

Guorong Li

Department of Physics and Astronomy, Louisiana State University
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QUALIFICATIONS

- Solid background in condensed-matter physics and correlated electronic materials.
- Expertise in Scanning Tunneling Microscopy (STM) and ultra-high vacuum (UHV) & cryogenic instrumentation.
- Expertise in Low Energy Electron Diffraction (LEED) and its I-V analysis.
- Computer skills including Matlab, LabVIEW, C/C++, Java, FORTRAN, Igor Pro, and OriginLab.
- Strong problem-solving abilities, communication and interpersonal skills.

EDUCATION

- Ph.D. Physics, Louisiana State University (LSU), Baton Rouge, LA, USA** Aug. 2013
Advisor: Prof. Ward Plummer
- B. S. Physics, Peking University (PKU), Beijing, China** July 2007

RESEARCH EXPERIENCE

- Graduate Research Assistant, Louisiana State University (LSU)** June 2008 – Present
- Investigated the surface geometric and electronic structure of $\text{Ca}_{10}(\text{Pt}_4\text{As}_8)(\text{Fe}_2\text{As}_2)_5$ using STM.
 - Investigated the two surface reconstructions on BaFe_2As_2 using STM and LEED.
 - Studied the strong couplings between spin, charge and lattice on the surface of BaFe_2As_2 and reported atomically resolved STM images of spin chirality at the anti-phase magnetic-structural domain walls.
 - Determined the quantitative surface structure of Fe-based superconductors including $\text{FeTe}_{1-x}\text{Se}_x$ and $(\text{Ba,Ca})(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ by LEED experiments and I-V analysis.
 - Worked with a senior post-doc on STM user project to study Kondo effect of Co adatom on surface of $\text{Ag}(\sqrt{3}\times\sqrt{3})$ monolayer fabricated on substrate $\text{Si}(111) (7\times 7)$ surface.
 - Worked with a senior graduate student on STM user project to study the surface reconstruction of TiO_2 .
 - Worked with a senior post-doc on STM user project to study geometric and electronic structure of 2D Au islands on single-layer graphene/ $\text{Ru}(0001)$.
 - Sputtered and annealed $\text{Au}(111)$, $\text{Cu}(111)$, $\text{Cu}(110)$ samples to prepare atomic flat surfaces to test STM.
 - Designed and built UHV LEED systems; designed and built sample holder on manipulator for sputtering and annealing; designed & built STM head parts, drew a modified STM head (AutoCAD, Solidworks).
 - Developed interface for tip etching control using LabVIEW.
 - Assisted with preparing NSF research grant proposal figures and participated in reviewing manuscripts.
- Visiting Facility User, Center for Nanophase Materials Sciences at Oak Ridge National Laboratory** July 2011 – Sep. 2011
- Investigated the superconducting gaps on Co-doped CaFe_2As_2 using LT-STM at LHe temperature.
 - Studied the local Mn-dopant effects in $\text{Sr}_3\text{Ru}_2\text{O}_7$ using VT-STM at LN_2 temperature
 - Tested and established procedures for liquid helium cooling, sample transfer, and operation on the new home-made LT-STM.
- Visiting Facility User, Dr. Vidya Madhavan's group, Boston College** Mar. 2011 – May 2011
- Investigated the superconducting gaps on $\text{FeTe}_{1-x}\text{Se}_x$ using LT-STM at LHe temperature.
 - Diagnosed and repaired electrical circuits and STM heads to correctly take tunneling spectroscopy at sub-mV resolution.
 - Performed Fourier analysis of STM images using Igor Pro built-in structured programming language.
- Graduate Research Assistant, Dr. Ward Plummer's group, University of Tennessee at Knoxville (UTK)** June 2008 – Dec. 2008
- Studied the temperature dependence of superconducting gaps on poly-crystal $\text{NdFeAsO}_{0.86}\text{F}_{0.14}$ superconducting samples using VT-STM.
 - Assisted a senior post-doc to design and build a variable temperature VT-STM Head.
 - Developed interface to simplify the temperature control on the STM head using LabVIEW.
 - Organized and packaged laboratory equipments to ship to LSU because of adviser's moving to LSU.

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Research Assistant, Peking University

Sep. 2005 – June 2007

- Operated Superconducting Quantum Interference Device (SQUID) MPMS to measure the magnetic properties of NiS nano-tubes, Co nano-chains, and Co_3O_4 nano-particles.
- Fabricated Pd coated Mg film using Magnetron Sputtering.
- Programmed interface to measure 4-probe film resistance during hydrogen adsorption using LabVIEW.
- Applied pulsed high energy density plasma technique to fabricate core-shell iron nano-particles.

