

## Zhenhai Wang(updated at 12/12/2016)

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**Webpage:** <https://scholar.google.com/citations?user=Cry1PFwAAAAJ&hl>

Up to now, **39** published articles, *h*-index is *h*=**15** and citations are **700** more times.

### EDUCATION

- *Jul. 2012*, Ph.D. degree, **Condensed Matter Physics**, *Shandong University*, P. R. China.
- *Jul. 2007*, B. S. degree, **Physics**, *Shandong University*, P. R. China.

### EXPERIENCE

- *Aug. 2016- Now*, Post-Doc Research Fellow, Laboratory of Materials Computer Design, Moscow Institute of Physics and Technology, Russia.
- *Feb. 2016 - Jul. 2016*, Post-Doc Research Fellow, Center for Materials by Design, Institute for Advanced Computational Science, and Department of Geosciences, Stony Brook University, USA.
- *Dec. 2014 - Dec. 2015*, Visiting Scholar, Center for Materials by Design, Institute for Advanced Computational Science, and Department of Geosciences, Stony Brook University, USA.
- *Mar. 2013 - Nov. 2014*, Lecturer/Researcher, Peter Grünberg Research Center, College of Telecommunications and Information Engineering, Nanjing University of Posts and Telecommunications, P. R. China.
- *Sep. 2012 - Feb. 2013*, Visiting Scholar, Beijing Computational Science Research Center, P. R. China.

### RESEARCH INTEREST

The modern theory of materials based on the quantum theory of solids and powerful computational methods, make it possible not only to explain experimental findings in great details but also to make predictions about possible new structures and materials with interesting behaviors. I am very interested in material designs and predication-s, especially for low-dimensional materials. I hope to explore fascinating physics by modern methods, especially those related to practical applications.

### AFFLIATION

- Laboratory of Materials Computer Design, Moscow Institute of Physics and Technology, Dolgoprudny city, Moscow Region, 141700, Russia.
- College of Telecommunications and Information Engineering, Nanjing University of Posts and Telecommunications, Nanjing, Jiangsu 210003, China.

### PERSONAL DATA

Date of Birth: June 12th, 1985.

Place of Birth: Linqu, Shandong Province, P. R. China.

Languages: Chinese (native), English (fluent), Russian (learning).

### SKILLS

- Density functional theory (DFT) calculations. Packages such as Vasp, Siesta, FHI-aims, Quantum Espresso, Wien2k, *etc*;

- Programming tools and scripting languages such as Matlab, Fortran, C/C++, and Python *etc*;
- Certain ability of computational cluster management.

## RESEARCH PROJECTS

- *Theoretical Study of Novel Two-dimensional Dirac Allotropes in Carbon and Silicon Systems*, the National Nature Science Foundation of China. 2017-2019. Host.
- *Theoretical Study of Novel Hetero-structured Nanowires in AlGa<sub>N</sub>/Ga<sub>N</sub> High Electron Mobility Transistors*, the Nature Science Foundation of Jiangsu Province, China. 2014-2017. Host.
- *First-principles study of ZnO/GaN core-shell heterostructured Nanowires*, Graduate Independent Innovation Foundation of Shandong University, China. 2010-2011. Host.
- *Electronic Features of Low-dimensional nanomaterial structures*, the Nature Science Funds for Distinguished Young Scholar of Shandong Province, China. 2011-2013. Participate.
- *Theoretical study of hetero-structural and electronic properties of C/SiC nanotubes and nanodots*, the National Nature Science Foundation of China. 2010-2012. Participate.
- *The properties and applications of nanomaterials and nanostructures* (The 2nd Group), the National Basic Research 973 Program of China. 2005-2010. Participate.

