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EDUCATION

1997-2000 *Ph.D.* Condensed Matter Physics *Chinese Academy of Sciences*
1994-1997 *M.S.* Solid State Physics *Nankai University*
1990-1994 *B.S.* Physics *Nankai University*

RESEARCH EXPERIENCE

- 2004-pres. **Associate Beamline Scientist, Principal Investigator** *Lawrence Berkeley National Lab*
Berkeley, California
- IR and THz Spectroscopy of Artificial Materials
 - Sub-ps X-Ray Streak Camera
 - Infrared Beamline Management
- 2003-2004 **Physicist Postdoctoral Fellow** *Lawrence Berkeley National Laboratory*
Berkeley, California
- Detection of Far Infrared Coherent Synchrotron Radiation
 - Ultrafast Electro-Optics Sampling and Analysis
- 2001-2003. **Postdoctoral Research Associate** *National High Magnetic Field Laboratory*
Tallahassee, Florida
- Development of the World-First Femtosecond Time-Resolved Electron Diffraction System
 - Experimental Study on Ultrafast Structural Changes in Metal Thin Films and Nano-particles
 - Ultrafast Dynamics of Electron-Phonon Coupling in Colossal Magneto-Resistance (CMR) Manganites and High- T_C Superconductors (HTSC)
- 2000-2001 **Visiting Research Scientist** *Superconductivity Research Laboratory*
International Superconductivity Technology Center, Tokyo, Japan
- HTSC Thin Film Growth by Liquid Phase Epitaxy and Pulsed Laser Deposition
 - Transport/Magnetic Properties of HTSC Thin Films and Single Crystals
 - Experimental Study on Metal-Insulator Transitions, Charge Density Wave and Charge Transport, D-Wave Pairing Symmetry in HTSC
 - HTSC Bicrystal Josephson Junctions as Large Current Switch
- 1997-2000 **Research Assistant** *National Laboratory for Superconductors*
Institute of Physics, Chinese Academy of Sciences (CAS), Beijing, China
- HTSC Thin Film Growth by Pulsed Laser Deposition and Magnetron Sputtering
 - Superconductor-Insulator Transitions in Underdoped HTSC at High Magnetic Field

- Transport/Magnetic Properties of HTSC Thin Films and Single Crystals
- CMR Thin Films and their Electrical/Magnetic Properties

1994-1997 **Research Assistant**

Department of Physics

Nankai University, Tianjin, China

- Upconversion Luminescence of Rare-Earth Ions Doped in Glasses
- IR and Visible Light Spectroscopy, Raman Spectroscopy
- Photonic Diodes Using Nonlinear Processes in BR-Films and Related Organic Materials

TEACHING EXPERIENCE

2003-2003 Summer Teaching on **General Physics B (PHY-2049C)** *Department of Physics*
 Florida State University, Tallahassee
<http://www.physics.fsu.edu/courses/summer03/phy2049c/2049SM03.html>

1995-1996 Teaching Assistant on *Solid State Physics* *Department of Physics*
 Nankai University, Tianjin

HONORS AND AWARDS

- 2000 Science & Technology Agency (STA) Fellowship, Japan
- 2000 Excellent Graduated Award, Institute of Physics, CAS
- 1997 Excellent Graduated Student, Nankai University
- 1997 Excellent Thesis Award and Certificate, Nankai University
- 1990-1997 Scholarship per annum, Nankai University
- 1988 Third-Class Award of National Physics Competition, China

TECHNICAL SKILLS

- *Author of more than 39 articles on refereed journals and more than 13 presentations*
- *First to develop a world fastest electron diffraction system*
- *Developing a world fastest x-ray detector and streak camera*
- *Thin film growth using physical methods*
- *Fourier Transform Infrared Spectroscopy and Microscopy*
- *Transmission Electron Microscopy*
- *Low or ultra-low temperature physics in liquid Ne, Liquid He and He-3 Cryostat*
- *Operation of Ultrafast Lasers*
- *Proficient on simulation and control software: Labview, Microwave studio, Office*
- *Programming on Visual C++, BASIC, FORTRAN, MATHEMATICA*

