

# Yong Gao

---

CONTACT INFORMATION	k102, Kavli Institute for Astronomy and Astrophysics Peking University, Yiheyuan Rd. 5, Haidian District Beijing 100871, China	email: <a href="mailto:gaoyong.physics@pku.edu.cn">gaoyong.physics@pku.edu.cn</a> academic records: <a href="#">ORCID</a>
EDUCATION	<b>Ph.D. candidate, Physics</b> , Peking University, Beijing, China Dissertation Advisor: Prof. Lijing Shao Dissertation Title: <i>Probing Structures of Neutron Stars with Gravitational Waves</i> <b>August 2018–Present</b> <b>B.S., Physics</b> , Dalian University of Technology, Dalian, Liaoning Province, China Degree conferred with honor. Senior Thesis Advisors: Prof. Renxin Xu and Prof. Chong Li Thesis Title: <i>The Electron Distributions of Strangelets in the Thomas-Fermi Model</i> <b>July 2018</b>	
RESEARCH INTERESTS	<b>Understanding the composition and state of matter under the extreme conditions inside neutron stars (NSs).</b> One major theme is modelling gravitational waves (GWs) from systems involving NSs: tidal/spin effects in the inspiral phase of binary NS systems, GW asteroseismology of oscillating NSs. A second major theme is studying the dynamics and observational consequences of freely precessing NSs. <b>Testing gravity in the strong-field regime of NSs.</b> Focusing on the properties of rotating, tidally-deformed, and oscillating NSs in alternative theories of gravity.	
HONORS AND AWARDS	<b>Principal Scholarship</b> , Peking University <b>Tung Scholarship</b> , Peking University <b>Merit Student</b> , Peking University <b>The Second Prize for Oral Presentation</b> , Physics Five Universities <b>Vela Prize for Oral Presentation</b> , FAST/Future Pulsar Symposium 9 (FPS9) <b>National Scholarship</b> , Peking University <b>Merit Student</b> , Peking University <b>Excellent Teaching Assistant Award</b> , Peking University <b>Principal Scholarship</b> , Peking University <b>Learning Excellence Award (First Prize)</b> , Dalian University of Technology <b>National Encouragement Scholarship</b> , Dalian University of Technology	<b>2022–2023</b> <b>2021–2022</b> <b>2021–2022</b> <b>April 2021</b> <b>August 2020</b> <b>2019–2020</b> <b>2019–2020</b> <b>2019–2020</b> <b>2018–2019</b> <b>2015–2016</b> <b>2015–2016</b>
TEACHING EXPERIENCE	<b>Teaching Assistant</b> , Peking University <b>Electrodynamics (B)</b>	<b>Fall 2022</b>

**General Physics I**, \*incl. Mechanics & Electromagnetism

Fall 2021

**Theoretical Mechanics (A)**, Excellent Teaching Assistant Award

Fall 2019

#### CO-ADVISED STUDENTS

##### Graduate Student, Peking University

**Hongbo Li**, co-advise with Prof. Lijing Shao and Prof. Renxin Xu

2021–present

*Oscillations of neutron stars and gravitational wave asteroseismology*

##### Undergraduate students, Peking University

**Haoyang Qi**, co-advise with Prof. Lijing Shao

2021–Present

*Constraints on ultralight dark matter with pulsar timing*

**Huimei Wang**, co-advise with Prof. Lijing Shao

2020–2021

*Undergraduate thesis: The structure of neutron stars with anisotropic pressure*

**Jingyuan Deng**, co-advise with Prof. Lijing Shao

2020–2021

*Undergraduate thesis: Forced Precession of neutron stars*

**Zexin Hu**, co-advise with Prof. Lijing Shao

2020–2021

*Scalarized neutron stars in massive scalar-tensor gravity*

#### PROFESSIONAL ACTIVITIES, OUTREACH, AND SERVICE

##### KAGRA Collaboration

Member of KAGRA Future Strategy Committee (FSC)

2021–Present

##### Chair of conference session/group meeting

**KAGRA Future Working Group 1st Open Meeting** (*online*)

November 2021

Chair of the group meeting, **KIAAGRAVITY**

2020–2021

##### Journal referee

Classical and Quantum Gravity (CQG)

2021–Present

Research in Astronomy and Astrophysics (RAA)

2021–Present

Science China Physics, Mechanics & Astronomy (SCPMA)

2021–Present

#### COMPUTER SKILLS

Proficient in MATHEMATICA, Python, and Matlab. Experience in C, Bash, and HPC.  
Markup languages:  $\text{\LaTeX}$ , Markdown.

