

# Qian Hu

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## EDUCATION

### University of Science and Technology of China (USTC)

Hefei, China

*Undergraduate in Department of Astronomy, School of Physical Sciences*

*Aug 2017 - Present*

GPA: 3.90/4.30, Ranking: 22/350 in School of Physical Sciences

## RESEARCH INTEREST

- **Gravitational-wave (GW) astronomy:** GW data analysis & its physical implications.
- **Cosmology:** Problems around dark matter, dark energy, and primordial gravitational-wave.

## RESEARCH EXPERIENCE

### Efficient Low-latency Sky Localization of Gravitational Wave Sources

June 2020 - Present

*Advisor: Prof. Linqing Wen@The University of Western Australia*

- By investigating how extrinsic parameters' distributions vary with signal-to-noise ratio, derive an analytical solution of the Bayesian posterior probability density for GW source sky localization.
- This algorithm has low latency and good self-consistency, and will be implemented to GW detection pipeline SPIIR.
- Paper in preparation as first author.

### Investigating joint observations of space-borne GW detectors

Feb 2020 - June 2020

*Advisor: Prof. Wen Zhao@USTC*

- Modify the Python package Bilby, and enable it to perform Bayesian analysis+MCMC/Nested sampling on space-borne GW detectors.
- Investigate the localization ability of space-borne GW detectors network.
- Investigate the constraint on parity-violating gravity given by space-borne GW detectors network.
- Paper submitted to Science Bulletin as first author.

### Fast gravitational wave localization based on null SNR

July 2019 - Aug 2019

*Advisor: Prof. Linqing Wen@The University of Western Australia*

- Use the stability of distribution of null SNR to constrain the influence caused by non-Gaussian noise during GW sources localization.
- Construct probability skymap based on null SNR and coherent SNR, and give GW source localization

### Model-Independent test of the parity symmetry of gravity using GWs

Feb 2019 - Aug 2020

*Advisor: Prof. Wen Zhao@USTC*

- Develop a waveform-independent method to decompose right-hand and left-hand polarizations of GWs.
- By comparing arrival time of circular polarizations, give the constraint on velocity birefringence in parity-violating gravity.
- Paper published in EPJC as coauthor.

## PUBLICATIONS

1. **Qian Hu**, Cong Zhou, Jhao-Hong Peng, Linqing Wen, Qi Chu, Manoj Kovalam, *Efficient Low-latency Sky Localization of Gravitational Wave Sources*, in preparation.
2. **Qian Hu**, Mingzheng Li, Rui Niu, and Wen Zhao. *Constraining parity asymmetry of gravity with joint observations of space-borne gravitational-wave detectors*, submitted to Science Bulletin.

3. Wen Zhao, Tan Liu, Linqing Wen, Tao Zhu, Anzhong Wang, **Qian Hu**, and Cong Zhou. *Model-independent test of the parity symmetry of gravity with gravitational waves. The European Physical Journal C*, 80(7), Jul 2020.

## TEACHING

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### Physical experimental software design & development

July 2020 - Present

*Member of a national virtual simulation experimental teaching project*

- Design and develop an application of GW data simulation, data analysis and Bayesian statistics in GW astronomy for physical experiment teaching.
- The software will be employed in experimental teaching in USTC in 2021.

### Classical Mechanics and Electrodynamics

2020 Fall@USTC

*Teaching assistant*

- Correct homework and answer questions.

## AWARDS

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- Outstanding Student Scholarship, USTC, 2019
- CGN Scholarship (Gold), USTC, 2019
- Outstanding Student Scholarship, USTC, 2018

## STANDARDIZED TEST

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- TOEFL 99 (R: 29 L: 26 S: 22 W: 22). Best Score: 102

## PROFESSIONAL SKILLS

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- Python, C, Matlab, Mathematica,  $\text{\LaTeX}$ .