

## RESUME

Ming-Hui Lu

### 1. PERSONAL INFORMATION

1.1. **Name:** Minghui Lu, **Sex:** Male, **Birth Date:** Oct. 13<sup>th</sup>, 1979.

**Country:** LongYan (Ciry ) Fujian (Province)

**Home Address:** No. 404, Building 4, ErHaoXinCun, Ertiao Lane, Beijing West Road, Nanjing, JiangSu, China,

**Zipcode:** 210093

1.2. Mailing Address:

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1.3. Degree

Ph.D., Nanjing University, Nanjing, China, 2007,

Dissertation title: Novel physical Effects of Sonic Crystals,

Dissertation advisor: Yan-feng Chen,

Major. Materials Physics.

B.S., Nanjing University, Nanjing, China, 2002, Major Field: Materials Physics

1.4. Position

2007.9-2009.12: Assistant Professor at Nanjing University

2009.12-present: Associate Professor at Nanjing University

### 2. TEACHING

#### 2.1 Courses Taught

- **Materials physics** taught in the Spring semester of 2007, 2008, 2009
- **Materials laboratory.** Designed in the Fall semester of 2007 and taught in the Fall semester of 2007, 2008, 2009

### 3. RESEARCH INTERESTS:

My past and current research is mainly focusing on fundamental study of photonic and acoustic artificial structures and metamaterials as well as their related applications. I have been working on a series of interesting projects and therefore mastered useful skills covering from simulation, fabrication to characterization.

- **Projects:** Acoustic Sonic Crystals, Acoustic Metamaterials, Acoustic Superlattice, Photonic Crystals, Plasmonics and Metamaterials, Opto-Mechanics, DMS(Diluted Magnetism Semiconductors), Multi-ferroelectrics

- **Calculations and Simulations Tools:** COMSOL (FEM), RSoft, FDTDsolution (FDTD). RCWA, Plane Wave Expansions. MSM(Multiple scattering Methods), The first principle calculations for electronic materials, such as LDA, GGA methods by using VASP, CASTEP soft package;
- **Fabrication:** Ebeam Lithography, Focused Ion Beam, Photo-Lithography, Nanoimprint, Scanning Electron Microscopy, RIE/ICP Dry etching, Oxygen Plasma Ashing, Ebeam Evaporation, RF Magnetic-Sputtering, Pulsed Laser Deposition(PLD), Wafer Polishing and Lapping, Atomic Force Microscopy
- **Characterization:** Far-field time-resolved heterodyne vibration measurement by optical interference, Far-field detection of transmission and reflection spectra of optical waves, Far-field mapping of acoustic pressure information in k space, Acoustic detection of transmission spectrum and field distribution.

## 4. PUBLICATION

### 4.1. Publication

### Major Publications

- [1] Negative bi-refraction of acoustic waves in a sonic crystal  
Ming-Hui Lu, Chao Zhang, Liang Feng, Jun Zhao, Yan-Feng Chen, Yi-Wei Mao, Jian Zi, Yong-Yuan Zhu, Shi-Ning Zhu, Nai-Ben Ming  
*Nature Mater.* **6**, (2007)744-748 (doi:10.1038/nmat1987)
- [2] Extraordinary acoustic transmission through acoustic gratings with very narrow apertures  
Ming-Hui Lu, Xiao-Kang Liu, Liang Feng, Jian Li, Cheng-Ping Huang, Yan-Feng Chen,\* Yong-Yuan Zhu, Shi-Ning Zhu and Nai-Ben Ming  
*Phys. Rev. Lett.* **99**, (2007) 174301
- [3] Acoustic Surface Evanescent Wave and its Dominant Contribution to Extraordinary Acoustic Transmission and Collimation of Sound  
Yu Zhou, Ming-Hui Lu\*, Liang Feng, Xu Ni, Yan-Feng Chen, Yong-Yuan Zhu, Shi-Ning Zhu, and Nai-Ben Ming  
*Phys. Rev. Lett.* **104**, (2010) 164301
- [4] Phononic crystals and acoustic metamaterials  
Ming-Hui Lu, Liang Feng, Yan-Feng Chen  
*Mater. Today*, **12**, issue 12 (2009), 34-42
- [5] Acoustic backward-wave negative refractions in the second band of a sonic crystal  
Liang Feng, Xiao-Ping Liu, Ming-Hui Lu, Yan-Bin Chen, Yan-Feng Chen, Yi-Wei Mao, Jian Zi, Yong-Yuan Zhu, Shi-Ning Zhu, and Nai-Ben Ming  
*Phys. Rev. Lett.* **96**, (2006)014301
- [6] Tunable one-way cross-waveguide splitter based on gyromagnetic photonic crystal  
Cheng He, Xiao-Lin Chen, Ming-Hui Lu, Xue-Feng Li, Wei-Wei Wan, Xiao-Shi Qian, Ruo-Cheng Yin, and Yan-Feng Chen  
*Appl. Phys. Lett.* **96**, (2010)111111
- [7] Structure, optical and magnetic properties of sputtered manganese and nitrogen-codoped ZnO films  
Zheng-Bin Gu, Ming-Hui Lu, Jing Wang, Di Wu, Shan-Tao Zhang, Xiang-Kang Meng, Yong-Yuan Zhu, Shi-Ning Zhu, and Yan-Feng Chen\*, Xiao-Qing Pan  
*Appl. Phys. Lett.* **88**, (2006)082111
- [8] Larger polarization and weak ferromagnetism in quenched BiFeO<sub>3</sub> ceramics with a distorted rhombohedra crystal structure  
Shan-Tao Zhang, Ming-Hui Lu, Di Wu, Yan-Feng Chen, and Nai. Ben Ming  
*Appl. Phys. Lett.* **87**, (2005) 262907
- [9] Tunable negative refraction based on the Pockels effect in two-dimensional photonic crystals composed of electro-optic crystals  
Jian Li, Ming-Hui Lu, Liang Feng, Xiao-Ping Liu, and Yan-Feng Chen\*

