

1. CV for

Gang Xiao Professor of Physics

Box 1843, Department of Physics, Brown University
Providence, Rhode Island 02912
(401) 863-2586 (office), 2609 (lab), 2024 (FAX)
E-mail: Gang_Xiao@brown.edu

2. Education

Feb. 1988 Ph.D. physics The Johns Hopkins University.
Magnetic and electronic studies of artificial metallic solids:
amorphous, superlattice, and granular materials.
Oct. 1982 M.A. physics The Johns Hopkins University.
July 1981 B.S. physics, Nanjing University, Nanjing, China.

3. Professional Appointments:

Nov. 2005-Present Brown University, Professor of Physics and Professor of Engineering
June 2008-Present Director, Center for Nanoscience & Soft Matter, Brown University
July 1999 – Present Brown University, Professor of Physics
Jan. 2000 – Aug. 2000 Visiting Professor, Hong Kong University of Science and Technology
July 1995 – June 1999 Brown University, Associated Professor of Physics.
Sept. 1995- May 1996 Visiting Scientist, IBM T. J. Watson Research Center
July 1989 - June 1995 Brown University, Assistant Professor of Physics.
Sept. 1988 - June 1989 The Johns Hopkins Univ., Associate Research Scientist.
Feb. 1988 - Sept. 1988 The Johns Hopkins University, Post-Doctoral Associate.
June 1983 - Feb. 1988 The Johns Hopkins University, Research Assistant
thesis advisor: Prof. C. L. Chien.
Sept. 1981 - May 1983 The Johns Hopkins University, Teaching Assistant.

Professional Activities:

Fellow of the American Physical Society
Member, Materials Research Society
Inducted Member, Society of Scholars, The Johns Hopkins University

4. Completed Publications

a. Books/Monographs (authored and/or edited volumes)

- *Superconductors, Magnetoresistive Materials, and Strongly Correlated Quantum Systems*, edited by N. V. Hieu, T. T. Van, and Gang Xiao, (Vietnam National University Press, Hanoi, 2000).

b. Chapters in books

- C. L. Chien and Gang Xiao, “Magnetism and Magnetic Measurements”, in *Characterization of Materials* (John Wiley & Sons, NY, 2003).

c. Refereed journal articles (Web of Science Total Citations: 7177, Average Citations per paper: 47.5, h-index: 44)

- 1) S.H. Liou, Gang Xiao, J. N. Taylor and C. L. Chien, “Magnetic properties and hyperfine interactions of amorphous Fe-Hf alloys”, **J. Appl. Phys.** **57**, 3536 (1985).
- 2) C.L.Chien, Gang Xiao and K. M. Unruh, “Hyperfine interactions and magnetic properties of amorphous Fe-Sb alloys”. **Phys. Rev.** **B32**, 5582 (1985).
- 3) Gang Xiao and C.L. Chien, “Mössbauer study of amorphous Fe-Sb alloys with large composition range”, **Hyperfine Interactions** **27**, 377 (1986).

- 4) C.L. Chien, Gang Xiao and S. H. Liou, "Isomer shift systematics of amorphous Fe-early transition metal and Fe-metalloid systems", **Hyperfine Interactions** **27**, 373 (1986).
- 5) Gang Xiao, and C. L. Chien, "Ferromagnetic and spin glass orderings in amorphous Fe-Sb alloys", **J. Magn. Magn. Matter**, **54-57**, 241 (1986).
- 6) C.L. Chien, S. H. Liou and Gang Xiao, "Granular Fe metal films" **J. Magn. Magn. Matter**. **54-57**, 759 (1986).
- 7) C.L. Chien, S. H. Ge, S. H. Liou and Gang Xiao, "Structural and magnetic behaviors of vapor quenched Fe-Mo alloys", **J. Magn. Magn. Matter**. **54-57**, 291 (1986).
- 8) Gang Xiao and C. L. Chien, "Metal-insulator transition and effects of localization and correlation in amorphous Fe-Sb alloys", **Phys. Rev.** **B34**, 8430 (1986).
- 9) Gang Xiao, S. H. Liou, A. Levy, J. N. Taylor and C. L. Chien, "Magnetic relaxation in Fe-SiO₂ granular films", **Phys. Rev.** **B34**, 7573 (1986).
- 10) Gang Xiao and C. L. Chien, "Polymorphism of amorphous pure Fe", **J. Appl. Phys.** **61**, 3246 (1987).
- 11) Gang Xiao, C. L. Chien and M. Natan, "Magnetization and its temperature dependence in compositionally modulated amorphous Fe₇₀B₃₀ - Ag films", **J. Appl. Phys.** **61**, 4314 (1987).
- 12) Gang Xiao and C. L. Chien, "Magnetic properties of [100] textured Cu-Ni superlattices", **J. Appl. Phys.** **61**, 4064 (1987).
- 13) Gang Xiao and C. L. Chien, "Temperature dependence of spontaneous magnetization of ultrafine Fe particles in Fe-SiO₂ granular solid", **J. Appl. Phys.** **61**, 3308 (1987).
- 14) C.L. Chien, Gang Xiao, S. H. Liou, J. N. Taylor and A. Levy, "Granular magnetic Fe-SiO₂ solids", **J. Appl. Phys.** **61**, 3311 (1987).
- 15) K. Bridger, J. Watts, M. Tadros, Gang Xiao, S. H. Liou and C. L. Chien, "Magnetic characteristics of ultrafine Fe particles reduced from uniform iron oxide particles", **Appl. Phys.** **61**, 3323 (1987).
- 16) L.H. Bennett, M. Rubinstein, Gang Xiao, and C. L. Chien, "Magnetism and the observation of NMR lines in hexagonal Al₄ Mn and icosahedral Al-Mn alloys", **J. Appl. Phys.** **61**, 4364 (1987).
- 17) S.H. Liou, Gang Xiao, C. L. Chien and K. M. Unruh, "Multilayer Fe/Cu films", in *Interface, Superlattices and Thin Films*, edited by J. D. Dow, I. K. Schuller, and J. Hillard, (Materials Research Society, Pittsburgh, 1987), p. 697.
- 18) C.L. Chien, S. H. Liou, Gang Xiao and M. A. Gatzke, "Magnetic percolation in new crystalline FCC Fe-Cu alloys", in *Science and Technology of Rapidly Quenched Alloys*, edited by M. Tenhover, L. E. Tanner, and W. L. Johnson (Materials Research Society, Pittsburgh, 1987), p. 395.
- 19) C.L. Chien, S. H. Liou and Gang Xiao, "Superlattice and multilayer systems with crystalline and amorphous constituent layers", *Metallic Multilayers and Epitaxy*, edited by M. Hong, S. Wolf and D. C. Gubser (The Metallurgical Society, Pennsylvania, 1988), p. 245.
- 20) Gang Xiao and C. L. Chien, "Nonuniqueness of the state of amorphous pure iron", **Phys. Rev.** **B35**, **Rapid Commun.**, 8763 (1987).
- 21) Gang Xiao, F. H. Streitz, A. Gavrin, Y. W. Du and C. L. Chien, "Effect of transition metal elements on the superconductivity of YBaCuO", **Phys. Rev.** **B35**, **Rapid Commun.**, 8782 (1987).
- 22) Gang Xiao, F. H. Streitz, A. Gavrin, M. Z. Cieplak, J. Childress, Ming Lu, A. Zwicker, and C. L. Chien, "Flux pinning and critical current density in YBa₂Cu₃O_{6+y} superconductors", **Phys. Rev.** **B36**, **Rapid Commun.**, 2382 (1987).
- 23) Gang Xiao, F. H. Streitz, A. Gavrin, and C. L. Chien, "Magnetic characteristics of superconducting RBa₂Cu₃O_{6+y} (R = Nd, Sm, Eu, Gd, Dy, Ho, Er, Tm and Yb)", **Solid State Commun.** **63**, 817 (1987).
- 24) H. Tang, Z. Q. Qiu, Y. W. Du, Gang Xiao, C. L. Chien, and C. Walker, "Magnetic ordering in GdBa₂(Cu_{0.94}Fe_{0.06})₃O_{9-δ} below the superconducting transition temperature", **Phys. Rev.** **B36**, **Rapid Commun.**, 4018 (1987).
- 25) Gang Xiao and C. L. Chien, "Giant magnetic coercivity and percolation effects in granular Fe-(SiO₂) solid", **Appl. Phys. Lett.** **51**, 1280 (1987).
- 26) C.L. Chien, Gang Xiao, F. H. Streitz, and A. Gavrin, "Magnetic study and critical current density of high T_c Y- and rare earth-Ba-Cu-O superconductors", **Rev. Solid State Sci.** **1**, 329 (1987), and in *Proc. Drexel International Conf. on High Temperature Superconductivity*, edited by S. Bose and S. Tyagi (World Scientific, Singapore, 1987), 183.