PUBLICATIONS ON REFEREED JOURNALS

- [1] J. M. Byrd, Z. Hao, M. C. Martin, D. S. Robin, F. Sannibale,^L R. W. Schoenlein, A. A. Zholents, and M. S. Zolotarev, Laser seeding of the storage ring microbunching instability for high-power coherent terahertz radiation, Submitted to Phys. Rev. Lett.
- [2] J.M. Byrd, Z. Hao, M.C. Martin, D.S. Robin, F. Sannibale, R.W. Schoenlein, M. Venturini, A.A. Zholents, M.S. Zolotarev, *Tailored terahertz pulses from a laser-modulated electron beam*, **Phys. Rev. Lett.** **96**, 164801(2006)
- [3] H. Park, Z. Hao, X. Wang, S. Nie, R. Clinite, and J. Cao, *Synchronization of femtosecond laser and electron pulses with sub-picosecond precision*, **Rev. Sci. Instrum.** **76**, 083905 (2005)
- [4] J. van Tilborg, C. G. R. Geddes, C. Tóth, E. Esarey, C. B. Schroeder, M. C. Martin, Z. Hao, and W. P. Leemans, *Coherent Transition Radiation From a Laser Wakefield Accelerator as an Electron Bunch Diagnostic*, **AIP Conf. Proc.** **737**, 372 (2004)
- [5] Jianming Cao, Zhao Hao, Hyuk Park, Chenggang Tao, Lukasz Blaszczyk, Daekwang Kau, *Femtosecond Electron Diffraction for Direct Measurement of Ultrafast Atomic Motions*, **Appl. Phys. Lett.** **83**, 1044 (2003)
- [6] K. Tao, Z. Hao, B. Xu, B. Chen, J. Miao, H. Yang, and B. R. Zhao, *Ferroelectric properties of (Ba,Sr)TiO₃ thin films grown on YBa₂Cu₃O₇ layers*, **J. Appl. Phys.** **94**, 4042 (2003)
- [7] Z. Hao, Y. Wu, Y. Enomoto, K. Tanabe, N. Koshizuka, *Extremely smooth YBa₂Cu₃O_{7-d} "thin" film grown by liquid phase epitaxy*, **J. Crys. Growth** **235**, 253-257 (2002)
- [8] Z. Hao, Y. Wu, Y. Enomoto, K. Tanabe, N. Koshizuka, *Microstructure and magnesium diffusion in YBa₂Cu₃O_{7-d} films on bicrystal MgO substrates*, **J. Appl. Phys.**, **91**, 9251(2002)
- [9] Youichi Enomoto, Zhao Hao, Satoru Hirano, and Katsumi Suzuki, *Characteristics of Long Grain Boundary Josephson Junctions on Bicrystal Substrates*, **Jpn. J. Appl. Phys.**, **41**, 925(2002)
- [10] Y. Wu, Z. Hao, Y. Enomoto, K. Tanabe, *Atomic configurations of YBCO/ MgO Interfaces*, **Physica C**, **371**, 309-314(2002)
- [11] Z. Hao, Y. Enomoto, Y. Wu, K. Tanabe, *Transport properties of bicrystal YBa₂Cu₃O_{7-d} Josephson junctions*, **Physica C** **378**, 1334-1338(2002)
- [12] Y. Wu, Z. Hao, S. Adachi, Y. Enomoto, K. Tanabe, *Microstructural Relationship between YBa₂Cu₃O_{7-x} seed films and thick films grown by liquid phase epitaxy*, **Physica C** **378**, 984-988(2002)
- [13] Z. Hao, B.R. Zhao, B.Y. Zhu, Z. X. Zhao, J. Vanacken, and V. V. Moshchalkov, *Transport properties of the underdoped Y_{0.5}Pr_{0.5}Ba₂Cu₃O_{7-δ} films in high magnetic fields*, **Europhys. Lett.**, **58** (1), 105 (2002)
- [14] Yuan Lin, Weizhi Gong, Chun Cai, Zhao Hao, Bo Xu, Bairu Zhao, *Effect of the charge distribution at the interface on the properties of PZT / SiO₂ / Si heterostructure*, **Ferroelectrics**, **252**, 321-328(2001)
- [15] Yuan Lin, Baoting Liu, Zhao Hao, Weizhi Gong, Chun Cai, Bo Xu, Bairu Zhao, *Fabrication and characteristics of Ag / Pb(Zr_{0.53}Ti_{0.47})O₃/ ultrathin-SiO₂ / Si and Ag/ Pb(Zr_{0.53}Ti_{0.47})O₃/YBa₂Cu₃O_{7-d} systems*, **Ferroelectrics**, **252**, 329-336(2001)
- [16] X.B. Chen, M.X. Li, Z. Hao, G.Z. Meng, Z.F. Song, *The upconversion "characteristic saturation phenomenon" of ErYb:ZBLAN glass excited by 966 nm diode laser*, **SPECTROSCOPY AND SPECTRAL ANALYSIS** **21**, 271-274(2001)