- J. Appl. Phys.** **101**, (2007)013516
- [10] All angle negative-refraction imaging effect with complex two-dimensional hexagonal photonic crystals  
Jian Li, Ming-Hui Lu, Tian Fan, Xiao-Kang Liu, Liang Feng, Yue-Feng Tang, and Yan-Feng Chen\*  
**J. Appl. Phys.** **102**, (2007) 073538
- [11] Phase compensating effect in left-handed materials  
Liang Feng, Xiao-Ping Liu Ming-Hui Lu and Yan-Feng Chen\*  
**Phys. Lett. A** **332**, (2004)449-455
- [12] Megneto-electric coupling in piezoelectric-piezomagnetic superlattices  
Jun Zhao, Tian Fan, Ming-Hui Lu, Ruo-Cheng Yin, Chao-Ling Du, Yan-Feng Chen\*, Yong-Yuan Zhu, Shi-Ning Zhu, Nai-Ben Ming  
**Phys. Lett. A** **372**, (2008)486-492
- [13] Plasmonic photonic crystal with a complete band gap for surface plasmon polariton waves  
Liang Feng, Ming-Hui Lu, Lomakin Vitaliy, Yeshaiahu Fainman  
**Appl. Phys. Lett.** **93** (2008). 2331105
- [14] Giant magnetoresistance in transition-metal-doped ZnO films  
Jing Wang, Zheng-Bin Gu, Ming-Hui Lu, Di Wu, Chang-Sheng Yuan, Shan-Tao Zhang, Yan-Feng Chen\*, Shi-Ning Zhu, and Yong-Yuan Zhu  
**Appl. Phys. Lett.** **88**, (2006)252110