- 27) Gang Xiao, M. Z. Cieplak, A. Gavrin, F. H. Streitz, A. Bakhshai, and C. L. Chien, "Superconductivity and structure of $\text{YBa}_2(\text{Cu}_{0.9}\text{A}_{0.1})_2\text{O}_7$ (A = Ti, V, Cr, Mn, Fe, Co, Ni, Cu, and Zn)", **Rev. Solid State Sci.** **1**, 323 (1987); and in *Proc. Drexel International Conf. on High Temperature Superconductivity*, edited by S. Bose and S. Tyagi (World Scientific, Singapore, 1987), p. 177.
- 28) C.L. Chien, Gang Xiao, F. H. Streitz, A. Gavrin, and M. Z. Cieplak, "Effect of noble metal substrate buffer layers on superconducting $\text{YBa}_2\text{Cu}_3\text{O}_7$ thin films", **Appl Phys. Lett.** **51**, 2155 (1987).
- 29) Gang Xiao, F. H. Streitz, A. Gavrin, and C. L. Chien, "Superconductivity and magnetism in transition element substituted $\text{YBa}_2\text{Cu}_3\text{O}_7$ compounds", **J. Appl. Phys.** **63**, 4196 (1988).
- 30) Gang Xiao and C. L. Chien, "Enhanced magnetic coercivity in magnetic granular solids", **J. Appl. Phys.** **63**, 4252 (1988).
- 31) Gang Xiao, F. H. Streitz, M. Z. Cieplak, A. Bakhshai, A. Gavrin, and C. L. Chien, "Electrical transport and superconductivity in $\text{Au-YBa}_2\text{Cu}_3\text{O}_7$ percolation system", **Phys. Rev. B** **38**, 776 (1988).
- 32) Gang Xiao, M. Z. Cieplak, A. Gavrin, F. H. Streitz, A. Bakhshai, and C. L. Chien, "High temperature superconductivity in tetragonal perovskite structure: is oxygen vacancy order important?", **Phys. Rev. Lett.** **60**, 1446 (1988).
- 33) F.H. Streitz, M. Z. Cieplak, Gang Xiao, A. Gavrin, A. Bakhshai, and C. L. Chien, "Superconducting $\text{Au-YBa}_2\text{Cu}_3\text{O}_7$ composites", **Appl. Phys. Lett.** **52**, 927 (1988).
- 34) Gang Xiao, M. Z. Cieplak, A. Bakhshai, G. H. Streitz, M. Lu A. Zwicker, A. Gavrin, and C. L. Chien, "Superconducting properties of $\text{YBa}_2(\text{Cu}_{1-x}\text{Zn}_x)_3\text{O}_7$ and $\text{YBa}_2(\text{Cu}_{1-x}\text{Ga}_x)_3\text{O}_7$ ", in *High-Temperature Superconductors*, edited by B. Brodsky, R. C. Dynes, K. Kitazawa, H. L. Tuller (Materials Research Society, Pittsburgh, 1988), p. 399.
- 35) C.L. Chien, Gang Xiao, F. H. Streitz, A. Gavrin, M. Z. Cieplak, and A. Bakhshai, "Fabrication of high T_c superconducting films with diffusion barriers", in *High-Temperature Superconductors*, Edited by B. Brodsky, R. C. Dynes, K. Kitazawa, Tuller (Materials Research Society, Pittsburgh, 1988), p. 311.
- 36) Gang Xiao, M. Z. Cieplak, D. Musser, A. Gavrin, F. H. Streitz, C. L. Chien, J. J. Rhyne and J. A. Gotaas, "Significance of plane versus chain sites in high T_c oxide superconductor", **Nature** (London) **332**, 238 (1988).
- 37) C.L. Chien, Gang Xiao, M. Z. Cieplak, D. Musser, J. J. Rhyne and J. A. Gotaas, "Superconductivity in orthorhombic and tetragonal $\text{YBa}_2(\text{Cu}_{1-x}\text{A}_x)_3\text{O}_y$ systems (A = Zn, Ga, Al, Co)", in *Superconductivity and Its Applications*, edited by H. S. Kwok and D. T. Shaw (Elsevier, New York, 1988), p. 110.
- 38) Gang Xiao, M. Z. Cieplak, and C. L. Chien, "The emergence of superconductivity in Bi-Sr-Cu-O systems", **Phys. Rev. B** **38**, 11824, (1988).
- 39) C.L. Chien, Gang Xiao, and S. H. Liou, "Magnetic properties of nanocrystals of iron", **Journal de Physique Colloq.** **C8-1821**, (1988).
- 40) Gang Xiao, A. Bakhshai, M. Z. Cieplak, Z. Tesanovic, and C. L. Chien, "Correlation between superconductivity and normal state properties in the $\text{La}_{1.85}\text{Sr}_{0.15}(\text{Cu}_{1-x}\text{Zn}_x)\text{O}_4$ system", **Phys. Rev. B** **39**, 315 (1989).
- 41) M.Z. Cieplak, Gang Xiao, A. Bakhshai, and C. L. Chien, "Superconducting and normal state properties of $\text{La}_{1.85}\text{Sr}_{0.15}(\text{Cu}_{1-x}\text{Ga}_x)\text{O}_4$ ", **Phys. Rev. B** **39**, 4222 (1989).
- 42) "Universal correlations between T_c and n_s/m^* (Carrier density over effective mass) in high- T_c cuprate superconductors", with Y. J. Uemura, et al., **Phys. Rev. Lett.** **2317** (1989).
- 43) Gang Xiao, M. Z. Cieplak, and C. L. Chien, "Systematic study of $(\text{La}_{1-x}\text{Gd}_{x1.85}\text{Sr}_{0.15}\text{CuO}_4$ ($0 \leq x \leq 1$): structure, superconductivity, resistivity, and magnetic properties", **Phys. Rev. B** **40**, 4538 (1989).
- 44) C.L. Chien, Gang Xiao, and M. Z. Cieplak, "Experimental study of high temperature superconductors through substitution", in *Oxygen Disorder Effects in High- T_c Superconductors*, edited by J. L. Moran-Lopez and I. K. Schuller (Plenum, New York, 1990), p.189.
- 45) R.J. Hichen, G. T. Rado, Gang Xiao, and C. L. Chien, "Observation of thickness dependence of magnetic surface anisotropy in ultrathin amorphous films", **Phys. Rev. Lett.** **64**, 1820(1990).
- 46) Gang Xiao, M. Z. Cieplak, and C. L. Chien, "Static vacancies in antiferromagnetic La_2CuO_4 and superconducting $\text{La}_{1.85}\text{Sr}_{0.15}\text{CuO}_4$ " **Phys. Rev. B** **42**, 240 (1990).
- 47) H. Tang, Gang Xiao, A. Signh, Z. Tesanovic, J. C. Walker, and C. L. Chien, "Magnetic magnetoresistance dynamics of La_2CuO_4 studied by Mossbauer spectroscopy", **J. Appl. Phys.** **67**, 4518 (1990).

- 48) M.Z. Cieplak, Gang Xiao, C. L. Chien, A. Bakhshai, D. Artymowicz, W. Bryden, K. Stalick, and J. J. Rhyne, "Incorporation of gold in $\text{YBa}_2\text{Cu}_3\text{O}_7$: structure and T_c enhancement", **Phys. Rev. B** **42**, 6200 (1990).
- 49) J.Q. Xiao, A. Gavrin, Gang Xiao, J. R. Childress, W. A. Bryden, C. L. Chien, and A. S. Edelstein, "Structural studies and magnetic properties of Fe/Ag superlattices", **J. Appl. Phys.** **67**, 5388 (1990).
- 50) M.Z. Cieplak, Gang Xiao, and C. L. Chien, "Transport properties of doped $\text{La}_{1.85}\text{Sr}_{0.15}\text{CuO}_4$ ", in *Proc. Europ. Conf. on High-Tc Thin Films and Single Crystals*, edited by W. Gorzkowski, M. Gutowski, A. Reich, and H. Szymczak (World Scientific, Singapore, 1990), p.587.
- 51) A. Singh, Z. Tesanovic, H. Tang, Gang Xiao, C. L. Chien, and J. C. Walker, "Magnetic dynamics in copper-oxide based antiferromagnets -- the role of interlayer coupling," **Phys. Rev. Lett.** **64**, 2571 (1990).
- 52) M.Z. Cieplak, Gang Xiao, S. Guha, D. Doatch, H. Kojima, and P. Lindenfeld, "Superconductivity and metal-insulator transition in zinc-substituted $\text{La}_{1.85}\text{Sr}_{0.15}\text{CuO}_4$ ", **Physica B** **165 & 166**, 1527 (1990).
- 53) Gang Xiao, M. Z. Cieplak, J. Q. Xiao, and C. L. Chen, "Magnetic pair-breaking effect: moment formation and critical doping level in superconducting $\text{La}_{1.85}\text{Sr}_{0.15}\text{Cu}_{1-x}\text{A}_x\text{O}_4$ systems (A=Fe, Co, Ni, Zn, Ga, Al)," **Phys.Rev. B** **42**, **Rapid Commun.**, 8752 (1990).
- 54) M.Z. Cieplak, Gang Xiao, C. L. Chien, J. K. Stalick and J. J. wazzu Rhyne, "Unexpected results of gold on the structure, superconductivity and normal-state of $\text{YBa}_2\text{Cu}_3\text{O}_7$," **Appl. Phys. Lett.** **57**, 934 (1990).
- 55) "Correlations between T_c and n_s/m^* (carrier density / effective mass) in High- T_c and organic superconductors," with Y. J. Uemura, et. al., **Hyperfine Interactions** **63**(1-4), 131 (1990).
- 56) A. Sienkiewicz, M. Z. Cieplak, Gang Xiao, and C. L. Chien, "EPR study of Fe-doped $\text{La}_{1.85}\text{Sr}_{0.15}\text{CuO}_4$," **J. Less-Common Metals** **V164-165**, 870 (1990).
- 57) S. Guha, M. Z. Cieplak, Gang Xiao, J. Q. Xiao, C. L. Chien, H. Kojima, and P. Lindenfeld, "The metal-insulator transition in $\text{La}_{1.85}\text{Sr}_{0.15}\text{CuO}_4$ with various substitutions for Cu", in *High Temperature Superconductivity: Proc. LT-19 Satellite Conf. 1990*, edited by J. Evetts (Adam Hilger, INVITED Bristol, 1991), S67.
- 58) Gang Xiao, J. Q. Xiao, M. Z. Cieplak, and C. L. Chien, "Asymmetrical effects of copper-site holes versus oxygen-site holes in La-Sr-Cu-O", **Phys. Rev. B** **43**, **Rapid Commun.**, 1245 (1991).
- 59) S. Guha, H. Kojima, Gang Xiao, J. Q. Xiao, M. Z. Cieplak, C. L. Chien, and P. Lindenfeld, "The relation of superconductivity to the metal-insulator transition in $\text{La}_{1.85}\text{Sr}_{0.15}\text{CuO}_4$ with zinc and gallium substitution," **Supercond. Sci. Techno.** **4**, S67 (1991).
- 60) Gang Xiao and D. P. Xue, "Superconducting electron focusing and guiding based on Andreev reflection mechanism", **Appl. Phys. Lett.** **60**, 504 (1992).
- 61) D.P. Xue and Gang Xiao, "Electron transport of 2D electron gas systems in a periodic magnetic field", **Phys. Rev. B** **45**, 5986 (1992).
- 62) M.Z. Cieplak, S. Guha, H. Kojima, P. Lindenfeld, Gang Xiao, J. Q. Xiao, and C. L. Chien, "Metal-insulator transition in $\text{La}_{1.85}\text{Sr}_{0.15}\text{CuO}_4$ with various substitutions for Cu", **Phys. Rev. B** **46**, 5536 (1992).
- 63) Gang Xiao, Peng Xiong, and M. Z. Cieplak, "Universal Hall effect in $\text{La}_{1.85}\text{Sr}_{0.15}(\text{Cu}_{1-x}\text{A}_x)\text{O}_4$ systems (A = Fe, Co, Ni, Zn, Ga)", **Phys. Rev. B** **46** (**Rapid Commun.**), 8687(1992).
- 64) P. Xiong, Gang Xiao, J. Q. Wang, J. Q. Xiao, J. S. Jiang, and C. L. Chien, "Extraordinary Hall effect and giant magnetoresistance in granular Co-Ag systems", **Phys. Rev. Lett.** **69**, 3220 (1992).
- 65) Gang Xiao, J. Q. Wang, P. Xiong, "Giant magnetoresistance and its evolution in granular $\text{Fe}_x\text{Ag}_{100-x}$ system", **Appl. Phys. Lett.** **62**, 420 (1993).
- 66) P. Xiong, Gang Xiao, and X. D. Wu, "Study of Hall angle in $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ epitaxial films: comparison between oxygen reduction and Pr-doping", **Phys. Rev. B** **47** (**Rapid Commun.**), 5516 (1993).
- 67) J.Q. Wang, P. Xiong, and Gang Xiao, "Investigation of giant magnetoresistance in magnetic concentrated and nanostructured alloys", **Phys. Rev. B** **47** (**Rapid Commun.**), 8341 (1993)
- 68) Gang Xiao, J. Q. Wang, and P. Xiong, "Giant Magnetoresistance and anomalous Hall effect in Co-Ag and Fe-(Cu, Ag, Au, Pt) granular alloys", **IEEE Trans. Magn.** **29**, 2694 (1993).
- 69) Gang Xiao and N. S. Rebello, "Electrical transport and superconductivity in the $(\text{Y}_{0.8}\text{Ca}_{0.2})\text{Ba}_2\text{Cu}_3\text{O}_y$ system with variable oxygen content", **Physica C** **211**, 433 (1993).

