

# Haowen Zhong, Ph.D. Candidate

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## Education

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University of Minnesota, Ph.D. in Physics, Data Science in Astrophysics (Minor)	Sept 2021 – May 2026 (Expected)
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- Advisor: Vuk Mandic

Huazhong University of Science and Technology, B.Sc. in Physics	Sept 2017 – May 2021
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- Thesis title: *Gravitational waves from bubble collisions in FLRW spacetime.*
- Advisor: Biping Gong

## Selected Publications and Preprints

### Refereed Journal Articles

- **H. Zhong**, L. Reali, B. Zhou, E. Berti, and V. Mandic, “A two-step procedure to detect cosmological gravitational wave backgrounds with next-generation terrestrial gravitational-wave detectors,” 2025. arXiv: 2501.17717 [gr-qc]. url:<https://arxiv.org/abs/2501.17717>.
- **H. Zhong**, M. Isi, K. Chatziioannou, and W. M. Farr, “Multidimensional hierarchical tests of general relativity with gravitational waves,” *Phys. Rev. D*, vol. 110, no. 4, p. 044 053, 2024. doi:10.1103/PhysRevD.110.044053. arXiv:2405.19556 [gr-qc].
- **H. Zhong**, B. Zhou, L. Reali, E. Berti, and V. Mandic, “Searching for cosmological stochastic backgrounds by notching out resolvable compact binary foregrounds with next-generation gravitational-wave detectors,” *Phys. Rev. D*, vol. 110, no. 6, p. 064 047, 2024. doi: 10.1103/PhysRevD.110.064047. arXiv: 2406.10757 [gr-qc].
- A. I. Renzini et al., “pygwb: A Python-based Library for Gravitational-wave Background Searches,” *Astrophys. J.*, vol. 952, no. 1, p. 25, 2023. doi: 10.3847/1538-4357/acd775. arXiv: 2303.15696 [gr-qc].
- **H. Zhong**, R. Ormiston, and V. Mandic, “Detecting cosmological gravitational wave background after removal of compact binary coalescences in future gravitational wave detectors,” *Phys. Rev. D*, vol. 107, no. 6, p. 064 048, 2023, [Erratum: *Phys.Rev.D* 108, 089902 (2023)]. doi: 10.1103/PhysRevD.107.064048. arXiv: 2209.11877 [gr-qc].
- **H. Zhong**, B. Gong, and T. Qiu, “Gravitational waves from bubble collisions in FLRW spacetime,” *JHEP*, vol. 02, p. 077, 2022. doi: 10.1007/JHEP02(2022)077. arXiv: 2107.01845 [gr-qc].

### Articles in Preparation

- **H. Zhong** and V. Mandic (in prep), "Importance of Shot Noise in the Search for an Isotropic Stochastic Gravitational-Wave Background with Next Generation Detectors"
- **H. Zhong**, J. D. Romano, V. Mandic, S. Kandhasamy, and A. I. Renzini (in prep), A Thorough Investigation of the Frequency Domain Cross-Correlation Method in the Search of a Stochastic Gravitational-Wave Background

## Teaching Experience as a Teaching Assistant

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### 1. Kinematics&Mechanics:

- **PHYS 1301:** Fall 2021
- **PHYS 1101:** Spring 2025

### 2. E&M:

- **PHYS 1302:** Spring 2022, Fall 2022, Spring 2023, Fall 2023, Spring 2024

## Talks&Presentations

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### Seminars/Telecons

- 2025 **Importance of Shot Noise in the Search for an Isotropic Stochastic Gravitational-Wave Background with Next Generation Detectors**, August, LIGO stochastic subgroup telecon
- 2024 **Searching for cosmological stochastic backgrounds by notching out resolvable compact binary foregrounds with next-generation gravitational-wave detectors**, August, Sun Yat-Sen University
- 2024 **Generalizing hierarchical tests of general relativity with gravitational waves to arbitrary dimensions**, May, LIGO TGR telecon
- 2023 **Removing the Astrophysical Stochastic Gravitational Wave Foreground in Next-Generation Gravitational Wave Detectors & Arbitrary-Dimensional Hierarchical Test of GR with Gravitational Waves**, November, Johns Hopkins University
- 2022 **Detecting cosmological gravitational waves background after removal of compact binary coalescences in future gravitational wave detectors**, October, CE telecon

### Conferences/LVK Meetings

- 2025 **Detecting a Cosmological Gravitational-Wave Background with Next-Generation Detectors**, Fundamental Physics Across the Gravitational Wave Spectrum, August, Chicago (IL)
- 2024 **Bypassing the Unresolvable Binary Neutron Star Foreground to Dig into Cosmological Background by Combining Notching Procedure and Joint Analysis**, LVK Meeting, September, Online
- 2024 **Updates on Detecting Cosmological Gravitational Wave Background by Notching Astrophysical Foreground out in t-f space**, LVK Meeting, March, Baton Rouge (LA)
- 2023 **Detecting cosmological gravitational waves background after removal of compact binary coalescences in future gravitational wave detectors**, APS Meeting, April, Minneapolis (MN)
- 2023 **Detecting cosmological gravitational waves background after removal of compact binary coalescences in future gravitational wave detectors**, LVK Meeting, March, Online
- 2022 **Dive into SGWB by Notching Out CBC Foreground For 3G Detector e.g (Cosmic Explorer)**, LVK Meeting, March, Evanston (IL)

## Professional Organizations

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- 2022-Present **Member**, Cosmic Explorer Consortium
- 2021-Present **Student Member**, American Physical Society
- 2021-Present **Member**, LIGO-Virgo-KAGRA Scientific Collaboration

## Referee

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Physical Review D

## Awards and Achievements

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1. National Scholarship (2 out of 170), 2020
2. Merit Student Scholarship (10 out of 170), 2020
3. National Astronomical Observatory Scholarship (2 out of 340), 2020
4. National Astronomical Observatory Scholarship (2 out of 317), 2019
5. Scholarship of Academic Excellence in school of Physics (8 out of 170), 2019
6. Scholarship of Self-Improvement for freshman (2 out of 22) , 2018
7. Scholarship of Academic Excellence for freshman (11 out of 155), 2018