## Publication lists

- [1] Phase compensating effect in left-handed materials  
Liang Feng, Xiao-Ping Liu Ming-Hui Lu, Yan-Feng Chen  
**Phys. Lett. A** **332**, (2004)449-455
- [2] Magnetic and transport properties of (Mn,Co)-codoped ZnO films prepared by radio-frequency magnetron co sputtering  
Zheng-Bin Gu, Chang-Sheng Yuan, Ming-Hui Lu, Jing Wang, Di, Wu, Shan-Tao Zhang, Shi-Ning Zhu, Yong-Yuan Zhu, and Yan-Feng Chen  
**J. Appl. Phys.** **98**, (2005)053908
- [3] Large polarization and weak ferromagnetism in quenched BiFeO<sub>3</sub> ceramics with a distorted rhombohedra crystal structure  
Shan-Tao Zhang, Ming-Hui Lu, Di Wu, Yan-Feng Chen, and Nai-Ben Ming  
**Appl. Phys. Lett.** **87**, (2005) 262907
- [4] Composition-dependent structures and properties of Bi<sub>4</sub>Ti<sub>3</sub>-xZr<sub>x</sub>O<sub>12</sub> ceramics  
Cao-Ling Du, Shan-Tao Zhang, Guang-Xu Cheng, Ming-Hui Lu, Zheng-Bin Gu, Jing Wang, Yan-Feng Chen  
**Phys. B, Condens. Matter.** **368**, (2005)157
- [5] Acoustic backward-wave negative refractions in the second band of a sonic crystal  
Liang Feng, Xiao-Ping Liu, Ming-Hui Lu, Yan-Bin Chen, Yan-Feng Chen, Yi-Wei Mao, Jian Zi, Yong-Yuan Zhu, Shi-Ning Zhu, and Nai-Ben Ming  
**Phys. Rev. Lett.** **96**, (2006)014301
- [6] Refraction control of acoustic waves in a square-rod-constructed tunable sonic crystal  
Liang Feng, Xiao-Ping Liu, Ming-Hui Lu, Yan-Bin Chen, Yan-Feng Chen, Yi-Wei Mao, Jian Zi, Yong-Yuan Zhu, Shi-Ning Zhu, and Nai-Ben Ming  
**Phys. Rev. B** **73**, (2006) 193101
- [7] Composition-dependent structures and properties of (1-x)BaTiO<sub>3</sub>-xNaNbO<sub>3</sub>  
Shan-Tao Zhang, Ming-Hui Lu, Yan-Feng Chen, Zhi-Guo Liu, and Nai-Ben Ming, Jia Wang, Guang-Xu Cheng  
**Appl. Phys. Lett.** **88**, (2006)092901
- [8] Giant magnetoresistance in transition-metal-doped ZnO films  
Jing Wang, Zheng-Bin Gu, Ming-Hui Lu, Di Wu, Chang-Sheng Yuan, Shan-Tao Zhang, Yan-Feng Chen, Shi-Ning Zhu, and Yong-Yuan Zhu  
**Appl. Phys. Lett.** **88**, (2006)252110
- [9] Substitution-induced phase transition and enhanced multiferroic properties of Bi<sub>1-x</sub>La<sub>x</sub>FeO<sub>3</sub> ceramics

