He**, D. H. Lu, S.-K. Mo, R. G. Moore, F. Baumberger, T. P. Devereaux, N. Nagaosa and Z.-X. Shen
“Strong energy-momentum dispersion of phonon-dressed carriers in the lightly doped band insulator SrTiO₃”
New J. Phys. 12, 023004 (2010)
Media report: [[VerticalNews](#)]
 11. R. G. Moore, V. Brouet, **R. He**, D. H. Lu, N. Ru, J.-H. Chu, I. R. Fisher, Z.-X. Shen
“Fermi surface evolution across multiple charge density wave transitions in ErTe₃”
Phys. Rev. B 81, 073102 (2010)
 10. M. Yi, D. H. Lu, J. G. Analytis, J.-H. Chu, S.-K. Mo, **R.-H. He**, M. Hashimoto, R. G. Moore, I. I. Mazin, D. J. Singh, Z. Hussain, I. R. Fisher and Z.-X. Shen
“Unconventional electronic reconstruction in undoped (Ba,Sr)Fe₂As₂ across the spin density wave transition”
Phys. Rev. B 80, 174510 (2009) (Editors’ suggestion)
 9. M. Yi, D. H. Lu, J. G. Analytis, J.-H. Chu, S.-K. Mo, **R.-H. He**, R. G. Moore, X. J. Zhou, G. F. Chen, J. L. Luo, N. L. Wang, Z. Hussain, D. J. Singh, I. R. Fisher and Z.-X. Shen

- “Electronic structure of the BaFe₂As₂ family of iron-pnictide superconductors”*
Phys. Rev. B 80, 024515 (2009)
8. **R.-H. He**, K. Tanaka, S.-K. Mo, T. Sasagawa, M. Fujita, T. Adachi, N. Mannella, K. Yamada, Y. Koike, Z. Hussain and Z.-X. Shen
“Energy gaps in the failed high-T_c superconductor La_{1.875}Ba_{0.125}CuO₄”
Nature Phys. 5, 119-123 (2009)
Media report: [[HighBeam Business](#)]
7. V. Brouet, W. L. Yang, X. J. Zhou, Z. Hussain, R. G. Moore, **R. He**, D. H. Lu, Z. X. Shen, J. Laverock, S. B. Dugdale, N. Ru and I. R. Fisher
“Angle-resolved photoemission study of the evolution of band structure and charge density wave properties in RTe₃ (R=Y, La, Ce, Sm, Gd, Tb, and Dy)”
Phys. Rev. B 77, 235104 (2008)
6. W. Meevasana, X. J. Zhou, S. Sahrakorpi, W. S. Lee, W. L. Yang, N. Mannella, T. Yoshida, Y. L. Chen, K. Tanaka, **R. H. He**, Hsin Lin, S. Komiyama, Y. Ando, F. Zhou, W. X. Ti, J. W. Xiong, Z. X. Zhao, T. Sasagawa, T. Kakeshita, K. Fujita, S. Uchida, H. Eisaki, A. Fujimori, Z. Hussain, R. S. Markiewicz, A. Bansil, N. Nagaosa, J. Zaanen, T. P. Devereaux and Z. X. Shen
“Hierarchy of multiple many-body interaction scales in high-temperature superconductors”
Phys. Rev. B 75, 174506 (2007)
5. D. W. Shen, B. P. Xie, J. F. Zhao, L. X. Yang, L. Fang, J. Shi, **R. H. He**, D. H. Lu, H. H. Wen, D. L. Feng
“Novel mechanism of charge density wave in a transition metal dichalcogenide”
Phys. Rev. Lett. 99, 216404 (2007)
Media report: [[SSRL Headlines](#) & [Science Highlight](#)]
4. K. Yang, B. P. Xie, D. W. Shen, J. F. Zhao, H. W. Ou, J. Wei, S. Wang, Y. H. Wang, D. H. Lu, **R. H. He**, M. Arita, S. Qiao, A. Ino, H. Namatame, M. Taniguchi, F. Q. Xu, N. Kaneko, H. Eisaki, D. L. Feng
“Normal state electronic structure in the heavily overdoped regime of Bi_{1.74}Pb_{0.38}Sr_{1.88}CuO_{6+d}”
single-layer cuprate superconductors”
Phys. Rev. B 73, 144507 (2006)
3. C. S. Tian*, D. Qian*, D. Wu*, **R. H. He***, Y. Z. Wu*, W.X. Tang, L. F. Yin, Y. S. Shi, G. S. Dong, X. F. Jin, X. M. Jiang, F. Q. Liu, H. J. Qian, K. Sun, L. M. Wang, G. Rossi, Z. Q. Qiu and J. Shi
“Body-centered-cubic Ni and its magnetic properties”
Phys. Rev. Lett. 94, 137210 (2005)
Media report: [[Physics World](#)]
2. **R. H. He**, D. L. Feng, H. Eisaki, J.-i. Shimoyama, K. Kishio and G. D. Gu
“Superconducting order parameter in heavily overdoped Bi₂Sr₂CaCu₂O_{8+d}: A global quantitative analysis”
Phys. Rev. B 69, R220502 (2004) (rapid comm.)
1. **R. H. He**, G. S. Dong and X. F. Jin

“*Spin polarized scanning tunneling microscopy*”
Progress in Physics 22, 265 (2002) (Chinese)

* These authors contributed equally to this work.