- 70) M.Z. Cieplak, A. Sienkiewicz, F. Mila, S. Guha, Gang Xiao, J. Q. Xiao, and C. L. Chien, "Spin dynamics in the $\text{La}_{1.85}\text{Sr}_{0.15}\text{Cu}_{1-x}\text{Fe}_x\text{O}_4$ system probed by EPR", **Phys. Rev. B** **48**, 4019 (1993).
- 71) P. Xiong, Gang Xiao, R. B. Laibowitz, "Subgap and above-gap differential resistance anomalies in superconductor-normal-metal microjunctions", **Phys. Rev. Lett.** **71**, 1907 (1993).
- 72) H. Tang, R. J. Hicken, J. C. Walker, and Gang Xiao, "Intrinsic magnetic properties of ultrathin amorphous $\text{Fe}_{70}\text{B}_{30}$ multilayers", **Phys. Rev. B** **49** (**Rapid Commun.**), 3625 (1994).
- 73) J.Q. Wang and Gang Xiao, "Transition-metal granular solids: microstructure, magnetic properties and giant magnetoresistance", **Phys. Rev. B** **49**, 3982 (1994).
- 74) Gang Xiao and J. Q. Wang, "Magnetic properties of metallic Co- and Fe-based granular alloys", **J. Appl. Phys.** **75**, 6604 (1994).
- 75) J.Q. Wang, E. Price, and Gang Xiao, "Giant magnetoresistance and its dependence on processing conditions in magnetic granular alloys", **J. Appl. Phys.** **75**, 6903 (1994).
- 76) W. Chen, Y. Lu, H. Maris, and Gang Xiao, "Picosecond ultrafast study of localized surface modes in Al/Ag superlattices", **Phys. Rev. B** **50**, 14506 (1994).
- 77) Q. Zhang, D. A. Brown, L. Reinhart, T. F. Morse, J. Q. Wang, and Gang Xiao, "Tuning Bragg wavelength by writing gratings on pre-strained fibers", **IEEE Photonics Tech. Lett.** **6**, 839 (1994).
- 78) J.Q. Wang and Gang Xiao, "The origin of the temperature dependence of the giant magnetoresistance in magnetic granular solids", **Phys. Rev. B** **50**, 3423 (1994).
- 79) J.Q. Wang and Gang Xiao, "Large finite-size-effect of giant magnetoresistance in magnetic granular thin films", **Phys. Rev. B** **51**, 5863 (1995).
- 80) G.Q. Gong, C. Canedy, Gang Xiao, J.Z. Sun, A. Gupta, and W.J. Gallagher, "Colossal magnetoresistance of millionfold magnitude achieved in the antiferromagnetic phase of $\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$ ", **Appl. Phys. Lett.** **67**, 1783 (1995).
- 81) J.Z. Sun, S.S.P. Parkin, L. Krusin-Elbaum, and Gang Xiao, "Transport and Magnetic properties of in situ Grown Thin Film", **Appl. Phys. Lett.** **67**, 2726(1995).
- 82) A. Gupta, T.R. McGuire, P.R. Duncombe, M. Rupp, J.Z. Sun, W.J. Gallagher, and Gang Xiao, "Growth and magnetoresistance properties of La-deficient $\text{La}_{1-x}\text{MnO}_{3-\delta}$ ". **Appl. Phys. Lett.** **67**, 3494 (1996).
- 83) J.Q. Wang and Gang Xiao, "Finite size effect and its temperature dependence of giant magnetoresistance in magnetic granular materials", **J. Appl. Phys.** **79**, 5587 (1996).
- 84) C.L. Canedy, G. Q. Gong, J.Q. Wang, and Gang Xiao, "Large magnetic Hall effect in ferromagnetic thin films", **J. Appl. Phys.** **79**, 6126 (1996).
- 85) G.Q. Gong, C.L. Canedy, Gang Xiao, J.Z. Sun, A. Gupta, and W.J. Gallagher, "Colossal magnetoresistance in the antiferromagnetic La-Ca-Mn-O system", **J. Appl. Phys.** **79**, 4538 (1996).
- 86) C.L. Canedy, K.B. Ibsen, Gang Xiao, J.Z. Sun, A. Gupta, and W.J. Gallagher, "Magnetotransport in epitaxial (La-Ca) MnO_3 thin films", **J. Appl. Phys.** **79**, 4546 (1996).
- 87) T.R. McGuire, A. Gupta, P.R. Duncombe, M. Rupp, J.Z. Sun, R.B. Laibowitz, W.J. Gallagher, and Gang Xiao, "Magnetization and magnetoresistance properties of $\text{La}_{1-x}\text{MnO}_{3-\delta}$ thin films", **J. Appl. Phys.** **79**, 4549 (1996).
- 88) Gang Xiao, E.J. McNiff Jr., G.Q. Gong, A. Gupta, C.L. Canedy, and J.Z. Sun, "Magnetic field induced multiple electronic in $\text{La}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$ ", **Phys. Rev. B** **54**, 6073 (1996).
- 89) P. Lecoure, A. Gupta, G.Q. Gong, and Gang Xiao, "Emission studies of the gas-phase oxidation of Mn during pulsed laser deposition of manganates in O_2 and N_2O atmospheres", **J. Appl. Phys.** **80**, 513 (1996).
- 90) G.Q. Gong, A. Gupta, Gang Xiao, P. Lecoeur, T.R. McGuire, "Perovskite oxide superlattices: magnetotransport and magnetic properties", **Phys. Rev. B (Rapid Commun.)** **54**, R3742 (1996).
- 91) J.Z. Sun, W.J. Gallagher, P.R. Duncombe, L. Krusin-Elbaum, R.A. Atkman, A. Gupta, Y. Lu, G.Q. Gong, and Gang Xiao, "Observation of large low-field magnetoresistance in tri-layer perpendicular transport devices made using doped manganate perovskites", **Appl. Phys. Lett.**, **69**, 3266 (1996).
- 92) A. Gupta, G. Q. Gong, Gang Xiao, P.R. Duncombe, P. Trouilloud, P. Lecoeur, Y.Y. Wang, V.P. Dravid, and J.Z. Sun, "Grain boundary effects on the magnetoresistance properties of perovskite manganite films", **Phys. Rev. B (Rapid Commun.)** **54**, R15629 (1996).
- 93) J. Z. Sun, L. Krusin-Elbaum, A. Gupta, Gang Xiao, and S.S.P. Parkin, "Does magnetization in thin film manganates suggest the existence of magnetic clusters", **Appl. Phys. Lett.** **69**, 1002, (1996).

- 94) Yu Lu, X.W. Li, G.Q. Gong, Gang Xiao, A. Gupta, P. Lecoeur, J.Z. Sun, Y.Y. Wang, and V.P. Dravid, "Large magnetotunneling effect at low magnetic fields in micron-scale epitaxial $\text{La}_{0.67}\text{Sr}_{0.33}\text{MnO}_3$ tunnel junctions", **Phys. Rev. B (Rapid Commu.)** **54**, R8357 (1996).
- 95) S.A. Rishton, Y. Lu, R.A. Altman, A.C. Marley, X.P. Bian, C. Hahnes, R. Viswanathan, Gang Xiao, W.J. Gallagher, S.S.P. Parkin, "Magnetic tunnel junctions fabricated at tenth-micron dimensions by electron beam lithography", **Microelectron Eng.** **35**, 249 (1997).
- 96) Gang Xiao, G.Q. Gong, C.L. Canedy, E.J. McNiff, Jr, and A. Gupta, "Magnetic field induced properties of manganate perovskites with colossal magnetoresistance" (invited), **J. Appl. Phys.** **81**, 5324 (1997).
- 97) C.L. Canedy, X. W. Li, and Gang Xiao, "Extraordinary Hall effect in (111) and (100) oriented Co/Pt superlattices", **J. Appl. Phys.** **81**, 5367 (1997).
- 98) X.W. Li, Yu Lu, G.Q. Gong, Gang Xiao, A. Gupta, P. Lecoeur, J.Z. Sun, W.J. Gallagher, Y.Y. Wang, and V.P. Dravid, "Epitaxial $\text{La}_{0.67}\text{Sr}_{0.33}\text{MnO}_3$ magnetic tunnel junctions", **J. Appl. Phys.** **81**, 5509 (1997).
- 99) W.J. Gallagher, S.S.P. Parkin, Y.Lu, X.P. Bian, A. Marley, K. P. Roche, R.A. Altman, S.A. Rishton, K.P. Roche, C. Jahnes, T.M. Shaw, and Gang Xiao, "Microstructured magnetic tunnel junctions", **J. Appl. Phys.** **81**, 3741 (1997).
- 100) Y. Lu, R.A. Altman, A. Marley, S.A. Rishton, P.L. Trouilloud, Gang Xiao, W.J. Gallagher, and S.S.P. Parkin, "Shape-anisotropy-controlled magnetoresistive response in magnetic tunneling junctions", **Appl. Phys. Lett.** **70**, 2610 (1997).
- 101) P. Lecoeur, P.L. Trouilloud, Gang Xiao, A. Gupta, G.Q. Gong, and X.W. Li, "Magnetic domain structures of $\text{La}_{0.67}\text{Sr}_{0.33}\text{MnO}_3$ thin films with different morphologies", **J. Appl. Phys.** **82**, 3934, (1997).
- 102) W. Qian, V.P. Dravid, A. Gupta, G.Q. Gong, and Gang Xiao, "Microstructure of Fe_3O_4 thin films grown on (001) MgO substrates by pulsed laser deposition", **J. Mater. Sci.**, (1997).
- 103) X.W. Li, A. Gupta, Gang Xiao, and G.Q. Gong, "Low-field magnetoresistive properties of polycrystalline and epitaxial perovskite manganite films", **Appl Phys, Lett.** **71**, 1124 (1997).
- 104) G. Q. Gong, A. Gupta, Gang Xiao, W. Qian, and V.P. Dravid, "Magnetoresistance and magnetic properties of epitaxial magnetite thin films", **Phys. Rev. B** **56**, 5096 (1997).
- 105) Ganping Ju, A. Vertikov, A.V. Nurmikko, C. Canedy, Gang Xiao, R.F.C. Farrow, and A. Cebollada, "Ultrafast hot electron and spin relaxation dynamics in a ferromagnetic thin film", **Phys. Rev. B (Rapid Commu.)** **56**, 57, R700 (1997).
- 106) J.Z. Sun, L. Krusin-Elbaum, A. Gupta, Gang Xiao, P.R. Duncombe, P.L. Trouilloud, W.J. Gallagher, and S.S.P. Parkin, "Colossal magnetoresistance in manganate perovskites" (a review), **IBM J. Res. Dev.** **42**, 89(1998).
- 107) Gang Xiao, A. Gupta, X.W. Li, G.Q. Gong, and J.Z. Sun, "Sub-200 Oe giant magnetoresistance in manganite tunnel junctions", in *Metallic Magnetic Oxides*, edited by M. Hundley, J. Nickel, R. Ramesh, and Y. Tokura (Materials Research Society, Pittsburgh, 1998), 221.
- 108) Yu Lu, X.W. Li, Gang Xiao, R.A. Altman, W.J. Gallagher, C. Marley, K. Roche, and S.S.P. Parkin, "Bias voltage and temperature dependence of magnetotunneling effect", **J. Appl. Phys.** **83**, 6515 (1998).
- 109) J.J. Rhyne, H. Kaiser, H. Luo, Gang Xiao, M.L. Gardel, "Long wavelength spin dynamics in $\text{La}_{0.53}\text{Ca}_{0.47}\text{MnO}_3$ ", **J. Appl. Phys.** **83**, 7339 (1998).
- 110) X. W. Li, A. Gupta, Gang Xiao, and G.Q. Gong, "Transport and magnetic properties of epitaxial and polycrystalline magnetite thin films", **J. Appl. Phys.** **83**, 7049 (1998).
- 111) X.W. Li, A. Gupta, Gang Xiao, W. Qian, and V. P. Dravid, "Fabrication and properties of heteroepitaxial magnetite (Fe_3O_4) tunnel junctions", **Appl. Phys. Lett.** **73**, 3282 (1998).
- 112) S. Ingvarsson, Gang Xiao, R. Wanner, P. Trouilloud, Yu Lu, W.J. Gallagher, A. Marley, K. P. Roche, S.S.P. Parkin, "Electronic noise in magnetic tunnel junctions", **J. Appl. Phys.** **85**, 5270 (1999).
- 113) X.W. Li, A. Gupta, T.R. McGuire, P.R. Duncombe, Gang Xiao, "Magnetoresistance and hall effect of chromium dioxide epitaxial and polycrystalline thin films", **J. Appl. Phys.** **85**, 5585 (1999).
- 114) X.W. Li, A. Gupta, and Gang Xiao, "Influence of strain on the magnetic properties of epitaxial (100) Chromium Dioxide (CrO_2) Films", **Appl. Phys. Lett.** **75**, 713 (1999).
- 115) A. Gupta, X.W. Li, S. Guha, and Gang Xiao, "Selective-area and lateral overgrowth of chromium dioxide (CrO_2) films by chemical vapor deposition", **Appl. Phys. Lett.** **75**, 2996 (1999).

