

# MOHAMMAD SAGHAYEZHIAN

## PERSONAL DETAILS

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**DOB:** 15<sup>th</sup> July 1986

## EDUCATION

- 2011-present** LOUISIANA STATE UNIVERSITY, BATON ROUGE, USA
- PhD candidate, Condensed Matter Physics.
  - Supervisors: Prof. J. Zhang, Prof. W. Plummer.
- 2008-2010** ISFAHAN UNIVERSITY OF TECHNOLOGY, ISFAHAN, IRAN
- M.Sc. of Physics, Solid-state Physics.
- 2004-2008** SHAHED UNIVERSITY, TEHRAN, IRAN
- B.Sc. of Physics.
  - Ranked 3<sup>rd</sup> in class.
- 2000-2004** SHEYKHE ANSARI EDUCATIONAL CENTER, NATIONAL ORGANIZATION FOR DEVELOPMENT OF EXCEPTIONAL TALENTS, DEZFOUL, IRAN

## RESEARCH INTERESTS

- Fine control of growth in thin films in high polar directions.
- Understanding polar catastrophe at the interface of thin films with polar mismatch.
- Polar surfaces in transition metal oxides.
- Magnetic properties of Multi-valent materials and control the interactions to fine tune a desired property.
- Developing new systems to grow and characterize new functional materials.

## ACADEMIC PUBLICATIONS & PRESENTATIONS

### JOURNALS:

M. Saghayezhian, Lina Chen, Gaomin Wang, Hangwen Guo, E. W. Plummer, and Jiandi Zhang “Polar compensation at the surface of SrTiO<sub>3</sub> (111)”, Phys. Rev. B **93** 125408 (2016).  
M. Saghayezhian, S. J. Hashemifar, H. Akbarzadeh, J. Zarbakhsh, “Topological description of Mechanical behavior of copper, silver and gold”, Iranian Journal of Physics research, **11** (2012) 245.  
M.Ghasemlu, M. Saghayezhian, Y. S. Jalili, M. Ghoranneviss, “Measurement of Magnetic Field in IR-T1 Using Mesh-Grid Arrangement”, Journal of Basic Science, **12** 56, 2008.

### CONFERENCES:

Mohammad Saghayezhian, Z. Wang, H. Guo, J. Zhang, and E.W. Plummer “Avoiding polar catastrophe in materials with high polar mismatch LaNiO<sub>3</sub>/SrTiO<sub>3</sub>(111)” PEC 2016. Oral.  
Gaomin Wang, Mohammad Saghayezhian, Lina Chen, Hangwen Guo, Jiandi Zhang “Surface structural reconstruction of SrVO<sub>3</sub> thin films on SrTiO<sub>3</sub> (001)” APS March Meeting 2016, Oral.  
Mohammad Saghayezhian, Zhen Wang, Hangwen Guo, Gaomin Wang, Lina Chen, Ward Plummer, Jiandi Zhang “Single phase growth of materials with high polar mismatch at the interface” APS March Meeting 2016, Oral.  
L. Chen, Z. Wang, J. Kim, G. Wang, H. Guo, Mohammad Saghayezhian, Ward Plummer, Jiandi Zhang, Jing Tao, Yimei Zhu “Thickness-dependent structure variation and novel electronic properties of La<sub>2/3</sub>Sr<sub>1/3</sub>MnO<sub>3</sub> film on SrTiO<sub>3</sub> (001) substrate” APS March Meeting 2016, Oral.  
Hangwen Guo, Zhen Wang, Mohammad Saghayezhian, Lina Chen, Rongying Jin, Ward Plummer,

Jiandi Zhang, Shuai Dong “*Giant structural modulation & abnormal ferromagnetism in ferroelectric & ultrathin ferromagnetic digital superlattices*” APS March Meeting 2016, Oral.

Hangwen Guo, Zhenyu Diao, Wang Zhen, Mohammad Saghayezhian, Lina Chen, Rongying Jin, Ward Plummer, Jiandi Zhang, Shuai Dong “*Enhanced ferromagnetism in ferroelectric & ultrathin ferromagnetic digital superlattices*” APS March Meeting 2015, Oral.