- Shan-Tao Zhang, Yi Zhang, Ming-Hui Lu, Chao-Ling Du, Yan-Feng Chen, Zhi-Guo Liu, Yong-Yuan Zhu and Nai-Ben Ming, Xiao-Qing Pan  
***Appl. Phys. Lett.* 88**, (2006) 162901
- [10] Structure, optical and magnetic properties of sputtered manganese and nitrogen-codoped ZnO films  
Zheng-Bin Gu, Ming-Hui Lu, Jing Wang, Di Wu, Shan-Tao Zhang, Xiang-Kang Meng, Yong-Yuan Zhu, Shi-Ning Zhu, and Yan-Feng Chen, Xiao-Qing Pan  
***Appl. Phys. Lett.* 88**, (2006)082111
- [11] Raman study of anharmonic phonons in SrBi<sub>4</sub>Ti<sub>4</sub>O<sub>15</sub>  
Chao-Lin Du, Shan-Tao Zhang, Zheng-Bin Gu, Guang-Xu Cheng, Jia Wang, Ming-Hui Lu, Jun Zhao, and Yan-Feng Chen  
***J. Appl. Phys.* 99**, (2006) 094101
- [12] Raman spectroscopy of (Mn, CO)-codoped ZnO films  
Chao-Lin Du, Zheng-Bin Gu, Ming-Hui Lu, Guang-Xu Cheng, Jia Wang, Jun Zhao, and Yan-Feng Chen  
***J. Appl. Phys.* 99**, (2006) 123515
- [13] Preparation, structures, and multiferroic properties of single phase Bi<sub>1-x</sub>La<sub>x</sub>FeO<sub>3</sub>, x=0–0.40 ceramics  
Shan-Tao Zhang, Ling-Hua Pang, Yi Zhang, Ming-Hui Lu, Yan-Feng Chen  
***J. Appl. Phys.* 100**, (2006) 114108
- [14] Optical properties of (Mn,Co) co-doped ZnO films prepared by dual-radio frequency magnetron sputtering  
Zheng-Bin Gu, Ming-Hui Lu, Jing Wang, Chao-Ling Du, Chang-Sheng Yuan, Di Wu, Shan-Tao Zhang, Yong-Yuan Zhu, Shi-Ning Zhu, and Yan-Feng Chen  
***Thin Solid Films*,515**, (2006)2391-2365
- [15] Structures and dielectric properties of Bi<sub>1.5</sub>Zn<sub>1.0</sub>Nb<sub>1.5-x</sub>Ti<sub>x</sub>O<sub>7</sub>(x=0,0.05, and 0.10) thin films  
Shan-Tao Zhang, Yi Zhang, Ming-Hui Lu, Yan-Feng Chen, and Zhi-Guo Liu  
***Appl. Phys. Lett.* 90**, (2007)042903
- [16] Tunable negative refraction based on the Pockels effect in two-dimensional photonic crystals composed of electro-optic crystals  
Jian Li, Ming-Hui Lu, Liang Feng, Xiao-Ping Liu, and Yan-Feng Chen  
***J. Appl. Phys.* 101**, (2007)013516
- [17] All angle negative-refraction imaging effect with complex two-dimensional hexagonal photonic crystals  
Jian Li, Ming-Hui Lu, Tian Fan, Xiao-Kang Liu, Liang Feng, Yue-Feng Tang, and Yan-Feng Chen  
***J. Appl. Phys.* 102**, (2007) 073538
- [18] Negative bi-refraction of acoustic waves in a sonic crystal  
Ming-Hui Lu, Chao Zhang, Liang Feng, Jun Zhao, Yan-Feng Chen, Yi-Wei Mao, Jian Zi, Yong-Yuan Zhu, Shi-Ning Zhu, Nai-Ben Ming  
***Nature Mater.* 6**, (2007)744-748 (doi:10.1038/nmat1987)
- [19] Extraordinary acoustic transmission through acoustic gratings with very narrow apertures  
Ming-Hui Lu, Xiao-Kang Liu, Liang Feng, Jian Li, Cheng-Ping Huang, Yan-Feng Chen,\* Yong-Yuan Zhu, Shi-Ning Zhu and Nai-Ben Ming  
***Phys. Rev. Lett.* 99**, (2007) 174301
- [20] Experimental observation of both negative and positive phase velocities in a two-dimensional sonic crystal  
Ming-Hui Lu, Liang Feng, Xiao-Ping Liu, Yan-Feng Chen, Yong-Yuan Zhu, Yi-Wei Mao and Jian Zi  
***Phys. Lett. A* 366**, (2007)523-527
- [21] Magneto-electric coupling in piezoelectric-piezomagnetic superlattices  
Jun Zhao, Tian Fan, Ming-Hui Lu, Ruo-Cheng Yin, Chao-Ling Du, Yan-Feng Chen, Yong-Yuan Zhu, Shi-Ning Zhu, Nai-Ben Ming  
***Phys. Lett. A* 372**, (2008)486-492

