Yi Qiu

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RESEARCH INTERESTS

- **Cosmology**: gravitational waves, black hole physics, numerical relativity, modified gravity.
- **Astrophysics**: planetary science, new generation survey and data analysis, hydrodynamics simulation and N-body simulation.

EDUCATION

Dalian University of Technology, *Dalian, China*
Bachelor of Science in Applied Physics *Sep. 2017 – June. 2021*
Advisors: Weijie Fu, Lixin Xu

Major GPA: 3.87/4.00(from WES iGPA)
Ranking: 1/41 in junior academic year
TOEFL iBT score: 100 (R: 29 L: 24 S: 21 W: 26)
GRE score: 322 (Q: 170 V: 152 AW: 3.5)

PREVIOUS RESEARCH EXPERIENCE

Research Assistance, *School of Astronomy and Space Science of Nanjing University, China*
Finite element method numerical relativity *Oct. 2021 – present.*
Advisor: Jianhua He

- Construct the nonlinear 3+1 formalism of GR, while solving numerically the Einstein equation with the publicly available finite element method (FEM) code *deal.ii* (C++ based).
- Investigate into the wave effects of GW in time-domain through particularly the propagation of wavefronts.

Summer Internship, *Max Planck Institute for Gravitational Physics (Albert Einstein Institute), Germany*
Testing the instability of overtone models *May. 2021 – Sep. 2021*
Advisor: Xisco Jimenez Forteza, Pierre Mourier

- Analyze the instability of ringdown overtones through both the quasi-normal modes (QNMs) deviation to Kerr spectrum and alternative forms of damped-sinusoids.
- Implement a self-refinement-grid method on the fits to the numerical relativity GW waveforms (SXS catalog) to compare both the mass and spin consistency and the performance of fitting of different overtone models.

Undergraduate Thesis, *Dalian, China*
Gravitational waves in modified gravity *Feb. 2021 – May. 2021*
Advisor: Lixin Xu

- Comprehensive study of gravitational waves in scalar-vector-tensor modified gravity (MOG).
- Compare the MOG with general relativity by fitting to the numerical shears data of horizon during black hole merger.

Summer Internship, *Institute of Modern Physics, Chinese Academy of Sciences, China*
Experimental nuclear astrophysics *July. 2020 – Aug. 2020*
Advisor: Xiaodong Tang

- Calculate the cross sections of nuclear fusion in star core and compare them with results of well-defined experiments.
- Manipulate and test the TPC (Time Projection Chamber) helium-3 neutron detector.
- Analyze the data and plot the energy spectrum of several decay processes using CERN ROOT.

Chinese Undergraduate Innovation Training Program, *Dalian, China*
Application of machine learning in quantum field theory *Mar. 2019 – May. 2020*
Advisor: Weijie Fu

- As team leader of the project "Application of machine learning in Quantum field theory".
- Predict the spectral function by the integral equation of propagator with some prior-data of kernel function.
- Apply BP (Back Propagation) and GAN (Generative adversarial network) algorithms for the spectra generation.

Chinese Undergraduate Physics Tournament (CUPT), *Dalian, Shenyang, Haerbing, Qingdao. China*
The nature of 3 phenomena. *Sep. 2018 – Aug. 2019*
Advisors: Hongliang Bai

- Design experiments to study the thermal lens effect, and investigate the phenomena in regard to how different parameters determine the "lens" formation.
- Compare the experiments and numerical simulation results to study the funnel and ball problems.
- Establish analytical model of popsicle chain reaction events, look into its mechanical origin through dozens of elaborate tests.

VOLUNTEER WORKS

AIESEC Dare to Dream Project, *Dalian, China*
Program organizer, Local volunteer leader *Mar. 2018 – Aug. 2018*

- Contact and interview foreign volunteers, and arrange their trip for coming China
- Help foreign volunteers to find host families in Dalian, and contact local volunteers to accompany foreign volunteers during the project time
- Assisted foreign volunteers to adapt to the Chinese culture environment and hlep them carry out their volunteer works

AIESEC Empower Youth Project, *Jilin, China*
Local volunteer *July. 2018 – July. 2018*

- Organize foreign volunteers to hold global village activities in Yangshulin Junior High School in Jilin province
- Lead foreign volunteers to experience Chinese traditional cultures such as Guzheng and Chinese paper cutting arts

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AWARDS/ HONOURS/ SCHOLARSHIPS

Learning Excellence Award (First Prize) in academic year of 2019-2020 (Top 1/41) Sep. 2020
Second-class prize in China Undergraduate Mathematical Contest in Modeling Sep. 2019
First-class prize in Physics Experiment Competition in Dalian University of Technology Sep. 2019
National second-class prize in Chinese Undergraduate Physics Tournament (CUPT) Aug. 2019
First-class prize in Division of Northeast China of CUPT July 2019
First-class prize in Optoelectronic Design Competition at Dalian University of Technology June 2019
First-class prize in Division of Liaoning province of CUPT May 2019
Excellent Undergraduate Innovation Training Program at Dalian University of Technology Apr. 2019
Dalian University of Technology Undergraduate Physics Tournament (DUPT) (Top 1/32) Apr. 2019
Second-level Certificate for National Computer Rank Examination Mar. 2019
Second-class prize in Physics Experiment Competition in Division of Liaoning province Oct. 2018
Third-class prize in China Undergraduate Mathematical Contest in Modeling Sep. 2018

COMPUTER SKILLS

- **Applications**: LaTeX, COMSOL, IBM SPSS, Origin, Microsoft suite, Apple suite
- **High-level numerical languages**: Mathematica, Matlab, Numerical Python, C++
- **Operating Systems**: Unix/Linux, Mac, Windows