- [17] Z. Hao, B. R. Zhao, B. Y. Zhu, Y. M. Ni, Z. X. Zhao, *Magnetic Field Induced Superconductor-Insulator Transition and Abnormal Hall Effect in $Y_{0.5}Pr_{0.5}Ba_2Cu_3O_{7-\delta}$ Thin Films*, **Physica C**, 341-348, 1891(2000)
- [18] Z. Hao, B. T. Liu, B. Xu, F. Wu, H. J. Tao, B. Y. Zhu, Z. X. Zhao, B. R. Zhao, *Large Area Ferroelectricity of the Smooth Epitaxial $Pb(Zr_{0.53}Ti_{0.47})O_3 / YBa_2Cu_3O_{7-d}$ Film*, **Supercond. Sci. & Tech.**, 13, 316 (2000)
- [19] Z.H. Mai, B.T. Liou, J.H. Li, Z. Hao, B. Xu, B.R. Zhao, C. Giannini, S.A. Serinelli, L. Tapfer, Study of the microstructures of $Pb(Zr_xTi_{1-x})/YBa_2Cu_3O_{7-\delta}$ heterostructural films, **Supercond. Sci. & Tech.** 13, 598-601(2000)
- [20] B. T. Liu, Z. Hao, Y. F. Chen, B. Xu, H. Chen, F. Wu, B. R. Zhao, Yu. Kisilinskii, and E. Stepantsov, *Investigation on $Ag / Pb(Zr_{0.53}Ti_{0.47})O_3 / YBa_2Cu_3O_{7-\delta}$ Three-terminal System With Small Gate Area*, **Appl. Phys. Lett.**, 74, 2044 (1999)
- [21] H.B. Peng, B.R. Zhao, Z. Xie, Y. Lin, B.Y. Zhu, Z. Hao, H.J. Tao, B. Xu, C.Y. Wang, H. Chen, and F. Wu, *Ordered Surface Structure in $La_{1-x}Ca_xMnO_3$ Films*, **Phys. Rev. Lett.**, 82, 362(1999)
- [22] Y. Lin, B. R. Zhao, H. B. Peng, Z. Hao, B. Xu, Z. X. Zhao, J. S. Chen, *Asymmetry in the hysteresis loop of $Pb(Zr_{0.53}Ti_{0.47})O_3/SiO_2/Si$ structures*, **J. Appl. Phys.**, 86, 4467(1999)
- [23] H.B. Peng, B.R. Zhao, Z. Xie, Y. Lin, B.Y. Zhu, Z. Hao, Y.M. Ni, H.J. Tao, X.L. Dong, and B. Xu, *Surface pattern and large low-field magnetoresistance in $La_{0.5}Ca_{0.5}MnO_3$ films*, **Appl. Phys. Lett.**, 74, 1606 (1999)
- [24] B. T. Liu, Yu. Kisilinskii, Z. Hao, Y. F. Chen, B. Xu and B. R. Zhao, *Fabrication and properties of $Ag/Pb(Zr_{0.53}Ti_{0.47})O_3/YBa_2Cu_3O_{7-d}$ Three-terminal devices*, **Chinese journal of Low Temperature Physics**, 21, 59 (1999)
- [25] Z. H. Mai, A. J. Zhu, B. T. Liu, C. R. Liu, C. R. Li, S. F. Cui, Z. Hao, and B. R. Zhao, *Structural study of PZT/YBCO by triple-axes diffraction*, **Inter. J. of Mod. Phys.** 13, 383 (1999)
- [26] Liu BT, Huang WW, Qin YL, Hao Z, Xu B, Dong XL, Wu F, Tao HJ, Jia SL, Li L, Zhao BR, *Epitaxial growth of $Pb(Zr, Ti)O_3/(La, Sr)CuO_4$ heterostructures on $SrTiO_3$ by magnetron sputtering*, **Supercond. Sci. & Tech.** 12, 344-347(1999)
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- [28] Zhao Hao, Xiaobo Chen, Yanbing Hou, Feng Song, Hong Wang, Guangyin Zhang, Blue upconversion luminescence in Yb^{3+} and Tm^{3+} codoped Phosphate glass, **Acta Physica Sinica** (in Chinese) 5, 100(1997)
- [29] Zhao Hao, Xiaobo Chen, Guangyin Zhang, Yanbing Hou, Hong Wang, Zengfu Song, Frequency upconversion of the excited state in Yb^{3+} and Er^{3+} doped ZBLAN, **Journal of Photonics** (in Chinese), vol.26, No.4, (1997)
- [30] Zhao Hao, Xiaobo Chen, Guangyin Zhang, Meixian Li, Yuhong Mao, Zhiping Feng, Computational analysis of four-level dynamic avalanche upconversion process, **Journal of Infrared and Millimeter Wave** (in Chinese), No.1, (1997)
- [31] Hong Wang, Zhao Hao, Xiaobo Chen, Yanbing Hou, Guangyin Zhang, Frequency upconversion of the excited state in Er^{3+} doped ZBLAN, **Journal of Photonics** (in Chinese), 26, 4 (1997)

