

MALIN OUYANG

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EDUCATION

Nanjing, university, Astrophysics, *undergraduate* 2022.09 - present

- **GPA**: 4.46/5.0
- **Major courses**: Classical Mechanics, Thermodynamics and Statistical Physics, General Astronomy, Galaxy Physics, Observational Astrophysics, Machine Learning, Mathematical Physics, Optics, Quantum Mechanics, Electrodynamics, Linear Algebra, Calculus, Probability Theory and Mathematical Statistics, Atomic Physics.

RESEARCH EXPERIENCE

Nanohertz gravitational waves—A New Probe of the Matter Distribution of Milky Way 2023.10 - present

Mentor: Prof.Jian-hua He

- Our main goal is to use numerical methods to calculate the influence of the MW matter distribution on nanohertz gravitational wave propagation, in this way, improving the fit to the Hellings-Downs curve and further constraining models of the MW matter distribution. The project also plans to fit observational data to determine parameters of the MW matter distribution. This project is expected to provide new theoretical insights for future gravitational wave detection and studies of MW structure, while also offering an innovative method for measuring the total mass of the MW. Additionally, this project may resolve current discrepancies between HD curve in general relativity and actual observational data.

Detection of Gravitational Waves using Deep Learning 2024.06 - 2025.01

Mentor: Research Assistant.Wang He, Prof.He Jibo

- Participated in the undergraduate innovation practice training program of the Gravitational Wave Data Analysis and Machine Learning Research Group at the International Center for Theoretical Physics - Asia-Pacific (ICTP-AP) Gravitational Wave Cosmology Tai Chi Laboratory (Beijing). We aims to utilizes machine learning methods such as CNN/ResNet to detect gravitational wave signal data emitted by binary neutron star(BNS) and binary black holes(BBH) systems.

RESEARCH INTERESTS

Gravity

- Aiming to deepen knowledge in General Relativity, exploring frontier theories.

Cosmology

- Interested in analyzing current cosmological models using survey data, developing new methods to measure the average curvature of the universe and the distribution of galaxies and dark matter on large scales, and offering theoretical corrections to issues like the Hubble constant crisis through early universe measurements.

Gravitational Wave Physics

- Eager to study the stochastic gravitational wave background, the propagation of gravitational waves to validate their properties, and use gravitational waves to probe compact objects and cosmological phenomena. Also interested in gravitational wave data analysis and detection techniques.

HONORS AND AWARDS

- **National Natural Science Foundation Youth Student Basic Research Program (Undergraduate)** (Only 15 students university-wide)
- **National Astronomical Observatories, CAS Scholarship**, CNY 3,000
- **Nanjing University Undergraduate Fundamental Discipline Special Scholarship**, CNY 4,000
- **Zhenggang Overseas Scholarship**, CNY 30,000
- **Xiaomi Scholarship**, CNY 5,000
- **National Astronomical Observatories, CAS Scholarship**, CNY 3,000
- **Nanjing University Dongliang Excellence Scholarship**, CNY 3,000

- **Outstanding Individual in Social Practice, Nanjing University**
- **Outstanding Communist Youth League Member, Nanjing University**
- **Outstanding Minority Student, Nanjing University (2023-2024 Academic Year)**
- **Outstanding Student, Nanjing University (2024 Academic Year)**

SKILLS LANGUAGES

- C, C++, Python
- $\LaTeX$, Linux, Jupyter Notebook
- Languages: Chinese(native speaker), English(fluent)

CAMPUS ACTIVITIES

- **2024.09–Present:**
Deputy Secretary of the Youth League Committee, School of Astronomy and Space Science
- **2023.09–Present:**
Secretary of the Youth League Branch, Class of 2022, School of Astronomy and Space Science
- **2023.07:**
Volunteer Teaching with Nanyue Rural Education Group in Yunnan; awarded Outstanding Social Practice Team in Jiangsu Province and Top Ten in National "Research China" competition
- **2023.09–2024.07:**
Member of the Volunteer Service Department, Nanjing University Communist Youth League Committee; responsible for organization, logistics, and photography
- **2022.09–2023.07:**
Member of the College Mathematics and Physics Basketball Team(first-year university student)
- **2022.09–2023.07:**
Member of the Nanjing University BRAVO Guitar Club

Volunteer hours: 123 h (certified by university) + 108 h (Red Cross volunteer)