Yi Qiu

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EDUCATION

The Pennsylvania State University, *Pennsylvania, United States*
Ph.D. in Physics *2022 – present*
Advisors: David Radice

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

PUBLICATIONS

1. **Yi Qiu***, David Radice, Sherwood Richers, Maitraya Bhattacharyya, *"Neutrino Flavor Transformation in Neutron Star Mergers."* submitted to PRL, arXiv:2503.11758
2. **Yi Qiu***, Xisco Jiménez Forteza, Pierre Mourier, *"Linear vs. nonlinear modelling of black hole ringdowns."* Phys.Rev.D 109 (2024) 6, 064075, arXiv:2312.15904
3. **Yi Qiu***, Ke Wang, Jianhua He, *"Numerical simulation of gravitational waves passing through a rotating binary lens."*, arXiv:2205.01682

TALKS/SEMINARS

1. Neutrino flavor conversion in binary neutron star merger simulations
   Talk, APS Meeting 2025 at Anaheim, CA, March 18, 2024
2. Neutrino flavor transformation in binary neutron star merger simulations
   Seminar, Primordial Universe and Gravity (PUG) Seminar at Institute for Gravitation and the Cosmos, The Pennsylvania State University, PA, Feb 21, 2025
3. Binary neutron star merger simulation with neutrino flavor conversion
   Group Seminar, University of Tennessee, Knoxville, TN, Oct 29, 2024
4. Neutrino flavor conversion quantum effects in binary neutron star merger simulations
   Poster, CAMPS 2024 at University of Chicago, Chicago, IL, August 2, 2024
5. Linear vs. nonlinear modelling of black hole ringdowns
   Talk, APS April Meeting 2024 at Sacramento, CA, April 4, 2024
6. Numerical study of compact objects in a nutshell – GRMHD simulations and beyond
   Seminar, Primordial Universe and Gravity (PUG) Seminar at Institute for Gravitation and the Cosmos, The Pennsylvania State University, PA, March 15, 2024
7. Neutrino Oscillation simulation in Binary Neutron Stars and Supernovae
   Talk, N3AS Summer School at University of California, Santa Cruz, CA, July 20, 2023
8. Kinetic equations of Quantum Neutrino Oscillation
   Seminar, Primordial Universe and Gravity (PUG) Seminar at Institute for Gravitation and the Cosmos, The Pennsylvania State University, PA, May 5, 2023

PREVIOUS RESEARCH EXPERIENCE

Research Assistant, *School of Astronomy and Space Science of Nanjing University, China*
Finite element method numerical relativity *Sep. 2021 – June 2022*
Advisor: Jianhua He

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

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

- Analyze the nonlinearity of ringdown overtones through both the quasi-normal modes (QNMs) deviation to Kerr spectrum and alternative forms of damped-sinusoids.
- Implement Bayesian analysis and a second order self-refinement-grid method on the fits to the numerical relativity GW waveform data (from 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 (known as STVG or MOG).
- Compare the MOG with general relativity by fitting to the numerical shear modes data of dynamical horizon during black hole merger events. Place constraints on the scalar charge MOG predicted.

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

- Use machine learning algorithms (BP, CNN, GAN, etc.) to reconstruct the spectrum function with propagator with some prior data of kernel function.
- Compare the traditional reconstruction methods – maximum entropy method, analytic continuation and Bayesian method – to machine learning, and see if it really help to reduce errors.

AWARDS/ HONOURS/ SCHOLARSHIPS

Highest merit scholarship (Top 1/41) Sep. 2020
National second-class prize in Chinese Undergraduate Physics Tournament (CUPT) Aug. 2019
First-class prize in Division of Northeast China of CUPT July 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
National Certificate for Computer Programming using Python Mar. 2019

OUTREACHES

Physics and Astronomy for Women+ Professional Development Chair
Physics Graduate Student Association Web Master

COURSES/ SKILLS

- **Courses Taken**: General Relativity, Quantum Field Theory, Particle Physics and Standard Model, Cosmology and Gravitational Waves, Math Method, Intro to Astronomy and Astrophysics, Electrodynamics, Statistical Physics
- **High-level numerical languages**: Mathematica, Matlab, Python, C++
- **Applications**: LaTeX, COMSOL, IBM SPSS, Origin, Microsoft suite, Apple suite, Adobe suite, HTML5, CSS, Javascript, Bootstrap, HTCondor, Homebrew.