PUBLICATIONS (in preparation)

9. **R.-H. He***, M. Fujita*, K. Tanaka, M. Enoki, H. Yao, S.-K. Mo, S. Iikubo, M. Hashimoto, E. Berg, T. Sasagawa, T. Adachi, T. Yoshida, N. Mannella, W. Meevasana, A. Fujimori, Y. Koike, Z. Hussain, Z.-X. Shen and K. Yamada
“*Evidence for a crossover between localized and itinerant spin physics in a high- T_c cuprate family*”
in preparation for *Nature Phys.*
8. **R.-H. He**, Y.-D. Chuang, M. Hashimoto, K. Tanaka, S.-K. Mo, W. L. Yang, T. Sasagawa, N. Mannella, M. Fujita, T. Adachi, M. Enoki, S. Iikubo, W. Meevasana, Y. He, K. Yamada, Y. Koike, Z. Hussain, Z.-X. Shen
“*Evidence for a novel unidirectional period-doubling bond-direction order in La-based cuprates*”
in preparation for *Phys. Rev. Lett.*
7. Z. K. Liu, **R.-H. He**, D. H. Lu, M. Yi, Y. L. Chen, M. Hashimoto, R. G. Moore, S.-K. Mo, J. Hu, T. J. Liu, Z. Q. Mao, T. P. Devereaux, Z. Hussain and Z.-X. Shen
“*Signature of coherent polarons in strong-coupling antiferromagnetic ordered iron chalcogenide $Fe1.02Te$* ”
under review by *Phys. Rev. Lett.*
6. M. Hashimoto, **R.-H. He**, I. M. Vishik, R. G. Moore, D. H. Lu, Y. Yoshida, H. Eisaki, Z. Hussain, T. P. Devereaux, and Z.-X. Shen
“*Robustness of distorted superconductivity by the coexisting pseudogap in the antinodal region of $Bi1.5Pb0.55Sr1.6La0.4CuO6+d$: Photon-energy-dependent angle-resolved photoemission study*”
in preparation for *Phys. Rev. B*
5. **R.-H. He**, M. Hashimoto*, K. Tanaka*, A. Sorini, S.-K. Mo, T. Sasagawa, M. Fujita, T. Adachi, M. Enoki, S. Iikubo, N. Mannella, H. Yao, M. Yi, W. Meevasana, K. Yamada, Y. Koike, T. P. Devereaux, Z. Hussain and Z.-X. Shen
“*Observation of symmetry-distinct states proximate to the Fermi level in a high- T_c cuprate family*”
in preparation for *Science*
4. G. Yu, D.-D. Xia, N. Barišić, **R.-H. He**, N. Kaneko, Y. Li, A. Shekhter, X. Zhao and M. Greven
“*Torque magnetometry reveals narrow superconducting fluctuation regime in the model cuprate $HgBa2CuO4+d$* ”
in preparation for *Nature*
3. **R. H. He** and X. F. Jin
“*Finite lattice size effect on the ground state phase diagram of quasi-two-dimensional magnetic dipolar dots array with perpendicular anisotropy*”

in preparation for *Phys. Rev. B*; Preprint available at arXiv: cond-mat/0408324

2. P. D. C. King, **R. H. He**, T. Eknapakul, S.-K. Mo, Y. Kaneko, S. Harashima, Y. Hikita, S. Bahramy, C. Bell, Y. Tokura, Z.-X. Shen, H. Y. Hwang, F. Baumberger and W. Meevasana
“*Subband structure of a two-dimensional electron gas formed at the polar surface of the strong spin-orbit perovskite $KTaO_3$* ”
under review by *Phys. Rev. Lett.*; Preprint available at arXiv:1111.2782
1. I. M. Vishik, M. Hashimoto, **R.-H. He**, W. S. Lee, F. Schmitt, D. H. Lu, R. G. Moore, C. Zhang, W. Meevasana, T. Sasagawa, S. Uchida, K. Fujita, S. Ishida, M. Ishikado, Y. Yoshida, H. Eisaki, Z. Hussain, T. P. Devereaux, and Z. X. Shen
“*Phase competition in trisected superconducting dome*”
under review by *Nature Mat.*

* These authors contributed equally to this work.