- 116) A. Anguelouch, B.D. Schrag, Gang Xiao, R. Wanner, P. Trouilloud, Yu Lu, W.J. Gallagher, and S.S.P. Parkin, "Two-dimensional magnetic switching of micron-size films in magnetic tunnel junctions", **Appl. Phys. Lett.** **76**, 622 (2000).
- 117) F.Y. Yang, C.L. Chien, E.F. Ferrari, X.W. Li, A. Gupta, and Gang Xiao, "Uniaxial Anisotropy and switching behavior of epitaxial CrO₂ films", **Appl. Phys. Lett.** **75**, 2996 (1999)
- 118) B.D. Schrag, A. Anguelouch, Gang Xiao, P. Trouilloud, Yu Lu, W.J. Gallagher, and S.S.P. Parkin, "Magnetization reversal and interlayer couplings in magnetic tunnel junctions", **J. Appl. Phys.** **87**, 4682 (2000).
- 119) A. Gupta, X.W. Li, and Gang Xiao, "Magnetic and Transport Properties of Epitaxial and Polycrystalline Chromium Dioxide Thin Films (invited)", **J. Appl. Phys.** **87**, 6073 (2000).
- 120) C.L. Canedy, X.W. Li, and Gang Xiao, "Extraordinary Hall effect and magnetic properties of Co/Pt superlattices", **Phys. Rev. B** **62**, 508 (2000).
- 121) L. Spinu, H. Srikanth, A. Gupta, X.W. Li, and Gang Xiao, "Probing magnetic anisotropy effects in epitaxial CrO₂ thin films", **Phys. Rev. B** **62**, 8931 (2000).
- 122) B.D. Schrag, A. Anguelouch, S. Ingvarsson, Gang Xiao, Yu Lu, P.L. Trouilloud, A. Gupta, R. A. Wanner, W.J. Gallagher, P.M. Rice, and S.S.P. Parkin, "Neel 'orange-peel' coupling in magnetic tunneling junction devices", **Appl. Phys. Lett.** **77**, 2373 (2000).
- 123) S. Ingvarsson, Gang Xiao, R. Wanner, P. Trouilloud, Yu Lu, W.J. Gallagher, A. Marley, K. P. Roche, S.S.P. Parkin, "Low frequency magnetic noise in magnetic tunneling junctions", **Phys. Rev. Lett.** **85**, 3289 (2000)
- 124) F.Y. Yang, C.L. Chien, X.W. Li, A. Gupta, and Gang Xiao, "Critical behavior of epitaxial half-metallic ferromagnetic CrO₂ films", **Phys. Rev. B** **63**, 92403 (2001).
- 125) Y. Ji, G. J. Strijkers, F.Y. Yang, C.L. Chien, J.M. Beyers, A. Anguelouch, Gang Xiao, and A. Gupta, "Determination of intrinsic spin polarization of ferromagnets with point-contact Andreev reflection", **Phys. Rev. Lett.** **86**, 5585 (2001).
- 126) A. Anguelouch, A. Gupta, and Gang Xiao, "Thickness dependence of magnetic and transport properties of chromium dioxide (CrO₂) strained epitaxial thin films", **IEEE Trans. Magn.** **37**, 2135 (2001).
- 127) A. Gupta, X.W. Li, and Gang Xiao, "Inverse magnetoresistance in Chromium dioxide (CrO₂)-based magnetic tunnel junctions", **Appl. Phys. Lett.** **78**, 1894 (2001).
- 128) L. Spinu, H. Srikanth, X.W. Li, A. Gupta, and Gang Xiao, "Strain dependence and magnetic anisotropy in chromium dioxide thin films", **Mat. Res. Soc. Symp. Proc. Vol. 648**, P3.31 (Material Research Society, 2001).
- 129) L. Spinu, H. Srikanth, C. J.O'Connor, A. Gupta, X.W. Li, and G. Xiao, "Switching behavior and strain dependence in epitaxial CrO₂ thin films", **IEEE Trans. Magn.** **37**, 2596 (2001).
- 130) A. Anguelouch, A. Gupta, Gang Xiao, D.W. Abraham, B.Y. Ji, S.T. Ingvarsson, and C.L. Chien "Near-complete spin polarization in atomically smooth chromium dioxide epitaxial films prepared using a CVD liquid precursor", **Phys. Rev. B (Rapid Commu.)** **64**, 180408(R) (2001).
- 131) A. Anguelouch, A. Gupta, Gang Xiao, D.W. Abraham, Y. Ji, G.X. Miao, S. Ingvarsson, and C.L. Chien, "Properties of epitaxial chromium dioxide films grown by chemical vapor deposition using a liquid precursor", **J. Appl. Phys.** **91**, 7140 (2002).
- 132) Qiang Zhang, A.V. Nurmikko, A. Anguelouch, Gang Xiao, A. Gupta, "Coherent magnetization rotation and control by ultrashort optical pulses in CrO₂ thin films", **Phys. Rev. Lett.** **89**, 177402 (2002).
- 133) L.D. Ritchie, X. Liu, S. Ingvarsson, Gang Xiao, Jun Du, and J.Q. Xiao "Magnetic exchange bias enhancement through seed layer variation in FeMn/NiFe layered structures", **J. Magn. Magn. Mater.** **247**, 187-190 (2002).
- 134) S. Ingvarsson, Gang Xiao, S.S.P. Parkin, and W.J. Gallagher, "Thickness-dependent magnetic properties of Ni₈₁Fe₁₉, Co₉₀Fe₁₀, and Ni₆₅Fe₁₅Co₂₀ thin films", **J. Magn. Magn. Mater.** **251**, 202-206 (2002).
- 135) S. Ingvarsson, L. Ritchie, X.Y. Liu, Gang Xiao, J.C. Slonczewski, P.L. Trouilloud, and R. Koch, "Role of electron scattering in the magnetization relaxation of thin Ni₈₁Fe₁₉ films", **Phys. Rev. B.** **66**, 214416 (2002).
- 136) X.Y. Liu, Cong Ren, and Gang Xiao "Magnetic tunnel junction field sensors with hard axis bias field", **J. Appl. Phys.** **92**, 4722 (2002).

- 137) L.F. Li, X.Y. Liu, and Gang Xiao "Microstructures of magnetic tunneling junctions", **J. Appl. Phys.** 93, 467 (2003).
- 138) Z. H. Liu, M. Zhang, Y. T. Cui, Y.Q. Zhou, W.H. Wang, G.H. Wu, X.X. Zhang, and Gang Xiao "Martensitic transformation and shape memory effect in ferromagnetic Heusler alloy Ni_2FeGa ", **Appl. Phys. Lett.** 82, 424 (2003).
- 139) X.Y. Liu, Cong Ren, Lance Ritchie, B.D. Schrag, Gang Xiao, and Lai-feng Li "Magnetic tunneling junctions with permalloy electrodes: a study of barrier, thermal annealing, and interlayer coupling", **J. Magn. Magn. Mater.** 267, 133 (2003).
- 140) X.X. Zhang, G.H. Wen, Gang Xiao, and S.H. Sun "Magnetic relaxation of diluted and self-assembled Co nanocrystals", **J. Magn. Magn. Mater.** 261, 21-28 (2003).
- 141) L. Ritchie, Gang Xiao, Yi Ji, T.Y. Chen, C.L. Chien, M. Zhang, J. Chen, Z. Liu, G.H. Wu, and X.X. Zhang "Magnetic, structural, and transport properties of the Heusler alloys Co_2MnSi and NiMnSb ", **Phys. Rev. B** 68, 104430 (2003).
- 142) B.D. Schrag and Gang Xiao "Submicron current density imaging of embedded microstructures", **Appl. Phys. Lett.** 82, 3272 (2003). Selected for the May 19, 2003 issue of the Virtual Journal of Nanoscale Science & Technology (<http://www.vjnano.org/>), which covers a focused area of frontier research.
- 143) X.Y. Liu and Gang Xiao "Thermal annealing effects on low-frequency noise and transfer behavior in magnetic tunnel junction sensors", **J. Appl. Phys.** 94, 6218 (2003).
- 144) B. D. Schrag, X. Y. Liu, M. J. Carter, and Gang Xiao "[Scanning magnetoresistive microscopy for die-level submicron current density mapping](#)" Proceedings of the 29th International Symposium for Testing and Failure Analysis (ISTFA), 2-6 November, 2003, Santa Clara, California. Awarded the Outstanding Paper Award at ISTFA 2003
- 145) Cong Ren, X.Y. Liu, B.D. Schrag, and Gang Xiao "Low-frequency magnetic noise in magnetic tunnel junctions", **Phys. Rev. B** 69, 104405 (2004).
- 146) G.X. Miao and Gang Xiao, "Giant Hall Resistance in Pt-based Ferromagnetic Alloys", **Appl. Phys. Lett.** 85, 73 (2004).
- 147) B.D. Schrag, X.Y. Liu, W.F. Shen, and Gang Xiao "Current density mapping and pinhole imaging in magnetic tunnel junctions via scanning magnetic microscopy", **Appl. Phys. Lett.** 84, 2937 (2004).
- 148) M. Zhang, Y.T. Cui, Z.H. Liu, G.D. Liu, J.L. Chen, G.H. Wu, X.X. Zhang, and Gang Xiao, "Nearly Half-metallic Heusler Compound Co_2CrAl : Band Structure, Magnetism, and Electron Transport", **Phys. Rev. B** 69, 134415 (2004).
- 149) M. Zhang, Z.H. Liu, H.N. Hu, G.D. Liu, Y.T. Cui, J.L. Chen, G.H. Wu, X.X. Zhang, Gang Xiao, "Is Heusler compound Co_2CrAl a half-metallic ferromagnet: Electronic band structure, and transport properties", **J. Magn. Magn. Mater.** 277 (1-2), 130-135 (2004).
- 150) Z.H. Liu, H.N. Hu, G.D. Liu, Y.T. Cui, M. Zhang, J.L. Chen, G.H. Wu, and Gang Xiao, "Electronic structure and ferromagnetism in the martensitic-transformation material Ni_2FeGa ", **Phys. Rev. B** 69 (13), 134415 (2004).
- 151) X.Y. Liu, D. Mazumdar, B.D. Schrag, W. Shen, and Gang Xiao "Magnetization reversal of submicrometer Co rings with uniaxial anisotropy via scanning magnetoresistance microscopy", **Phys. Rev. B** 70, 14407 (2004).
- 152) Q. Zhang, Y. Li, A. V. Nurmikko, G. X. Miao, Gang Xiao, A. Gupta "Magnetization reversal of CrO_2 nanomagnet arrays", **J. Appl. Phys.** 96(12), 7527 (2004).
- 153) B. Z. Rameev, A. Gupta, A. Anguelouch, Gang Xiao, F. Yildiz, L. R. Tagirov, and B. Akta, "Probing magnetic anisotropies in half-metallic CrO_2 epitaxial films by FMR", **J. Magn. Magn. Mater.** 272, 1167 (2004).
- 154) B. Z. Rameev, A. Gupta, G. X. Miao, Gang Xiao, F. Yildiz, L. R. Tagirov, and B. Aktas "FMR study of strain-induced magnetic anisotropies in CrO_2 thin films", **Phys. Stat. Sol. (a)** 201, 3350-3353 (2004) .
- 155) S. Ingvarsson, Gang Xiao, S. S. P. Parkin, R. H. Koch, "Tunable magnetization damping in transition metal ternary alloys", **Appl. Phys. Lett.** 85, 4995 (2004) .
- 156) Q. Zhu, F. Y. Yang, C. L. Chien, L. Ritchie, Gang. Xiao, G. H. Wu "Ferromagnetic shape memory alloy $\text{Ni}_{51.9}\text{Mn}_{23.2}\text{Ga}_{24.9}$ with martensitic transition near room temperature", **J. Magn. Magn. Mater.** 288, 79 (2005).