TEACHING AND OTHER EXPERIENCE

Participant, Louisiana Alliance for Simulation-Guided Materials at LSU

Aug. 2012

- A four week workshop for Best Practices in Scientific Teaching in STEM

Graduate Teaching Assistant, University of Tennessee at Knoxville (UTK)

Aug. 2007 – May 2008

- Graded homework and tutored individuals for class *Physics 432: Electricity and Magnetism*.

Instructor, Beijing high school Winter Olympic Camp, Beijing, China

Dec. 2004 – Jan. 2005

Volunteer Intern, Office of Intellectual Property, Commercialization & Development, LSU

Jan. 2012 – Aug. 2012

- Performed patent research on 4+ inventions in the field of thin films, optical device, bio-sensor, and polymer.
- Analyzed the market and industry, prepared marketing flyers, and recommended potential licensees for 2 pending patents.
- Engaged in 1 on 1 weekly discussion with the office technology manager on new inventions, technologies and patent issues.

PUBLICATIONS

- **Guorong Li**, X. He, J. Zhang, R. Jin, A. S. Sefat, M. A. McGuire, D. G. Mandrus, B. C. Sales, and E. W. Plummer. “Coupled Structural-Magnetic Antiphase Domain Walls on BaFe_2As_2 ”. *Phys. Rev. B* 86, 060512 *Rapid Communication* (2012)
- **Guorong Li**, L. Liang, V.B. Nascimento, X. He, A.B. Karki, Y. M. Xiong, V. Meunier, R. Jin, J. Zhang, and E.W. Plummer. “Surface Structure of Stripe-Ordered (1x2) Phase on $(\text{Ba, Ca})(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ ”. *In preparation*.
- **Guorong Li**, Q. Li, M. Pan, B. Hu, V.B. Nascimento, J. Zhang, R. Jin, and E. W. Plummer. “STM study of the local Mn-dopants effects in $\text{Sr}_3(\text{Ru}_{1-x}\text{Mn}_x)_2\text{O}_7$ ”. *In preparation*.
- X. He, J. Teng, V. B. Nascimento, R. G. Moore, **Guorong Li**, C. Chen, J. Zhang, E. W. Plummer. “Surface of transition-metal compounds: the interplay between structure and functionality”. *Book Chapter in Frontiers of 4d- and 5d- Transition Metal Oxides, World Scientific Press* (2011).
- X. He, **Guorong Li**, J. Zhang, A. B. Karki, R. Jin, B. C. Sales, A. S. Sefat, M. A. McGuire, D. G. Mandrus, and E. W. Plummer. “Nanoscale chemical phase separation in $\text{FeTe}_{0.55}\text{Se}_{0.45}$ as seen via scanning tunneling spectroscopy”. *Phys. Rev. B*: 83, 220502 *Rapid Communication* (2011).
- R. Jin, M. H. Pan, X. B. He, **Guorong Li**, D. Li, R. Peng, J. R. Thompson, B. C. Sales, A. S. Sefat, M. A. McGuire, D. Mandrus, J. F. Wendelken, V. Keppens and E W Plummer. “Electronic, magnetic and optical properties of two Fe-based superconductors and related parent compounds”. *Supercond. Sci. Technol.* 23, 054005 (2010)
- V. B. Nascimento, A. Li, D. R. Jayasundara, Y. Xuan, Jared O’Neal, S. Pan, T.Y. Chien, B. Hu, X. B. He, **Guorong Li**, A. S. Sefat, M. A. McGuire, B. C. Sales, D. Mandrus, M. H. Pan, J. Zhang, R. Jin, and E.W. Plummer. “Surface Geometric and Electronic Structures of $\text{BaFe}_2\text{As}_2(001)$ ”. *Phys. Rev. Lett* 103, 076104 (2009).