## PRESENTATIONS

- *Oral*: Anisotropic Dirac Fermions in Novel two-dimensional Carbon and Silicon Allotropes. American Physical Society (APS) March Meeting, March 14-18, 2016, Baltimore, Maryland, USA.
- *Oral*: Metasurfaces based on Gallium Nitride High Contrast Gratings at Visible Range. American Physical Society (APS) March Meeting, March 2-6, 2015, San Antonio, Texas, USA.
- *Oral*: Natural charge spatial separation and quantum confinement of Zinc Oxide/Gallium Nitride-core/shell nanowires. Chinese Physical Society (CPS) Fall Meeting, September 16-19, 2010, Tianjin, China.
- *Oral*: First-principles study of faceted single-crystalline Silicon Carbide nanowires and nanotubes. Chinese Physical Society (CPS) Fall Meeting, September 19-21, 2008, Jinan, China.

## HONORS AND AWARDS

- National Abroad Scholarship of China Scholarship Council (CSC) 2014, China.
- Excellent PhD Student of Shandong University 2012, China.
- Excellent Graduate Student of Shandong Province 2010, China.
- The President Scholarship of Shandong University 2009, China.
- Excellent Graduate Student of Shandong University 2009, China.

- PUBLICATIONS** [39] Aizhu Wang, Zhenhai Wang, Aijun Du\*, Mingwen Zhao\*. *Band inversion and topological aspects in a TiNI monolayer*. **Physical Chemistry Chemical Physics**, 18 (2016) 22154.
- [38] Qifa Liu\*, Zhenhai Wang, Wei Wang, Shumin He. *Design of free-standing GaN strip waveguide and grating couplers*. **Optik**, 127 (2016) 7726-7731.
- [37] Shumin He, Zhenhai Wang\*, Qifa Liu. *Positive focal shift of gallium nitride high contrast grating focusing reflectors*. **Materials Research Express**, 3 (2016) 095901.
- [36] Xiaoming Zhang, Zhenhai Wang, Mingwen Zhao\*, and Feng Liu. *Tunable Topological States in Electron-Doped HfT-Pt*. **Physical Review B**, 93 (2016) 165401.
- [35] Zhenhai Wang\*, Mingwen Zhao\*, Xiang-Feng Zhou, Qiang Zhu, Xiaoming Zhang, Huafeng Dong, Artem R. Oganov\*, Shumin He and Peter Grünberg. *Prediction of Novel Stable 2D-Silicon with Fivefold Coordination*. (2016). [arXiv:1511.08848]
- [34] M. Mahdi Davari Esfahani, Zhenhai Wang, Artem R. Oganov\*, Huafeng Dong, Qiang Zhu, Shengnan Wang, Maksim S. Rakitin, and Xiang-Feng Zhou. *Superconductivity of novel tin hydrides ( $Sn_nH_m$ ) under pressure*. **Scientific Reports**, 6 (2016) 22873.
- [33] Xiang-Feng Zhou\*, Artem R. Oganov, Zhenhai Wang, Ivan A. Popov, Alexander I. Boldyrev, and Hui-Tian Wang. *Two dimensional magnetic boron*. **Physical Review B**, 93 (2016) 085406.
- [32] Zhenhai Wang, Shumin He\*, Qifa Liu and Wei Wang. *Visible light metasurfaces based on gallium nitride high contrast gratings*. **Optics Communications**, 367 (2016) 144-148.
- [31] Jin Zhang, Artem R. Oganov\*, Xinfeng Li, Kan-Hao Xue, Zhenhai Wang and Huafeng Dong. *Pressure-induced novel compounds in the Hf-O system from first-principles calculations*. **Physical Review B**, 92 (2015) 184104.
- [30] Shumin He, Zhenhai Wang\*, Qifa Liu and Wei Wang. *Study of focal shift effect in planar GaN high contrast grating lenses*. **Optics Express**, 23 (2015) 29360-29368. (shared first author)
- [29] Zhenhai Wang\*, Xiang-Feng Zhou, Xiaoming Zhang, Qiang Zhu, Huafeng Dong, Mingwen Zhao\* and Artem R. Oganov\*. *Phagraphene: a low-energy graphene allotrope composed of 5-6-7 carbon rings with distorted Dirac cones*. **Nano Letters**, 15 (2015) 6182-6186. [arXiv:1506.04824]
- [28] Zhenhai Wang, Shumin He, Qifa Liu, Wei Wang, Yongjin Wang and Hongbo Zhu. *Metasurfaces based on Gallium Nitride High Contrast Gratings at Visible Range*. **APS March Meeting**, 1 (2015) 8003.
- [27] Qifa Liu, Zheng Shi, Ganyi Zhu, Wei Wang, Zhenhai Wang and Yongjin Wang\*. *Freestanding GaN grating couplers at visible wavelengths*. **Journal of Optics**, 17 (2015) 045607.
- [26] Shumin He, Zheng Shi, Xin Li, Xumin Gao, Zhenhai Wang, Qifa Liu, Gangyi Zhu, Miao Zhang, Hongbo Zhu and Yongjin Wang\*. *Membrane guided-mode resonant color filters exhibiting adjustable spectral response*. **Optics Communications**, 342 (2015)