- 157) G. X. Miao, H. Sims, A. Gupta, W. H. Butler, S. Ghosh, Gang Xiao "Giant magnetoresistance structures based on CrO_2 with epitaxial RuO_2 as the spacer layer", **J. Appl. Phys.** 97, 10C924 (2005).
- 158) G.X. Miao, A. Gupta, Gang Xiao, A. Anguelouch "Epitaxial growth of RuO_2 films by chemical vapor deposition and a comparison with similarly-grown CrO_2 films", **Thin Solids Films** (2005).
- 159) G. X. Miao, Gang Xiao, and A. Gupta "Variations in the magnetic anisotropy properties of epitaxial CrO_2 films as a function of thickness", **Phys. Rev. B** 71, 94418 (2005).
- 160) Weifeng Shen, Xiaoyong Liu, Dipanjan Mazumdar, and Gang Xiao "In situ detection of single micron-sized magnetic beads using magnetic tunnel junction sensors", **Appl. Phys. Lett.** 86, 253901 (2005).
- 161) D. Mazumdar and Gang Xiao "Scanning magnetoresistive microscopy study of quasi-static magnetic switching in mesoscopic square dots: observation of field-driven transition between flux-closure states", **IEEE Trans. Magn.** 41, 2226 (2005).
- 162) W.W. Lin, H. Sang, B. You, Z.S. Jiang, and Gang Xiao, "Angular dependence of magnetic properties in Co/Pt multilayers with perpendicular magnetic anisotropy", **Inter. J. Mod. Phys. B** 19, Issue 15-17, 2562-2567 (2005).
- 163) B.Z. Rameev, A. Gupta, G. Miao, Gang Xiao, F. Yildiz, L.R. Tagirov, B. Aktas, "The magnetic anisotropy of thin epitaxial CrO_2 films studied by ferromagnetic resonance", **Tech Phys. Lett.** 31 (9), 802-805 (2005).
- 164) Z.Y. Chen, A. Biswas, J.C. Read, S.B. Gale, R.L. Greene, T. Venkatesan, A. Gupta, A. Anguelouch, and Gang Xiao "CrO₂/Ag/YBCO Interface Study with a Flip-Chip Configuration", **J. Superconductivity** 18(4), 499-502 (2005).
- 165) G.X. Miao, A. Gupta, Gang Xiao, and Maria Varela "Magnetic tunneling junctions based on CrO_2 and Co electrodes with epitaxial SnO_2 as the barrier", submitted to **Appl. Phys. Lett.** (2005).
- 166) G.X. Miao, A. Gupta, and Gang Xiao "Barrier induced exchange bias in $\text{CrO}_2/\text{Cr}_2\text{O}_3/\text{Co}$ magnetic tunnel junctions", submitted to **J. Appl. Phys.** (2005).
- 167) G.X. Miao, A. Gupta, W.H. Buttler, and Gang Xiao "Observation of a magnetovoltage effect in CrO_2 based magnetic tunnel junction", submitted to **J. Appl. Phys.** (2005).
- 168) G. X. Miao, K. Chetry, A. Gupta, W. H. Butler, K. Tsunekawa, D. Djayaprawira, Gang Xiao, "Inelastic tunneling spectroscopy in magnetic tunnel junctions based on CoFeB/MgO/CoFeB with Mg insertion layer", **J. Apply. Phys.** 99(8), Art. No. 08T305 (2006)
- 169) G. X. Miao, Gang Xiao, A. Gupta, "The influence of substrate treatment on the growth morphology and magnetic anisotropy of epitaxial CrO_2 films", **Phys. Stat. Sol.** 203/9, 1-8 (2006)
- 170) R. S. Keizer, S. T. B. Goennenwein, T. M. Klapwijk, G. X. Miao, Gang Xiao, A. Gupta, "A triplet supercurrent through the half-metallic ferromagnet CrO_2 ", **Nature** 439, 825 (2006).
- 171) G.X. Miao, P. LeClair, A. Gupta, Gang Xiao, M. Varela, and S. Pennycook, "Magnetic tunnel junctions based on $\text{CrO}_2/\text{SnO}_2$ epitaxial bilayers", **Appl. Phys. Lett.** 89(2), Art. No. 022511 (2006).
- 172) W.W. Lin, H. Sang, D. Liu, Z.S. Jiang, A. Hu, X.S. Wu, and Gang Xiao "Magnetization switching induced by in-plane current with low density in Pt/Co/Pr sandwich", **J. Appl. Phys.** 99(8) Art. No. 08G518 (2006).
- 173) W.F. Shen, D. Mazumdar, X.J. Zou, X.Y. Liu, B.D. Schrag, and Gang Xiao, "Effect of film roughness in MgO-based magnetic tunnel junctions", **Appl. Phys. Lett.** 88, 182508 (2006).
- 174) X.Y. Liu, D. Mazumdar, W.F. Shen, B.D. Schrag, and Gang Xiao "Thermal stability of magnetic tunneling junctions with MgO barriers for high temperature spintronics", **Appl. Phys. Lett.** 89 (2): Art. No. 023504 (2006).
- 175) Q. Zhang, and A.V. Nurmikko, G.X. Miao, Gang Xiao, and A. Gupta, "Ultrafast spin dynamics in half-metallic CrO_2 thin film", **Phys. Rev. B** 74, 064414 (2006).
- 176) B. D. Schrag, M. J. Carter, X. Liu, J. S. Hoftun, and, G. Xiao "[Magnetic current imaging with magnetic tunnel junction sensors: case study and analysis](#)", Proceedings of the 2006 International Symposium for Testing and Failure Analysis (2006).
- 177) D. Mazumdar, X.Y. Liu, B.D. Schrag, W.F. Shen, M. Carter, and Gang Xiao, "Thermal Stability, sensitivity, and noise characteristics of MgO-based magnetic tunnel junctions (invited)", **J. Appl. Phys.** 101, 09B502 (2007). S. T. B. Goennenwein, R. S. Keizer, S. W. Schink, I. van Dijk, T. M.

- Klapwijk, G. X. Miao, Gang. Xiao, A. Gupta, "Planar Hall effect and magnetic anisotropy in epitaxially strained chromium dioxide thin films", **Appl. Phys. Lett.** **90**, 142509 (2007).
- 179) D. Mazumdar, X.Y. Liu, B.D. Schrag, M. Carter, W.F. Shen, and Gang Xiao, "Low frequency noise in highly sensitive magnetic tunnel junctions with (001) MgO barrier", **Appl. Phys. Lett.** **91**, 033507 (2007). X.J. Zou and Gang Xiao "Magnetic domain configurations of epitaxial chromium dioxide (CrO₂) nanostructures", **Appl. Phys. Lett.** **91**, 113512 (2007). G.D. Liu, X.F. Dai, H.Y. Liu, J.L. Chen, Y.X. Li, Gang Xiao, and G.H. Wu "Mn₂CoZ (Z=Al,Ga,In,Si,Ge,Sn,Sb) compounds: Structural, electronic, and magnetic properties", **Phys. Rev. B** **77**, 014424 (2008).
 - 182) N.S. Safron, B.D. Schrag, X.Y. Liu, W.F. Shen, D. Muzumdar, M.J. Carter, and Gang Xiao "Magnetic characterization of magnetic tunnel junction devices using circle transfer curves", **J. Appl. Phys.** **103**, 033507 (2008).
 - 183) X.J. Zou and Gang Xiao "Electronic transport and magnetoresistance in polycrystalline and epitaxial CrO₂ nanowires", **Phys. Rev. B** **77**, 054417 (2008).
 - 184) X.J. Zou and Gang Xiao "Magnetotransport properties of polycrystalline and epitaxial chromium dioxide nanowires", **J. Appl. Phys.** **103**, 07D710 (2008).
 - 185) X.J. Zou and Gang Xiao "Half-metallic chromium dioxide (CrO₂) nanostructures and field-dependent magnetic domain evolution", **J. Appl. Phys.** **103**, 07D701 (2008).
 - 186) Y. Nie, W.W. Lin, M. Huang, K.Z. Xie, J. Du, H. Sang, and Gang Xiao "Angular dependence of magnetization reversal in exchange-biased Co/Pt multilayer with perpendicular magnetic anisotropy", **J. Appl. Phys.** **103**, 07C110 (2008).
 - 187) W.F. Shen, B.D. Schrag, M.J. Carter, J. Xie, C.J. Xu, S.H. Sun, and Gang Xiao "Detection of DNA labeled with magnetic nanoparticles using MgO-based magnetic tunnel junction sensors", **J. Appl. Phys.** **103**, 07A306 (2008).
 - 188) W.F. Shen, B.D. Schrag, M.J. Carter, and Gang Xiao "Quantitative detection of DNA labeled with magnetic nanoparticles using arrays of MgO-based magnetic tunnel junction sensors", **Appl. Phys. Lett.** **93**, 033903 (2008).
 - 189) D. Mazumdar, W.F. Shen, X.Y. Liu, B.D. Schrag, M. Carter, and Gang Xiao "Field sensing characteristics of magnetic tunnel junctions with (001) MgO tunnel barrier", **J. Appl. Phys.** **103**, 113911 (2008).
 - 190) Weifeng Shen, Benaiah D. Schrag, Anuj Girdha, Matthew J. Carter, Hai Sang, and Gang Xiao "[Effects of superparamagnetism in MgO-based magnetic tunnel junctions](#)", **Phys. Rev. B** **79**, 014418 (2009).
 - 191) G.X. Miao, Gang Xiao, and A. Gupta "Anomalous bias dependence in magnetic tunnel junctions based on half-metallic CrO₂ with heteroepitaxial SnO₂ tunnel barrier", **Europhysics Letters (EPL)**, **87**, 47006 (2009).
 - 192) Snorri Ingvarsson, Mustafa Arikan, Matthew Carter, Weifeng Shen, and Gang Xiao "[Impedance spectroscopy of micron sized magnetic tunnel junctions with MgO tunnel barrier](#)", **Appl. Phys. Lett.** **96**, 232506 (2010); doi:10.1063/1.3449573.
 - 193) W. F. Egelhoff, V. E. Höink, J. W. Lau, W. F. Shen, B. D. Schrag, and Gang Xiao "[Magnetic tunnel junctions with large tunneling magnetoresistance and small saturation fields](#)", **J. Appl. Phys.** **107**, 09C705 (2010); doi:10.1063/1.3358609

d. Non-refereed journal articles

e. Book Reviews

f. Abstracts

- 1) Gang Xiao, C. L. Chien, and Karl Unruh, "Hyperfine interactions in amorphous Fe-Sb alloys", in March Meeting of American Physical Society, March 25-29, 1985, Baltimore, Maryland, Bull. Ame. Phys. Soc. **30**, 426 (1985).
- 2) N. Taylor, S. H. Liou, Gang Xiao, and C. L. Chien, "Amorphous Fe-Hf alloys", in March Meeting of American Physical Society, March 25-29, 1985, Baltimore, Maryland, Bull. Ame. Phys. Soc. **30**, 426 (1985).

