ZIEN ZHU

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EDUCATION

University of Science and Technology of China (USTC)
Bachelor of Science (Applied Physics Major) *Sept.2019-Jul.2023* (expected)
GPA: 3.66/4.3 (Overall) 3.70/4.3 (Major)
Ranking: 42/195 in Applied Physics Major
Average Score: 87.75 (Overall) 88.52 (Major)
Core Courses: Computational Physics: 92 Mechanics: 97 Electrodynamics: 99
Thermodynamics and Statistical Physics: 98 Atomic Physics: 93

AWARDS

National Inspirational Scholarship (Top 5% in USTC) *2022*
***First Prize*, The 12th China Undergraduate Physics Tournament** (National Top 5%) *2021*
The 12th China Undergraduate Physics Tournament (1^{st} in East China Division) *2021*
National Inspirational Scholarship (Top 5% in USTC) *2021*
Yang Ya Foundation Scholarship (Top 5% in USTC) *2020*
Chen Guoliang Scholarship (Top 5% in USTC) *2020*
Excellent Student Scholarship-Bronze (Top 20% in USTC) *2019*

RESEARCH INTERESTS

- *Development of New Functional Low-Dimensional Nanodevices*
- *Exploration of Exotic Properties of Quantum Materials*
- *Discovery and Design of Novel Information and Energy Materials*
- *Development of State-of-Art Computational Methods*

RESEARCH EXPERIENCES

Reproduction of the 7×7 reconstruction of Si (111) surface using machine learning interatomic potential

Advisor: ***Prof. Zhenyu Zhang*** & ***Prof. Ping Cui*****, USTC** *Jul.2022-Present*

- Generated the machine learning (ML) interatomic potential of Si by training a neural network using deepmd-kit and first-principles calculation.
- Reproduced the experimentally observed 7×7 reconstruction on Si (111) surface in molecular dynamics simulations using the ML potential with high accuracy and efficiency.

Thermochromic smart windows regulating radiative cooling and solar transmission simultaneously and dynamically

Advisor: ***Prof. Chongwen Zou*****, USTC** *Aug.2022-Present*

- Designed an intelligent window automatically adjusting the solar transmittance and infrared emissivity for energy saving by combining hydroxypropyl cellulose hydrogel and VO_2.
- Increased the phase transition rate and optical modulation amplitude of the smart window.

Mechanism of thickness-dependent color variation of 2D materials

Advisor: *Prof. Boris Yakobson*, Rice University *Jun.2022-Aug.2022*

- Calculated the color of graphene, MoS_2, WSe_2 and $CrCl_3$ multilayers based on electronic structure and transfer matrix method.
- Proposed a multi-beam interference model to explain the experimentally observed oscillation of the optical color of 2D materials as a function of thickness.

Efficient algorithm for work function calculation of diamond with electric intercalation layers

Advisor: *Prof. Boris Yakobson*, Rice University *May.2022-Oct.2022*

- Proposed a fast convergent Fourier analysis method for the spatial electrostatic potential distribution of periodic ionic crystal planes.
- Numerically calculated the spatial distribution and offsets of the electrostatic potential of boron nitride (BN) intercalation in diamonds with different crystal planes.
- Derived a theoretical formula for the work function of diamond with different BN intercalation based on the calculated offsets, in agreement with the DFT results.

SKILLS & STANDARDIZED ENGLISH TEST

Programming	C/C++, Python, Linux Shell, Mathematica, MATLAB
Computational Expertise	VASP, Deepmd-kit, DPGEN
Experiment	XRD, STM, Magnetron Sputtering
TOEFL	102 (Listening: 28, Reading: 29, Writing: 25, Speaking: 20)

EXTRA-CURRICULAR ACTIVITIES

Teaching Assistant for "Thermodynamics and Statistical Physics B" Course *Sept.2022-Jan.2023*
Leadership of the Campus Alumni Volunteer Team *Sept.2019-Sept.2022*
Community Volunteer for Epidemic Prevention and Control *Jan.2021-Mar.2021*