129-135.

[25] Zheng Shi, Xin Li, Gangyi Zhu, Zhenhai Wang, Peter Grünberg, Hongbo Zhu, Yongjin Wang\*. *Characteristics of GaN-based LED fabricated on a GaN-on-silicon platform*. **Applied Physics Express**, 7 (2014) 082102.

[24] Xiaopeng Wang, Mingwen Zhao\*, Tao He, Zhenhai Wang and Xiangdong Liu. *Cation vacancy defects induce room temperature ferromagnetism in GaN?*. **Applied Physics Letters**, 102 (2013) 062411.

[23] Aizhu Wang, Mingwen Zhao\*, Yan Xi, Xiaopeng Wang and Zhenhai Wang. *Spin-polarized zero-energy states in BN/C core-shell quantum dots*. **Physics Letters A**, 377 (2013) 1102-1108.

[22] Zhenhai Wang, Mingwen Zhao\*, Xiaopeng Wang, Yan Xi, Xiujie He, Xiangdong Liu and Shishen Yan. *Hybrid density functional study of band alignment in ZnO-GaN and ZnO-(Ga<sub>1-x</sub>Zn<sub>x</sub>)(N<sub>1-x</sub>O<sub>x</sub>)-GaN heterostructures*. **Physical Chemistry Chemical Physics**, 14 (2012) 15693-15698.

[21] Xiaopeng Wang, Mingwen Zhao\*, Zhenhai Wang, Xiujie He, Yan Xi and Shishen Yan. *Spin-polarization of VGaON center in GaN and its application in spin qubit*. **Applied Physics Letters**, 100 (2012) 192401.

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[19] Yingcai Fan, Mingwen Zhao\*, Zhenhai Wang, Xuejuan Zhang and Hongyu Zhang. *Tunable electronic structures of graphene/boron nitride heterobilayers*. **Applied Physics Letters**, 98 (2011) 083103.

[18] Hongyu Zhang, Mingwen Zhao\*, Xiujie He, Zhenhai Wang, Xuejuan Zhang and Xiangdong Liu. *High mobility and high storage capacity of lithium in sp-sp<sup>2</sup> hybridized carbon network: The case of graphyne*. **The Journal of Physical Chemistry C**, 115 (2011) 8845-8850.

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[14] Zhenhai Wang, Yingcai Fan and Mingwen Zhao\*. *Natural charge spatial separation and quantum confinement of ZnO/GaN-core/shell nanowires*. **Journal of Applied Physics**, 108 (2010) 123707.