- 3) C.L. Chien, S. H. Ge, S. H. Liou, and Gang Xiao, "Structural and magnetic behaviors of vapor quenched Fe-Mo alloys", in March Meeting of American Physical Society, March 25-29, 1985, Baltimore, Maryland, Bull. Ame. Phys. Soc. **30**, 426 (1985).
- 4) Gang Xiao and C. L. Chien, "Ferromagnetic and spin glass orderings in amorphous Fe-Sb alloys", in International Conference on Magnetism, Aug. 26-30, 1985, San Francisco, California.
- 5) C. L. Chien, S. H. Liou, Gang Xiao, J. N. Taylor, and A. Levy, "Magnetic properties of granular Fe-SiO₂ films", in March Meeting of American Physical Society, March 31 - April 4, 1986, Las Vegas, Nevada.
- 6) Gang Xiao and C. L. Chien, "Cu-Ni superlattice with [100] texture", in 1986 Fall Meeting of the Materials Research Society, Dec. 1-6, 1986, Boston, Massachusetts.
- 7) C. L. Chien, S. H. Liou, Gang Xiao, S. H. Ge, and M. A. Gatzke, "Magnetic percolation in new crystalline bcc Fe-Mo and fcc Fe-Cu alloys", in 1986 Fall Meeting of the Materials Research Society, Dec. 1-6, 1986, Boston, Massachusetts.
- 8) Gang Xiao and C. L. Chien, "Temperature dependence of spontaneous magnetization of ultrafine Fe particle in Fe-SiO₂ granular solids", 1986 Fall Meeting of the Materials Research Society, Dec. 1-6, 1986, Boston, Massachusetts.
- 9) Gang Xiao and C. L. Chien, "Magnetic study of compositionally modulated amorphous Fe₇₀B₃₀-Ag films", in March Meeting of American Physical Society, March 16-20, 1986, New York, New York, Bull. Ame. Phys. Soc. **32**, 420 (1987).
- 10) Gang Xiao and C. L. Chien, "Giant magnetic coercivity in granular Fe-SiO₂ solids", in March Meeting of American Physical Society, March 16-20, 1986, New York, New York, Bull. Ame. Phys. Soc. **32**, 832 (1987).
- 11) Gang Xiao, M. Z. Cieplak, A. Bakhshai, F. H. Streitz, M. Lu, A. Zwicker, A. Gavrin, and C. L. Chien "Superconducting properties of YBa₂(Cu_{1-x}Zn_x)₃O₇ and YBa₂(Cu_{1-x}Ga_x)₃O₇", in 1987 Fall Meeting of the Materials Research Society, Nov. 30 - Dec. 5, 1987, Boston, Massachusetts.
- 12) C. L. Chien, Gang Xiao, M. Z. Cieplak, A. Bakhshai, A. Gavrin, G. H. Streitz, and J. Childress, "Fabrication of high T_c superconducting films with diffusion barriers", in 1987 Fall Meeting of the Materials Research Society, Nov. 30 - Dec. 5, 1987, Boston, Massachusetts.
- 13) Gang Xiao, F. H. Streitz, A. Gavrin, M. Z. Cieplak, and C. L. Chien, "Superconductivity and Magnetism in transition element substituted YBa₂Cu₃O₇ compound", in 32nd Annual Conference on Magnetism and Magnetic Materials, Nov. 9-12, 1987, Chicago, Illinois.
- 14) Gang Xiao and C. L. Chien, "Enhanced magnetic coercivity in magnetic granular solids", in 32nd Annual Conference on Magnetism and Magnetic Materials, Nov. 9-12, 1987, Chicago, Illinois.
- 15) Gang Xiao, F. H. Streitz, M. Z. Cieplak, A. Gavrin, A. Bakhshai, and C. L. Chien, "Superconducting Au-YBa₂Cu₃O₇ composites", in March Meeting of American Physical Society, March 21-25, 1988, New Orleans, Louisiana, Bull. Ame. Phys. Soc. **33**, 468 (1988).
- 16) Gang Xiao and C. L. Chien, "Substitution for the Cu-site in high T_c cuprate superconductors", in Gordon Research Conference on High Temperature superconductivity, February 27 - March 3, 1989, Ventura, California.
- 17) Gang Xiao, M. Z. Cieplak, and C. L. Chien, "The investigation of (La-Gd)_{1.85}Sr_{0.15}CuO₄ system", in March Meeting of American Physical Society, March 20-24, 1989, St. Louis, MO, Bull. Ame. Phys. Soc. **34**, 889 (1989).
- 18) M. Z. Cieplak, Gang Xiao, A. Bakhshai, and C. L. Chien, "Anomalous electrical transport properties of La_{1.85}Sr_{0.15}(Cu_{1-x}Ga_x)O₄", in March Meeting of American Physical Society, March 20-24, 1989, St. Louis, MO, Bull. Ame. Phys. Soc. **34**, 742 (1989).
- 19) A. Bakhshai, Gang Xiao, M. Z. Cieplak, and C. L. Chien, "Superconductivity and normal state properties of Zn-doped La_{1.85}Sr_{0.15}CuO₄ system", in March Meeting of American Physical Society, March 20-24, 1989, St. Louis, MO, Bull. Ame. Phys. Soc. **34**, 743 (1989).
- 20) Gang Xiao, M. Z. Cieplak, and C. L. Chien, "Static Vacancies in Antiferromagnetic La₂CuO₄ and Superconducting La_{2-x}Sr_xCuO₄", in March Meeting of American Physical Society, March 12--16, 1990, Anaheim, CA, Bull. Ame. Phys. Soc. **35**, 340(1990).
- 21) M. Z. Cieplak, Gang Xiao, J. Q. Xiao, A. Bakhshai, and C. L. Chien, "Transport and Superconductivity in La_{1.85}Sr_{0.15}Cu_{1-x}A_xO₄ Systems (A=Fe, Co, Ni, Zn, Ga, Al)," in March Meeting of American Physical Society, March 12--16, 1990, Anaheim, CA, Bull. Ame. Phys. Soc. **35**, 340(1990).

- 22) J. Q. Xiao, C. L. Chien, and Gang Xiao, "Superconducting and Normal-State Properties of $\text{La}_{1.85}\text{Sr}_{0.15}(\text{Cu}_{1-x}\text{Al}_x\text{O}_4$," in March Meeting of American Physical Society, March 12--16, 1990, Anaheim, CA, Bull. Ame. Phys. Soc. **35**, 340 (1990).
- 23) M. Z. Cieplak, A. Sienkiewicz, S. Guha, Gang Xiao, and C. L. Chien, "Magnetic Interactions of Fe moments in Fe-doped $\text{La}_{1.85}\text{Sr}_{0.15}\text{CuO}_4$," in March Meeting of American Physical Society, March 18--22, 1991, Cincinnati, OH, Bull. Ame. Phys. Soc. **36**, 832 (1991).
- 24) Gang Xiao, "Magnetism in low dimensional metallic systems", Proceedings of 1991 Chinese Academy of Sciences Physical Workshop for Young Scientists, August 18--24, 1991, Beijing, China.
- 25) Gang Xiao, "Universal Hall effect in (1) $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ with varying δ , (2) $\text{Y}_{1-x}\text{Pr}_x\text{Ba}_2\text{Cu}_3\text{O}_7$, and (3) $\text{La}_{1.85}\text{Sr}_{0.15}(\text{Cu}_{1-x}\text{Al}_x\text{O}_4$," in Gordon Research Conference on Superconductivity, Jan. 4-8, 1993, Oxnard, CA.
- 26) H.J. Maris, W. Chen, Y. Lu and Gang Xiao, "Sub-THz Localized Phonons and Attenuation by Electrons in Al/Ag Superlattices", in March Meeting of American Physical Society, March 21-25, 1994, Pittsburgh, PA, Bull. Ame. Phys. Soc. **39**, 747 (1994).
- 27) Chadwick L. Canedy, Jian-Qing Wang and Gang Xiao, Magnetotransport and Magnetic Properties of Fe-Pt Thin Films", in March Meeting of American Physical Society, March 21-25, 1994, Pittsburgh, PA, Bull. Ame. Phys. Soc. **39**, 141 (1994).
- 28) Peng Dai, Peng Xiong, and Gang Xiao, R.B. Laibowitz, "Anomalous Transport Properties in Superconductor-Normal-Metal Microjunctions", in March Meeting of American Physical Society, March 21-25, 1994, Pittsburgh, PA, Bull. Ame. Phys. Soc. **39**, 461 (1994).
- 29) Jian-Qing Wang and Gang Xiao, "The Origin of the Temperature Dependence of Giant Magnetoresistance in Granular Solids", in March Meeting of American Physical Society, March 21-25, 1994, Pittsburgh, PA, Bull. Ame. Phys. Soc. **39**, 624 (1994).
- 30) G. P. Ju, A. V. Numikko, C. Canedy, Gang Xiao, R. F. C. Farrow, and A. Cantarero, "Picosecond transient optically induced magnetization in Co/Pt multilayers and FePt alloys" in March Meeting of American Physical Society, March 18-22, 1996, St. Louis, MO, Bull. Ame. Phys. Soc. **41**, 662 (1996).
- 31) J. Z. Sun, L. Krusin-Elbaum, A. Gupta, S. S. P. Parkin, and Gang Xiao, "Synthesis and field-dependent magnetization of thin film manganates" in March Meeting of American Physical Society, March 18-22, 1996, St. Louis, MO, Bull. Ame. Phys. Soc. **41**, 793 (1996).
- 32) G. Q. Gong, A. Gupta, Gang Xiao, P. Lecoeur, P. Duncombe, T. M. McGuire, "Giant magnetoresistance in perovskite $\text{La}_{0.67}\text{Ca}_{0.33}\text{MnO}_3/\text{SrRuO}_3$ multilayer films" in March Meeting of American Physical Society, March 18-22, 1996, St. Louis, MO, Bull. Ame. Phys. Soc. **41**, 306 (1996).
- 33) Gang Xiao, E. McNiff, G. Q. Gong, A. Gupta, J. Z. Sun, T. M. McGuire, W. J. Gallagher, "Magnetic field induced metal-insulator transition in the La-Ca-Mn-O system" in March Meeting of American Physical Society, March 18-22, 1996, St. Louis, MO, Bull. Ame. Phys. Soc. **41**, 408 (1996).
- 34) A. Gupta, G. Q. Gong, Gang Xiao, P. Duncombe, P. Lecoeur, J. Z. Sun, T. M. McGuire, "The role of grain boundaries in the magnetoresistance properties of manganate films" in March Meeting of American Physical Society, March 18-22, 1996, St. Louis, MO, Bull. Ame. Phys. Soc. **41**, 555 (1996).
- 35) Yu Lu, Gang Xiao, W. J. Gallagher, J. Z. Sun, L. S. Yu-Jahnes, C. Jahnes, S. S. P. Parkin, X. P. Bian, "Fabrication and properties of micro-scale magnetic tunneling valves" in March Meeting of American Physical Society, March 18-22, 1996, St. Louis, MO, Bull. Ame. Phys. Soc. **41**, 130 (1996).
- 36) J. Z. Sun, L. Krusin-Elbaum, A. Gupta, Gang Xiao, P. R. Duncombe, W. J. Gallagher, and S. S. P. Parkin, "Magnetotransport in doped manganate perovskites", 41st Annual Conference on Magnetism and Magnetic Materials, Nov. 12-15, 1996, Atlanta, GA. See **J. Appl. Phys.** **81**, 5343 (1997).
- 37) C. Canedy, X. W. Li, and Gang Xiao, "Extraordinary Hall effect in Co/Pt superlattices", in March Meeting of American Physical Society, March 17-21, 1997, Kansas City, MO, Bull. Ame. Phys. Soc. **42**, 23 (1997).
- 38) G. P. Ju, A. V. Nurmikko, C. Canedy, Gang Xiao, R. F. C. Farrow, A. Cebollada, "Sub-picosecond spin dependent hot electron relaxation dynamics in ferromagnetic ordered CoPt_3 alloy", in March Meeting of American Physical Society, March 18-22, 1996, Kansas city, MO, Bull. Ame. Phys. Soc. **42**, 84 (1997).
- 39) A. Gupta, P. Lecoeur, G. Q. Gong, Gang Xiao, "Emission studies of Mn during pulsed laser deposition of manganites in O_2 and N_2O atmosphere", in March Meeting of American Physical Society, March 18-22, 1996, Kansas City, MO, Bull. Ame. Phys. Soc. **42**, 95 (1997).