- [32] Zhao Hao, Xiaobo Chen, Guangyin Zhang, Feng Song, Yanbing Hou, *Blue upconversion with excitation at 970 nm in Yb_{0.18}-doped Tm_{0.03}La_{0.97}P₅O₁₄ / Tm_{0.1}La_{0.9}P₅O₁₄*, **Proc. SPIE Int. Soc. Opt. Eng.** 2897, 275 (1996)
- [33] Xiaobo Chen, Zhao Hao, Guangyin Zhang, Yanbing Hou, Feng Song, *Multi-photon upconversion process in Er-doped, Er- and Yb- codoped ZBLAN*, **Proc. SPIE Int. Soc. Opt. Eng.** 2897, 279 (1996)
- [34] X. B. Chen, G. Y. Zhang, Y. Mao, Y. B. Hou, Y. Feng, Z. Hao, *Research on the upconversion luminescence of Tm³⁺ ions in crystal and amorphous pentaphosphate materials*, **J. Lumin.**, 69, 151 (1996)
- [35] Yanbing Hou, Xiaobo Chen, Guangyin Zhang, Feng Song, Zhao Hao, *Temperature Dependence of Upconversion Luminescence from Pr³⁺, Er³⁺ and Yb³⁺ Codoped ZBLAN Glass Pumped by Laser Diode*, **Proc. SPIE Int. Soc. Opt. Eng.** 2886, 241 (1996)
- [36] Jingcun Zang, Yiahang Liu, Xiaobo Chen, Zhao Hao, Weiqin Wang, Jianping Yie, *Upconversion in ZnWO₄:Er³⁺ pumped by laser diodes*, SPIE vol. 2897 supplement, 1996
- [37] Zhao Hao, Xiaobo Chen, Guangyin Zhang, *Computational analysis of "photonic transistor", Spectroscopy and spectrum analysis* (in Chinese), 15(6), 5 (1995)
- [38] Xiaobo Chen, Guangyin Zhang, Zhao Hao, Jingjun Xu, Chunping Zhang, *Study of the novel filters based on the integral type "photonic transistor"*, **Chinese Laser**, 22(12), 919 (1995)
- [39] Xiaobo Chen, Guangyin Zhang, Zhao Hao, Jingjun Xu, *Model study of integral type "photonic transistor" application of non-linear absorption*, **Chinese Laser**, 22(11), 865 (1995)