- [13] Kun Zhao, Mingwen Zhao\*, Zhenhai Wang and Yingcai Fan. *Tight-binding model for the electronic structures of SiC and BN nanoribbons*. **Physica E: Low-dimensional Systems and Nanostructures**, 43 (2010) 440-445.
- [12] Hongyu Zhang, Mingwen Zhao\*, Tao He, Xuejuan Zhang, Zhenhai Wang, Zexiao Xi, Shishen Yan, Xiangdong Liu, Yueyuan Xia and Liangmo Mei. *Orientation-selective unzipping of carbon nanotubes*. **Physical Chemistry Chemical Physics**, 12 (2010) 13674-13680.
- [11] Hongyu Zhang, Xuejuan Zhang, Mingwen Zhao\* and Zhenhai Wang. *Atomic-scale characterization of silicon diffusion on carbon nanotubes*. **Physica E: Low-dimensional Systems and Nanostructures**, 43 (2010) 610-613.
- [10] Xiujie He, Tao He, Zhenhai Wang and Mingwen Zhao\*. *Neutral vacancy-defect-induced magnetism in SiC monolayer*. **Physica E: Low-dimensional Systems and Nanostructures**, 42 (2010) 2451-2454.
- [9] Tao He, Fengchun Pan, Zexiao Xi, Xuejuan Zhang, Hongyu Zhang, Zhenhai Wang, Mingwen Zhao\*, Shishen Yan and Yueyuan Xia. *First-principles study of titania nanoribbons: formation, energetics, and electronic properties*. **The Journal of Physical Chemistry C**, 114 (2010) 9234-9238.
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- [7] Zhenhai Wang, Mingwen Zhao\*, Tao He, Hongyu Zhang, Xuejuan Zhang, Zexiao Xi, Shishen Yan, Xiangdong Liu and Yueyuan Xia. *Orientation-dependent stability and quantum-confinement effects of Silicon Carbide nanowires*. **The Journal of Physical Chemistry C**, 113 (2009) 12731-12735.
- [6] Zhenhai Wang, Mingwen Zhao\*, Tao He, Xuejuan Zhang, Zexiao Xi, Shishen Yan, Xiangdong Liu and Yueyuan Xia. *First-principles study of faceted single-crystalline Silicon Carbide nanowires and nanotubes*. **The Journal of Physical Chemistry C**, 113 (2009) 856-861.
- [5] Tao He, Mingwen Zhao\*, Xuejuan Zhang, Hongyu Zhang, Zhenhai Wang, Zexiao Xi, Xiangdong Liu, Shishen Yan, Yueyuan Xia and Liangmo Mei. *Layered titanium oxide nanosheet and ultrathin nanotubes: a first-principles prediction*. **The Journal of Physical Chemistry C**, 113 (2009) 13610-13615.
- [4] Tao He, Hongyu Zhang, Zhenhai Wang, Xuejuan Zhang, Zexiao Xi, Xiangdong Liu, Mingwen Zhao\*, Yueyuan Xia and Liangmo Mei. *First-principles study of cobalt silicide nanosheet and nanotubes: Stability and electronic properties*. **Physica E: Low-dimensional Systems and Nanostructures**, 41 (2009) 1795-1799.
- [3] Xuejuan Zhang, Mingwen Zhao\*, Tao He, Weifeng Li, Xiaohang Lin, Zhenhai Wang, Zexiao Xi, Xiangdong Liu and Yueyuan Xia. *Theoretical models of ZnS nanoclusters and nanotubes: First-principles calculations*, **Solid State Communications**, 147 (2008) 165-168.
- [2] Xuejuan Zhang, Mingwen Zhao\*, Shishen Yan, Tao He, Weifeng Li, Xiaohang Lin, Zexiao Xi, Zhenhai Wang, Xiangdong Liu and Yueyuan Xia. *First-principles study of ZnS nanostructures: nanotubes, nanowires and nanosheets*. **Nanotechnology**, 19

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[1] Zexiao Xi, Mingwen Zhao, Ruiqin Zhang, Shishen Yan, Tao He, Weifeng Li, Xuejuan Zhang, Xiaohang Lin, Zhenhai Wang, Xiangdong Liu and Yueyuan Xia. *Theoretical models of silica nanorings: First-principles calculations*. **The Journal of Physical Chemistry C**, 112 (2008) 17071-17075.