- 40) Yu Lu, R. A. Altman, S. A. Rishton, S. S. P. Parkin, A. Marley, S. Gider, Gang Xiao, and W. J. Gallagher, "Magnetoresistance response in magnetic tunnel junctions", in March Meeting of American Physical Society, March 18-22, 1996, Kansas City, MO, Bull. Ame. Phys. Soc. **42**, 394 (1997).
- 41) X. W. Li, Yu Lu, G. Q. Gong, Gang Xiao, A. Gupta, P. Lecoeur, J. Z. Sun, Y. Y., Wang, and V. P. Dravid, "Spin tunneling in epitaxial $\text{La}_{0.67}\text{Sr}_{0.33}\text{MnO}_3$ trilayer junctions", in March Meeting of American Physical Society, March 18-22, 1996, Kansas City, MO, Bull. Ame. Phys. Soc. **42**, 451 (1997).
- 42) G. Q. Gong, A. Gupta, and Gang Xiao, "Magnetoresistance and magnetic properties of epitaxial magnetite thin films", in March Meeting of American Physical Society, March 18-22, 1996, Kansas City, MO, Bull. Ame. Phys. Soc. **42**, 451 (1997).

g. Invited lectures:

- The Metallurgical Society, Feb. 23-25, 1987, Denver, CO.
"Superlattice and multilayer systems with crystalline and amorphous constituent layers".
- The Metallurgical Society, Oct. 12-14, 1987, Cincinnati, OH.
"Critical current densities and superconducting properties of high T_c ceramic superconductors in bulk and thin film forms".
- 2nd Annual Conf. on Superconductivity and Applications.
April 18-20, 1988, Buffalo, NY
"Significance of plane vs. chain sites in high T_c $\text{YBa}_2\text{Cu}_3\text{O}_7$ superconductors".
- Dept. of Phys. and Astro., Univ. of Maryland, Nov. 4, 1988, College Park, MD
"Probing high- T_c superconductors through doping".
- Dept. of Applied Physics and Nuclear Engineering, Columbia University.
Nov. 22, 1988, New York, NY
Seminar on high temperature superconductors.
- Department of Physics, Brown University, Jan. 26, 1989, Providence, RI.
Seminar on high temperature superconductors.
- Physics Department, Harvard University, Feb. 3, 1989, Cambridge, MA.
Seminar on high temperature superconductors.
- Dept. of Phys. and Astro., Univ. of Delaware, Feb. 9, 1989, Newark, DE.
Seminar on high temperature superconductors.
- Dept. of Physics, Univ. of Florida, Feb. 13, 1989, Gainesville, FL.
Seminar on high temperature superconductors.
- Dept. of Phys. and Astro., Univ. of Pittsburgh, Feb. 17, 1989, Pittsburgh, PA.
Seminar on high temperature superconductors.
- EXXON Research and Engineering Company, Feb. 22, 1991, Annadale, NJ.
Seminar "Magnetism and electron transport in low dimensional systems".
- Department of Physics, Brown University, April 29, 1991, Providence, RI.
Colloquium "Magnetism in low dimensional metallic systems".
- Chinese Academy of Sciences Physical Workshop for Young Scientists.
Aug. 19, 1991, Beijing, China
Invited Talk "Magnetism in low dimensional metallic systems".
- Magnetism Laboratory, Chinese Institute of Physics, Aug. 22, 1991, Beijing, China.
Seminar "Recent development in magnetism of superlattice and granular materials".
- Dept. of Phys. and Astro., Univ. of Delaware, Oct. 22, 1991, Newark, DE.
Seminar "Magnetism in low dimensional metallic systems".
- Department of Physics, SUNY at Stony Brook, Jan. 31, 1992, Stony Brook, NY.
Seminar "Magnetic superlattices and ultrafine particles".
- China Center of Advanced Science and Technology, Beijing, China.
Invited talks at the CCAST Workshop on High- T_c Superconductivity, March 19-30, 1992,
(1) Recent experimental development in high- T_c superconductivity
(2) Copper-site doping: an effective probe in high- T_c materials
(3) Magnetic pair breaking effect in high- T_c superconductors

(4) Electrical transport in high- T_c superconductors

(5) Research trend in superconductivity

- Department of Physics, Beijing University, Mar. 28, 1992, Beijing, China.
Seminar "Superconducting microstructures".
- Department of Physics, Suzhou University, Apr. 6, 1992, Suzhou, China.
Seminar "Superconducting microstructures".
- Department of Physics, University of Nevada at Las Vegas, May 1, 1992, Las Vegas, NV.
Seminar "Physics of magnetic superlattices and ultrafine particles".
- Dept. of Phys. and Astro., Univ. of Delaware, Oct. 23, 1992, Newark, DE.
Seminar "Giant magnetoresistance effect in magnetic concentrated and nanostructured alloys".
- Dept. of Applied Physics, Stanford Univ., Nov. 11, 1992, Stanford, CA.
Seminar "Giant magnetoresistance effect in magnetic concentrated and nanostructured alloys".
- 1993 International Magnetism Conference, Stockholm, Sweden, April 13-16, 1993
Invited talk of a symposium "Giant magnetoresistance and anomalous Hall effect in Co-Ag and Fe-Cu, Ag, Au, Pt granular alloys".
- Dept. of Physics, The Hong Kong Univ. of Science and Technology, Dec. 13-15, 1993.
Seminar "Novel magneto-transport properties in magnetic granular solids".
Seminar "Mesoscopic Superconductor - normal metal microjunctions".
- The American Physical Society, Mar. 21-25, 1994, Pittsburgh, PA.
Invited talk of a symposium "Giant magnetoresistance and extraordinary Hall effect in granular solids".
- Dept. of Physics, Nanjing Univ., June 28, 1995, Nanjing, China
Seminar "Magnetotransport properties of magnetic granular solids".
- 1995 HKUST Physics Summer School on Nanostructured and Granular Materials, July 3-14, 1995, Hong Kong
Invited Lectures "Magnetic properties and magnetotransport in granular materials I, II, III".
- IBM T.J. Watson Research Center, Oct. 6, 1995, Yorktown Heights, NY
Seminar "Novel magnetotransport in granular materials and oxide solids".
- Physics and Astronomy Dept., Michigan State University, Nov. 27, 1995, East Lansing, Michigan
Seminar "Colossal magnetoresistance in ferromagnetic and antiferromagnetic oxides".
- Dept. of Physics and Astronomy, Mar. 29, 1996, The State Univ. of New Jersey at Rutgers, Piscataway, NJ
Seminar "Colossal magnetoresistance in ferromagnetic and antiferromagnetic oxides".
- Dept. of Physics, Brown University, Sept. 23, 1996, Providence, RI, Colloquium "Magnetic tunneling junctions - a new player in magnetoelectronics."
- 41st Annual Conf. On Magnetism & Magnetic Materials, Nov. 12-15, 1996, Atlanta, GA., Invited talk "Magnetic field induced properties in manganites".
- Dept. of Physics & Astronomy, University of Missouri-Columbia, MO, Feb. 17, 1997, Colloquium "Colossal magnetoresistance in ferromagnetic and antiferromagnetic oxides".
- Materials Research Society, Dec. 1-5, 1997, Boston, MA, Invited talk of a symposium "Sub-200 Oe giant magnetoresistance in manganite tunnel junctions".
- Dept. of Physics, Nanjing Univ. May, 1998, Nanjing
Three Lectures "Spin-polarized tunneling and colossal magnetoresistance effect".
- International Workshop on Superconductivity, Magneto-resistive Materials, and Strongly Correlated Quantum Systems", Hanoi, Vietnam, Jan. 4-13, 1999.
Three invited lectures on "Giant and colossal magnetoresistive materials"
- Dept. of Physics and Astronomy, UCLA, Los Angeles, CA, Feb. 17, 1999
Seminar "Giant magnetoresistance: materials, physics, and applications".
- Dept. of Physics, Univ. of Southern California, Los Angeles, CA, Feb. 18, 1999
Seminar "Giant magnetoresistance: materials, physics, and applications".

- OCPA Conference on Recent Advances and Cross-Century Outlooks in Physics: Interplay between Theory and Experiment, March 18-20, 1999, Atlanta, Georgia
Invited talk “Giant magnetoresistance: materials, physics, and applications”.
- The 5th IUMRS (International Union of Materials Research Societies) International Conference on Advanced Materials, June 13-18, 1999.
- Invited talk “Spin-polarized transport in half-metallic magnetic oxide thin films and tunnel junctions”.
Dept. of Physics, Fudan University, Shanghai, June 29, 1999
Seminar “Magnetic tunneling junctions: a new type of magnetoelectronic devices”.
- IBM T.J. Watson Research Center, Aug. 18, 1999, Yorktown Heights, NY
Seminar “Two dimensional magnetic switching and interlayer couplings in magnetic tunnel junctions”.
- Dept. of Physics, Pennsylvania State University, Sept. 27, 1999
Seminar “Magnetoelectronic Materials: Physics and Applications”.
- Dept. of Physics and Astronomy, The Johns Hopkins University, Dec. 13, 1999
Seminar “Spin dependent transport and half metallic magnetic materials”.
- Institute of Physics, Chinese Academy of Sciences, March 21, 2000
Invited talk “Spin dependent transport and half metallic magnetic materials”.
- 6th International Conference in Asia (the International Union of Materials Research Societies”, July 26, 2000, Invited talk “Giant magnetoresistance, materials, physics, and applications”.
- Physical Society of Hong Kong, Post-graduate summer school, July 29, 2000
Invited lecture “Recent developments in magneto-electronic microstructures”.
- US Army Research Lab, Nov. 29, 2000, Maryland
Seminar “Magnetic tunneling junctions for magnetic field sensors”.
- American Physical Society March Meeting, 12-16, 2001, Seattle, Washington
Invited talk “[Extraordinary Hall effect and anomalous resistivity in half-metal CrO₂](#)”.
- Brown University, Faculty Forum “Voyages of discovery” Inauguration of President Ruth J, Simmons, Oct. 13, 2001
Invited talk “A big world of small things: nano science and technology”.
- Dept. of Physics, University of Massachusetts Amherst, Massachusetts, March 2002
Seminar “Magnetoelectronics: physics, materials, and applications”.
- 19th Symposium of the New England Society for Microscopy, May 10, 2002, Woods Hole, MA
Invited talk “Scanning magnetic microscopy”.
- JHU MRSEC Workshop on Current Topics in Magnetoelectronics, Sept. 3, 2003, Baltimore, MD
Invited talk “Low noise magnetic tunneling junctions”.
- Dept. of Physics, Florida State University, Nov. 17, 2003, Tallahassee, FL
Seminar “Magnetic tunneling and spintronics metrology”.
- American Physical Society March Meeting, 22-26, 2004, Montreal, Quebec, Canada
Invited talk “[Extraordinary Hall effect and anomalous resistivity in half-metal CrO₂](#)”.
- MINT (Center for Materials for Information Technology) Workshop, Nov. 4, 2004, University of Alabama, Tuscaloosa, AL
Invited talk “Low noise and highly sensitive magnetic tunneling junction sensors”.
- Materials Research Society Fall Meeting, Dec. 1, 2005, Boston, MA
Invited talk “[Low noise and highly sensitive magnetic tunneling junction sensors](#)”
- Dept. of Physics, Boston College, Oct. 4, 2006
Colloquium “Coherent magnetic tunneling and spintronics”,
- Joint MMM/Intermag Conference, Jan. 10, 2007, Baltimore, Md
Invited talk “High temperature properties of MgO based magnetic tunneling junctions”
- Seagate Corporation, March 15, 2007, Minneapolis, MN
Invited talk “MgO-based Coherent Magnetic Tunneling Junctions as Magnetic Sensors”
- IBM T.J. Watson Research Center, Dec. 17, 2008, Yorktown Heights, NY
Seminar “spintronics and applications using half metals and MgO-based magnetic tunnel junctions”

h. Papers read

i. Work in review

j. Work in progress

- Quantum mechanical tunneling in micro-structured magnetic tunneling junctions
- Spintronic immunoassay
- Ultrafast magnetization dynamics in magnetic systems
- Magnetic random access memories (MRAM) based on magnetic tunneling effect
- Novel magnetic sensors and devices, micromagnetics
- Magnetic properties and magnetotransport in magnetic superlattices and alloys

k. Patents:

