Zheng Gai

R&D Staff
Center for Nanophase Materials Sciences
Material Sciences and Technology Division
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Education

Peking University, Beijing, China	Surface Science	Ph.D.	1995
Peking University, Beijing, China	Condensed Matter Physics	B.S.	1989

Professional Experience

2005/8 - Present	R&D Staff Scientist, Center for Nanophase Materials Sciences and Material Science and Technology Divisions, Oak Ridge National Laboratory
2000/5 – 2005/8	Professor, Physics Department, Peking University, Beijing, P. R. China
2004/5 – 2005/8	Visiting Professor, Max Planck Institute of Microstructure Physics, Halle, Germany
2000/12 – 2003/12	Visiting Scientist, Low-Dimensional Materials by Design Group, Condensed Matter Sciences Division, Oak Ridge National Laboratory, USA
1997/8 – 2000/12	Associate Professor, Physics Department, Peking University, Beijing, P. R. China.
1998/7 – 1999/9	Visiting Scientist, Institute for Materials Research, Tohoku University, Japan.
1997/3 – 1997/5	Visiting Scientist, Department of Material Science, State University of New York, Stony Brook, USA.
1995/7 – 1997/7	Postdoctoral Fellow, Physics Department, Peking University, Beijing, P. R. China.

Professional and Synergistic Activities

2008–present	Chair-Elect, Treasurer and Executive Committee, Magnetic Interface and Nanostructure Division, American Vacuum Society
2010-present	Member and Review Panel of Center for Functional Nanomaterials at Brookhaven National Laboratory.
2001–present	Member: Materials Research Society, American Vacuum Society, and American Physical Society

Significant Awards and Honors

- Outstanding Doctoral Thesis Award, Education Ministry, P. R. China, 1999
- Award for Progress in Science and Technology (2nd grade), Education Ministry, P. R. China, 1998
- Hu Gangfu Physics Award, Chinese Association of Physics, 1997

- Award for Progress in Science and Technology (1st grade), Education Ministry, P. R. China, 1996
- Outstanding Doctoral Thesis Award, Chinese Vacuum Society, 1995

Publications (Over 69 peer-reviewed papers)

Research Synopsis

1. *Ferromagnetic films with broken inversion symmetry: discovery of emergent phenomena and new forms of order.* We grow ferromagnetic films with broken inversion symmetry using MBE, study the novel helical magnetic structure using SEMPA, SPM and MPMS.

2. *Complex Oxides films: correlation between local and global electronic structures.* We grow complex oxides films using PLD, and study the temperature dependence of the local electronic structure using in-situ STM, the results are compared with global magnetic and transport properties to understand the underneath physics.

3. *Property tuning of complex oxides films.* We tune the metal-insulator transitions of complex oxides films using surface exchange coupling with magnetic nanodots, lateral confinements, substrate induced strains, and oxygen overlayer.

4. *Nanomagnetism:* We study the magnetic exchange coupling of nanomaterials (0D dots, 1D wires, 2D films, and quasi 3D dots superlattices) using SEMPA, SMOKE, SPM and MPMS.

5. *Organic molecules on surfaces:* We study the adsorption of organic molecules on metal surfaces using SPM to understand the structure and electronic properties of the assemblies.

6. *Self-assembly of nanomaterials:* We develop novel methods to in-situ grow nanodots arrays with uniform size, composition, orientation and order.

Thesis Advisor and Postgraduate-Scholar Sponsor:

Past Ph.D. Students

X. W. Tu (Peking University), Lu Chi (Peking University), Lei Zhang (Peking University), Kenji Fuchigami (University of Tennessee) (with Jian Shen), Min Gao (Institute of Physics, Chinese Academy of Sciences)

Current Ph.D. Students

Jieyu Yi (University of Tennessee, with David Mandrus)

Postdoctoral Associates

Lan Gao, Deyong Wang, Lifeng Yin