Lina Chen, Zhen Wang, Gaomin Wang, Hangwen Guo, Mohammad Saghayezhian, EW Plummer, Jiandi Zhang, Jing Tao, Lijun Wu, Yimei Zhu “*The stoichiometry and Surface termination of  $La_{2/3}Sr_{1/3}MnO_3$  film on  $SrTiO_3$  (001) substrate*”, APS March Meeting 2015, Oral.

Zhen Wang, Hangwen Guo, Lina Chen, Mohammad Saghayezhian, EW Plummer, Jiandi Zhang, Jing Tao, Lijun Wu, Huolin Xin, Yimei Zhu “*Large Relaxation (Polar distortion) of  $SrTiO_3$  interfaced with  $La_{2/3}Sr_{1/3}MnO_3$* ”, APS March Meeting 2015, Oral.

Mohammad Saghayezhian, Lina Chen, Gaomin Wang, Hangwen Guo, Jiandi Zhang, Ward Plummer “*The surface of  $SrTiO_3$  (111): effect of annealing in vacuum and in oxygen*” APS March Meeting 2015, Oral.

14<sup>th</sup> International Congress on Plasma Physics 2008, “*Magnetic Fields In IR-TI Tokamak*”, Fukuoka, Japan, September 2008.

Research Seminar, Isfahan University of Technology, “*Linear response theory in density functional perturbation theory*”, September 2009.

" *Ab initio* study of mechanical properties of bulk and monatomic chain of gold " , Annual Physics Conference of Iran, Hamedan, Iran , September 2010.

## PROFESSIONAL SKILLS

### THEORETICAL COMPUTER MODELLING:

- Proficient user of Quantum Espresso package (PW-pseudopotential Code), WIEN2k package (LAPW-fullpotential) and WANNIER90 (based on wannier functions) [first principle calculation of mechanical, electronic, structural, transport properties of materials], CRITIC (analysis of topological charge density).
- Familiar with sax (Implementation of GW approx. in first principle calculation) and FHI-AIMS (cluster and nanoparticle calculation).
- Molecular Visualizer programs like XCrysden, GDIS and Material Studio.
- LEED I/V analysis using SATLEED.

### EXPERIMENTAL SKILLS:

- Extensive experience in UHV systems, low temperature UHV and UHV instruments such as, Low Energy Electron Diffraction (LEED), Reflection High Energy Electron Diffraction (RHEE).
- Expertise in designing, machining and building UHV systems.
- Working knowledge of Scanning Tunnelling Microscopy (STM).
- Expert in Photoemission Spectroscopy, X-ray and UV.
- Synchrotron experience in performing X-ray Absorption Spectroscopy, Electron Yield and Florescence.
- Extensive experience in thin film growth using Pulsed Laser Deposition System (PLD) and its related instruments.
- Expertise in measuring magnetic properties of materials using SQUID.

## OTHER EXPERIENCES

**Spring 2012-Spring 2013** Lab instructor of PHYS 2109 and PHYS 2108, Louisiana State University.

**01/10-06/10** Lecturer of Electricity and Magnetism Laboratory, Two class of 15 students, Spring semester 2010.

**2005-2007** **PRIVATE PHYSICS TUTOR, TEHRAN**

- Self-employed tutor of High School Physics and Mathematics.

**2006-2008** **WORK AS SCIENTIFIC JOURNALIST, FAZAYE NANO MAGAZINE, TEHRAN**

- Representative of Shahed University Nanotechnology Society in Editorial Board of Fazaye Nano Magazine.
- Translation of latest news in nanotechnology from English to Persian in Fazaye Nano Magazine.

#### OTHER SKILLS

**Languages:** Persian (native), English.

**IT Skills:** Proficient in Linux, Shell scripting (sh and csh), C++ programming (6 month), Familiar with Matlab, Sound work experience in Office package, Graphic softwares like Photoshop and etc.

#### OTHER DATA

Passionate about research, academia, learning and new challenges and love team work specially in experimental and computational projects because both have the same spirit (in my opinion). Enjoy speed, risk and sport – I play Volleyball, Ping Pong, rock climbing and sometimes football and soccer. As a teenager, I was a sponsored member of Shahid Rajaei volleyball Club. Also, I love Iranian food. Last but not least, I am not afraid to make a mistake, but I am terrified to repeat the same mistake.

#### REFERENCES

**Prof. Jiandi Zhang**  
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