- 1) U.S. Patent 4,973,525, Nov. 27, 1990, "Metal-insulator composites having improved properties and method for their preparation", C.L. Chien, **Gang Xiao**, and S. H. Liou.
- 2) U.S. Patent 5,792,569, Aug. 11, 1998, "Magnetic devices and sensors based on perovskite manganese oxide materials", J. Z. Sun, A. Gupta, **Gang Xiao**, P. L. Trouilloud, and P. P. Lecoeur.
- 3) U.S. Patent 6,452,240, Sept. 17, 2002 "Increased damping of magnetization in magnetic materials". S. Ingvarsson, R. Koch, S.S. Parkin, and **Gang Xiao**.
- 4) U.S. Patent 6,657,431, Dec. 2, 2003 "Scanning Magnetic Microscope Having Improved Magnetic Sensor", **Gang Xiao**.
- 5) U.S. Patent 6,756,237, June 29, 2004 "Reduction of noise, and optimization of magnetic field sensitivity and electrical properties in magnetic tunnel junction devices", **Gang Xiao** and Xiaoyong Liu.
- 6) U.S. Patent 6,930,479, Aug. 16, 2005 "High resolution scanning magnetic microscope operable at high temperature", **Gang Xiao** and Benaiah D. Schrag.
- 7) U.S. Patent 7,145,330, Dec. 5, 2006 "Scanning magnetic microscope having improved magnetic sensor", **Gang Xiao**.
- 8) U.S. Patent **7,192,491**, March 20, 2007 "Increased damping of magnetization in magnetic materials" S. Ingvarsson, R. Koch, S.S. Parkin, and **Gang Xiao**

6. RESEARCH GRANTS

a. Current Grants

NSF, Physics of Nanoscale Epitaxial and Textured Spintronic Structures, 9/1/09-8/31/12, Amount \$ 375,000 (3 years)

NSF, Materials Research Science/Engineering Center (subcontract from Johns Hopkins), 2006-2011, \$450,000

b. Completed Grants:

NSF, Magnetic/electronic Nanostructures and Spintronics, 9/1/06-8/31/09, \$498,685

c. Proposal Submitted

None

PAST RESEARCH GRANTS

NSF, Magnetic/electronic Nanostructures and Spintronics, 9/1/06-8/31/09, \$498,685

NSF, Nanoscale magnetism and spintronics, 2003-2006, PI, Amount \$300,000 (3 yrs)

DARPA Subcontract via JHU: Biomagnetic sensing, 2002-05, co-PI, \$275,000

NSF, Magnetism at ultrahigh speed, 2000-2005, co-PI, \$ 350,000 (5 yrs)

NSF, Magnetism at ultrahigh speed, 2000-2005, co-PI, \$ 350,000 (5 yrs)

NSF, Dynamics of ultrafast magnetization in heterostructures, 2000-2003, co-PI, Amount \$240,000 (3 yrs)

NSF, Physics of magnetoelectronics, 1997-2000, PI, \$270,000

Subcontract to IBM MRAM Consortium, Amount: \$38,515 (1yr) (2000)

NSF/JHU Subcontract: 1999, Amount \$21,0000 (7 mo.)

IBM Partnership Award: 1999, Amount: \$40,000 (1 yr.)

IBM Partnership Award: 1998, Amount: \$40,000 (1 yr.)
 NSF Award Number: INT-9801862, 1998, Amount: \$32,875 (1 yr.)
 NSF Award Number: DMR-9701579, 1997-2000, Amount: \$228,000 (3 yr.)
 IBM Partnership Award: 1997, Amount: \$40,000 (1 yr.)
 Airforce Research Award: 1997, Amount: \$25,000 (1yr.)
 Subcontract to IBM MRAM Consortium, Amount: \$116,836 (3 yr.)
 IBM Research Grant: 1996, Amount: \$29,163
 NSF Award Number: DMR-9503701, 1995-1996, Amount: \$ 92,900
 NSF Award Number: DMR-9414160, 1995-1998, Amount: \$260,000 (4 yr.)
 Matching Fund for NYI Award from Industries (IBM, Varian, etc.), 1993-1997,
 Amount: \$225,000 (cash value including equipment donation).
 NSF Award Number: DMR-9024402, 1991-1994, Amount: \$205,000 (3 yr.)
 NSF Award Number: DMR-9258306, 1992-1997, Amount: \$317,500 (5 yr.)
 NSF Award Number: DMR-9121747, 1992-1995, Amount: \$155,000 (3 yr.)
 NSF Award Number: DMR-9022033, 1990-1991, Amount: \$70,000 (1 yr.)
 Sloan Award Number: BR-2942, 1991-1994, Amount: \$25,000 (3 yr.)
 NSF Award Number: DMR-9503701, 1995-96, Amount: \$80,000 (1 yr.)

6. Services:

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| (I) | To the University |
| 2009 | University Resources Committee (URC)
Director, Center for Nanoscience & Soft Matter of Brown University
President Simmons' Science Advisory Council
Committee for graduate admission
Affirmative Action Officer of Physics Department |
| 2008 | University Resources Committee (URC)
Director, Center for Nanoscience & Soft Matter of Brown University
Committee for graduate curriculum
Affirmative Action Officer of Physics Department |
| 2007 | Chairman of Lab Instruction Committee
Promotion committee for Sean Ling
Faculty search committee for astrophysics
Faculty search committee for biophysics
Committee for graduate curriculum
Affirmative Action Officer of Physics Department |
| 2006 | Tenure committee for Meenakshi Narain
Promotion committee for Sean Ling
Search committee for Derek Stein
Search committee for Marcus Spradlin and Anastasia Volovich
Committee for graduate curriculum
University committee for intellectual properties
Affirmative Action Officer of Physics Department |
| 2005 | Chairman of graduate curriculum committee
2 Search Committees
2 Promotion Committees
Affirmative Action Officer of Physics Department |
| 2003 | Chairman of the department computing committee
Committee on graduate admission |
| 2002 | Chairman of the department computing committee
Graduate Council of Brown University
Committee on graduate admission
Joint Engineering/Physics machine shop committee
Search committee for two faculties in condensed matter physics |
| 2001 | Chairman of the department computing committee
Graduate Council of Brown University |

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| | Committee on undergraduate Curriculum |
| | Committee on graduate admission |
| | Joint Engineering/Physics machine shop committee |
| | Search committee for two faculties in condensed matter physics |
| | Chairman of the letter writing committee for an associate professor |
| | Letter writing committee for an assistant professor |
| 2000-2001 | Chairman of the Search Committee for faculty in condensed matter physics |
| | Chairman of the department computing committee |
| | Committee of the Joint Engineering/Physics machine shop |
| 1999-2000 | Graduate Student Adviser and Representative |
| | Qualifying and Preliminary exams committee |
| 1998-1999 | Graduate Student Adviser and Representative |
| 1997-1998 | Qualifying and Preliminary exams committee (Chair) |
| | Committee on graduate curriculum |
| | Committee on graduate student admission |
| | Committee of new faculty search |
| 1996-97 | Qualifying and preliminary exams committee |
| | Colloquium and seminar committee |
| | Brown Materials Research Council |
| | Co-director of the Brown Microelectronics Facility |
| 1994-95 | Chairman of graduate admission committee |
| | Colloquium and seminar committee |
| | Freshman/sophomore counseling |
| | Co-director of the Brown Microelectronics Facility |
| 1994-95 | Freshman/sophomore Counseling |
| | Colloquium and seminar committee |
| | Co-director of the Brown Microelectronics Facility |
| 1993-94 | Committee on Graduate Student Admission |
| 1992-93 | Committee on Graduate Student Admission |
| | Qualifying and preliminary exams committee |
| | Committee of Physics/Engineering Machine Shop |
| | New faculty search committee |
| 1991-92 | Committee on Graduate Student Admission |
| | Freshman/sophomore Counseling |
| | Qualifying and preliminary exams committee |
| | Colloquium and seminar committee |
| | New faculty search committee |
- (II) To the profession
- Member of Scientific Program Committee of International Conf. on Magnetism and Magnetic Materials (2005)
 - Member of Scientific Program Committee, International Workshop on Superconductivity, Magneto-resistive Materials, and Strongly Correlated Quantum Systems", Hanoi, Vietnam, Jan. 4-10, 1999.
 - Cochair of a session in the Conference on Magnetism and Magnetic Materials (1997)
 - Member of the Program Committee of the 40th (1995) Conference on Magnetism and Magnetic Materials.
 - Editorial Board Member of "Chinese Physics" (1990-1994)
 - (Published by American Institute of Physics)
- (III) To the community
- NSF Review Panel on Materials Research Science and Engineering Centers (2008)
 - Reviewed proposals and scientific papers both domestically and internationally (2008)
 - American Physical Society March Meeting organization (2003)
 - NSF Review Panel on NIRT (nanotechnology initiative) (2/2001)

Lecture on scientific discoveries at Primrose Hill Elementary School (Spring 2001)
 Reviewed many proposals and scientific papers (2001)
 Reviewed Ph.D Physics Thesis for University of Singapore (2001)
 Reviewed many proposals and scientific papers (2000)
 Reviewed papers for scientific journals (1999)
 Reviewed many proposals for federal agencies (1999)
 Reviewed papers for scientific journals (1998)
 Reviewed NSF proposals and papers for scientific journals (1997)
 Review of promotion to the rank of Professor for outside institution (1997)
 Member, board of directors of the Nanjing University Alumni and Friends
 Foundation: a not-for-profit charitable organization (1996)
 Reviewed research proposals for The City University of New York (1992, 1994)
 Reviewed two SBIR proposals for NSF (1993, 1995)
 Reviewed twelve individual proposals for NSF (1990-1996)
 Talks on superconductivity and magnetic materials to Brown Undergraduate Physics
 Club.

7. Academic honors, research grants, fellowships, honorary societies

2010	Inducted Member, Johns Hopkins Society of Scholars
2006	Fellow, American Physical Society
1999	IBM Partnership Award (National wide competition)
1998	IBM Partnership Award
1997	IBM Partnership Award
1998	IBM Invention Achievement Award
1994	Outstanding Young Researcher Award of the Overseas Chinese Physics Association.
1992	National Science Foundation Young Investigator Award (1992-1997).
1990	Alfred P. Sloan Research Fellow.
1989	Sigma Xi, The Johns Hopkins University.
1988	Ph.D. granted with distinction, The Johns Hopkins University.
1988	Phi Beta Kappa, The Johns Hopkins University.
1986	Graduate Student Award, Materials Research Society.
1981	CUSPEA fellow (Dr. T. D. Lee's program).