CONFERENCE ABSTRACT AND POSTERS

- X. He, V. Nascimento, **Guorong Li**, J. Zhang, R. Jin, A. S. Sefat, M. A. McGuire, B. C. Sales, D. Mandrus, E. W. Plummer. “The Surface Structure of $\text{FeTe}_{1-x}\text{Se}_x$: A LEED/STM Study”, *Bull. APS* 57 (2012).
- **Guorong Li**, V. Nascimento, X. He, A. B. Karki, R. Jin, J. Zhang, E. W. Plummer. “Surface Structure of Stripe ordered 1x2 phase on $(\text{Ba, Ca})(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ ”, *Bull. APS* 57 (2012).
- E. W. Plummer, **Guorong Li**, Q. Li, M. Pan, B. Hu, V. Nascimento, J. Zhang, R. Jin. “STM study of the Mn-dopants on the surface of $\text{Sr}_3(\text{Ru}_{1-x}\text{Mn}_x)_2\text{O}_7(x=6\%, 16\%)$ ”. *Bull. APS* 57 (2012).

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- **Guorong Li**, Q. Li, M. Pan, B. Hu, V. B. Nascimento, J. Zhang, R. Jin, and E. W. Plummer. “STM study of the Role of Mn-dopants in Phase Transitions of $\text{Sr}_3(\text{Ru}_{1-x}\text{Mn}_x)_2\text{O}_7$ ” *Poster section, Oak Ridge National Laboratory User Meeting, Oak Ridge, TN*, Sep. 2011.
- Jing Teng, Chen Chen, **Guorong Li**, A. B. Karki, J. Zhang, R. Jin, E. W. Plummer. “Surface lattice dynamics of the 122-type iron pnictides” *Bull. APS 56* (2011).
- X. He, V. Nascimento, **Guorong Li**, J. Zhang, R. Jin, A. S. Sefat, M. A. McGuire, B. C. Sales, D. Mandrus, E. W. Plummer. “Local topography and spectroscopy of the doped chalcogenide $\text{FeTe}_{1-x}\text{Se}_x$ ”. *Bull. APS 56* (2011).
- **Guorong Li**, V. Nascimento, X. He, A. B. Karki, J. Zhang, R. Jin, A. S. Sefat, M. A. McGuire, B. C. Sales, D. Mandrus, E. W. Plummer. “Surface geometric and electronic structures of $\text{A}(\text{Fe}, \text{Co})_2\text{As}_2$ ($\text{A}=\text{Ba}, \text{Ca}$)” *Bull. APS 56* (2011).
- **Guorong Li**, X. B. He, V. B. Nascimento, Jiandi Zhang, R. Jin, and E. W. Plummer, “ BaFe_2As_2 Surface Domains and Domain Walls: Mirroring the Bulk Spin Structure”. *The 77th Annual Meeting of the Southeastern Section of the APS* (2011).
- **Guorong Li**, X. He, J. Zhang, A. B. Karki, R. Jin, and E. W. Plummer. “Nanoscale Chemical Phase Separation in Optimally Doped $\text{FeTe}_{0.55}\text{Se}_{0.45}$ Superconductor” *The 71st physical electronic conference* (2011).
- X. He, **Guorong Li**, V. Nascimento, J. Zhang, R. Jin, E. W. Plummer, A. S. Sefat, M. A. McGuire, B. C. Sales, D. Mandrus. “Domain walls and boundaries on the Surface of $\text{BaF}_{e_2}\text{As}_2$ (001)” *Bull. APS 55* (2010).
- V. Nascimento, X. He, R. Jin, E. W. Plummer, T. Y. Chien, B. Hu, **Guorong Li**, M. Pan, J. F. Wendelken, A. S. Sefat, M. A. McGuire, B. C. Sales, D. Mandrus, A. Li, Dilushan R. Jayasundara, Y. Xuan, J. O’Neal, S. Pan. “Structural Investigation of the BaFe_2As_2 (001) Surface Using LEED and STM” *Bull. APS 54* (2009).

ACTIVITIES & HONORS

- American Physical Society Member (Oct. 2008 – Present).
- Assistant in organizing Institute for Complex Adaptive Matter Meeting (LSU, Oct. 2010).
- Joint Institute for Advanced Materials Fellowship, UTK, 2008-2009
- President’s Undergraduate Research Fellowship (PURF), China, 2005-2006
- The 3rd prize in Jang ZeHan Cup of Mathematical Modeling Contest as the team leader, PKU, China, 2006
- Dean’s Award for Study Excellence (twice), China, 2004-2005
- The 2nd prize of Beijing Undergraduate Physics Competition, China, 2004
- The 1st prize of National Scholarship, China, 2004; Freshmen scholarship, China, 2003
- Champion award in the 19th National Physics Olympic Competition, China, 2003

REFERENCE CONTACTS

Dr. E. W. Plummer

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