- [22] Coupled phonon polaritons in a piezoelectric-piezomagnetic superlattice  
Jun Zhao, Ruo-Cheng Yin, Tian Fan, [Ming-Hui Lu](#), Yan-Feng Chen,\* Yong-Yuan Zhu, Shi-Ning Zhu, and Nai-Ben Ming  
**Phys. Rev. B** **77**, (2008)075126
- [23] Microstructures and multiferroic properties of textured Bi<sub>0.8</sub>La<sub>0.2</sub>FeO<sub>3</sub> thin films  
Yi Zhang, Ling-Hua Pang, [Ming-Hui Lu](#), Zheng-Bin Gu, Shan-Tao Zhang, Chang-Sheng Yuan, and Yan-Feng Chen  
**Appl. Surf. Sci.** **254**, (2008)6762-6765
- [24] Ferromagnetism in Mn and Sb co-doped ZnO films  
Gen hua Ji, Zheng-Bin Gu, [Ming-Hui Lu](#), Di Wu, Shan-Tao Zhang, Yong-Yuan Zhu, Shi-Ning Zhu, Yan-Feng Chen  
**J. Phys. Con. Matt.** **20** (2008), 42507
- [25] Preparation and multiferroic properties of Bi<sub>0.8</sub>La<sub>0.2</sub>FeO<sub>3</sub>-CoFe<sub>2</sub>O<sub>4</sub> ceramics  
Shan-Tao Zhang, Lu-Yi Ding, [Ming-Hui Lu](#), Zhen-Lin Luo and Yan-Feng Chen  
**Solid State Comm.** **148** (2008) 420-423
- [26] Plasmonic photonic crystal with a complete band gap for surface plasmon polariton waves  
Liang Feng, [Ming-Hui Lu](#), Lomakin Vitaliy, Yeshaiahu Fainman  
**Appl. Phys. Lett.** **93** (2008). 2331105
- [27] Multiferroic properties of Bi<sub>0.8</sub>La<sub>0.2</sub>FeO<sub>3</sub>/CoFe<sub>2</sub>O<sub>4</sub> multilayer thin films  
Shan-Tao Zhang, Yi Zhang, Zhen-lin Luo, [Ming-Hui Lu](#), Zheng-Bin Gu, Yan-Feng Chen  
**Appl. Surf. Sci.** **255** (2009) 5092-5095
- [28] Phononic crystals and acoustic metamaterials  
Ming-Hui Lu, Liang Feng, Yan-Feng Chen  
**Mater. Today**, **12**, issue 12 (2009), 34-42
- [29] Acoustic Surface Evanescent Wave and its Dominant Contribution to Extraordinary Acoustic Transmission and Collimation of Sound  
Yu Zhou, [Ming-Hui Lu](#)\*, Liang Feng, Xu Ni, Yan-Feng Chen, Yong-Yuan Zhu, Shi-Ning Zhu, and Nai-Ben Ming  
**Phys. Rev. Lett.** **104**, (2010) 164301
- [30] Tunable one-way cross-waveguide splitter based on gyromagnetic photonic crystal  
Cheng He, Xiao-Lin Chen, [Ming-Hui Lu](#), Xue-Feng Li, Wei-Wei Wan, Xiao-Shi Qian, Ruo-Cheng Yin, and Yan-Feng Chen  
**Appl. Phys. Lett.** **96**, (2010)111111
- [31] Bulk acoustic wave delay line in acoustic superlattice  
Ruo-Cheng Yin, Si-Yuan Yu, Cheng He, [Ming-Hui Lu](#), Yan-Feng Chen  
**Appl. Phys. Lett** **97**, (2010) 092905
- [32] Left-handed and right-handed one-way edge modes in a gyromagnetic photonic crystal  
Cheng He, Xiao-Lin Chen, [Ming-Hui Lu](#), Xue-Feng Li, Wei-Wei Wan, Xiao-Shi Qian, Ruo-Cheng Yin, Yan-Feng Chen  
**J. Appl. Phys.** **107**, (2010) 123117
- [33] First-principles study of the IVA group atoms adsorption on grapheme  
Hai-Gen Gao, Jian Zhou, [Ming-Hui Lu](#), Wei Fa, Yan-Feng Chen  
**J. Appl. Phys.** **107**, (2010) 114311

- [34] nfluence of boundary conditions on the one-way edge modes in two-dimensional magneto-optical photonic crystals  
Cheng He, Ming-Hui Lu, Wei-Wei Wan, Xue-Feng Li, Yan-Feng Chen  
***Solid State Communications* 150**, (2010)1976-1979
- [35] Chiral properties in a two-dimensional chiral polaritonic photonic crystal  
Cheng He, Ming-Hui Lu, Ruo-Cheng Yin, Tian Fan, Yan-Feng Chen  
***J. Appl. Phys.* 108**, (2010) 073103

#### 4.2 Referred conference or proceedings

- [1] Acoustic metamaterials of sonic crystals  
Yan-Feng Chen, Ming-Hui Lu, Liang Feng, Yong-Yuan Zhu, Shi-Ning Zhu, Nai-Ben Ming  
PROCEEDINGS OF THE 2008 INTERNATIONAL WORKSHOP ON METAMATERIALS  
(2008) pp 38-38 **International Workshop on Metamaterials**, NOV 09-12, 2008 Nanjing,  
PEOPLES R CHINA
- [2] Nanoimprint-soft Lithography Combined Mold with Ultra-thin Rigid Patterning Layer on Elastic Support  
Zhi-wei Li, Hai-Xiong Ge, Wei-Wu, Qiang-Fei Xia, Chang-Sheng Yuan, Ming-Hui Lu, Yan-Feng Chen  
PROCEEDINGS OF THE 2008 INTERNATIONAL WORKSHOP ON METAMATERIALS  
(2008) pp 38-38 **International Workshop on Metamaterials**, NOV 09-12, 2008 Nanjing,  
PEOPLES R CHINA

#### 5. PATENTS

- [1] China Patent: ZL200510038777.8 (2005)  
A quenching method to prepare single phase BiFeO<sub>3</sub> ceramics  
Shan-Tao Zhang, Ming-Hui Lu, Yan-Feng Chen, and Nai-Ben Ming