PRESENTATIONS

- [1] Zhao Hao, Donnacha Lowney, Phil Heimann, Roger Falcone, Robert Schoenlein, Andrew Macphee, Howard Padmore, *Grazing incidence streak camera for ultrafast x-ray applications*, **SPIE Symposium on Optics & Photonics**, San Diego, 2005
- [2] Michael C. Martin, Zhao Hao, Alex Liddle, Erik H. Anderson, Willie J. Padilla, David Schurig, David R. Smith, *Fabrication and Optical Measurements of Nanoscale Meta-Materials: Terahertz and Beyond*, IRMMW-THz2005 Conference, IEEE, Williamsburg, Virginia, September 19-23, 2005
- [3] Michael C. Martin, John Byrd, Zhao Hao, David Robin, Fernando Sannibale, Robert W. Schoenlein, Alexander Zholents, Max Zolotarev, *Tailored terahertz pulses from a laser-modulated electron beam*, IRMMW-THz2005 Conference, IEEE, Williamsburg, Virginia, September 19-23, 2005
- [4] J.M. Byrd, Z. Hao, M. C. Martin, D.S. Robin, F. Sannibale, R.W. Schoenlein, A.A. Zholents, M.S. Zolotarev, *Terahertz coherent synchrotron radiation from femtosecond laser modulation of the electron beam at the advanced light source*, **European Particle Accelerator Conference, Lucerne Congress Center, Swiss** (2005)
- [5] Zhao Hao, Michael C. Martin, Alex Liddle, Erik H. Anderson, Willie J. Padilla, David Schurig, David R. Smith, *Fabrication and Optical Measurements of Nanoscale Meta-Materials: Terahertz and Beyond*, **APS March Meeting**, Los Angeles, CA, 2005
- [6] J.M. Byrd, Z. Hao, M.C. Martin, D.S. Robin, F. Sannibale, R.W. Schoenlein, M. Venturini, A.A. Zholents, M.S. Zolotarev, *Coherent infrared radiation from the ALS generated via*

- femtosecond laser modulation of the electron beam, Particle Accelerator Conference, Knoxville, TN, May 16-20, 2005*
- [7] J. van Tilborg, C. G. R. Geddes, C. Tóth, E. Esarey, C. B. Schroeder, M. C. Martin, Z. Hao, and W. P. Leemans, *Coherent Transition Radiation From a Laser Wakefield Accelerator as an Electron Bunch Diagnostic, AIP Conference*, (2004)
 - [8] Zhao Hao, "Time zero" measurement methods for UED and UEM (Invited), *First National Laboratory and University Alliance Workshop on Ultrafast Electron Microcopies*, Livermore (2004)
 - [9] Zhao Hao, *Femtosecond Electron Diffraction and Ultrafast Heating in Metals* (Invited), *ALS/CXRO Seminar Series*, Berkeley, California, Aug 13, 2003
 - [10] Zhao Hao, Hyuk Park, Chenggang Tao, Jianming Cao, *Femtosecond Electron Diffraction Observation of Ultrafast Structural Changes in Metal Films, APS March Meeting*, Austin, TX, 2003
 - [11] Z. Hao, Y. Enomoto, Y. Wu, K. Tanabe, *Transport properties of bicrystal $YBa_2Cu_3O_{7-d}$ Josephson junctions, 14th International Symposium on Superconductivity* (ISS 2001), Kobe, Japan (2001)
 - [12] Y. Wu, Z. Hao, S. Adachi, Y. Enomoto, K. Tanabe, *Microstructural Relationship between $YBa_2Cu_3O_{7-x}$ seed films and thick films grown by liquid phase epitaxy, 14th International Symposium on Superconductivity* (ISS 2001), Kobe, Japan (2001)
 - [13] Z. Hao, Y. Enomoto, *Growth and Microstructure of $YBa_2Cu_3O_{7-d}$ thin films on bicrystal MgO substrates By Liquid Phase Epitaxy* (invited), *The 62nd Annual Meeting of Japanese Society of Applied Physics*, Nigoya, Japan, September 11, 2001