

# YingKai Liu

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## Education

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TOEFL iBT: 99 (taken on Nov. 4<sup>th</sup>, 2018)

*2015 - present:* Boling school of Physics, Nankai University, Tianjin, China  
(Currently a junior undergraduate)  
GPA: 3.45 (Top 20%)

## Research Interest

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I am interested in the topological properties of materials and the phenomenon of integer discreteness arising from continuous symmetry. In a different perspective, I am interested in how particles subject to relatively simple laws can exhibit to collective novel properties as a whole. I am also interested degeneracy in band structures corresponding to quasi-particles.

## Research Experience

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- 2017. Dec. - present* Chern Institute of Mathematics (CIM), Nankai University  
Undergraduate research fellow (Prof. Molin Ge)  
☐ Learning Berry phase of spin-1 particle in anomalous Zeeman effect.
- 2018. July - Sept.* Yeshiva University (New York)  
Visiting undergraduate (Prof. Emil Prodan)  
☐ Studied theory and calculation techniques of 2D Topological model. Calculated the Chern number of bulk model and winding number of edge model under fluctuation.  
☐ Studied the Non-Abelian braiding of Majorana excitations.
- 2017. July - 2017. Oct.* University of Nevada, Las Vegas  
Visiting undergraduate (A. Prof. Qiang Zhu)  
☐ Built a database prototype for processing, storing and querying VASP calculation results using Python.  
☐ Built an Evolutionary Algorithm package using Python.
- 2016. Apr. -2018. Oct.* Nankai University  
Undergraduate research fellow (Prof. Xiangfeng Zhou)  
☐ Learning calculation methods of Berry phase in 2D materials  
☐ Using tight-binding model to investigate the band structure of multiple 2D materials.

## Awards and Scholarships

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MCM Successful Modeling prize (2016);  
MCM Honorable Mentioning prize (2017);  
Second scholarship of Nankai University (2016);  
Boling scholarship of Nankai University (2015, 2016, 2017);

## Courses Taken

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Theoretical Mechanics  
Quantum Mechanics  
Electrodynamics  
Thermodynamics  
Optics  
Introduction to Group theory  
Computational Physics  
Solid Physics (till June, 2019)  
Quantum Field Theory  
Advanced Quantum Mechanics (till Jan., 2019)

## Extracurricular Activities

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- ☐ Director of Academic Department, Student Union of School of Physics  
Responsible for holding college-wide and school-wide English and Physics activities and organize lectures of Physics.
- ☐ Participated in Physicists' Tournament of Nankai University and won the 4<sup>th</sup> place as group leader.