**Code development**— Most contributions can be found at <https://github.com/GravYong>.

#### SUBMITTED PUBLICATIONS

12. H.-B. Li, **Y. Gao (Corresponding author)**, L. Shao, R.-X. Xu, R. Xu, (2022) *Oscillation modes and gravitational waves from strangeon stars* [[arXiv:2206.09407](https://arxiv.org/abs/2206.09407)].
11. **Y. Gao**, R. Xu, L. Shao, *Precession of spheroids under Lorentz violation and observational consequences for neutron stars*, submitted to Proceedings of the Ninth Meeting on CPT and Lorentz Symmetry.

#### REFEREED PUBLICATIONS

10. **Y. Gao**, X.-Y. Lai, L. Shao, R.-X. Xu, (2022) *Rotation and deformation of strangeon stars in the Lennard-Jones model*, **Mon. Not. R. Astron. Soc.** **509**, 2758 [[arXiv:2109.13234](https://arxiv.org/abs/2109.13234)].
9. **Y. Gao**, L. Shao, R. Xu, L. Sun, C. Liu, R.-X. Xu, (2020) *Triaxially-deformed freely-precessing neutron stars: continuous electromagnetic and gravitational radiation*, **Mon. Not. R. Astron. Soc.** **498**, 1826 [[arXiv:2007.02528](https://arxiv.org/abs/2007.02528)].

8. Z. Hu, **Y. Gao (Corresponding author)**, R. Xu, L. Shao, (2021) *Scalarized neutron stars in massive scalar-tensor gravity: X-ray pulsars and tidal deformability*, *Phys. Rev. D* **104**, 104014 [[arXiv:2109.13453](#)].
7. R. Xu, **Y. Gao**, L. Shao, (2022) *Neutron stars in massive scalar-Gauss-Bonnet gravity: Spherical structure and time-independent perturbations*, *Phys. Rev. D* **105**, 024003 [[arXiv:2111.06561](#)].
6. R. Xu, **Y. Gao**, L. Shao, (2021) *Precession of spheroids under Lorentz violation and observational consequences for neutron stars*, *Phys. Rev. D* **103**, 084028 [[arXiv:2012.01320](#)].
5. R. Xu, **Y. Gao**, L. Shao, (2020) *Strong-field effects in massive scalar-tensor gravity for slowly spinning neutron stars and application to X-ray pulsar pulse profiles*, *Phys. Rev. D* **102**, 064057 [[arXiv:2007.10080](#)].
4. J. Zhao, L. Shao, **Y. Gao**, C. Liu, Z. Cao, B.-Q. Ma, (2021) *Probing dipole radiation from binary neutron stars with ground-based laser-interferometer and atom-interferometer gravitational-wave observatories*, *Phys. Rev. D* **104**, 084008 [[arXiv:2106.04883](#)].
3. C. Liu, L. Shao, J. Zhao, **Y. Gao**, (2020) *Multiband observation of LIGO/Virgo binary black hole mergers in the gravitational-wave transient catalog GWTC-1*, *Mon. Not. R. Astron. Soc.* **496**, 182 [[arXiv:2004.12096](#)].
2. **Y. Gao**, L. Shao, (2021) *Precession of triaxially deformed neutron stars*, *Astron. Nachr.* **342**, 364 [[arXiv:2011.04472](#)].
1. R. Xu, **Y. Gao**, L. Shao, (2021) *Signature of Lorentz violation in continuous gravitational-wave spectra of ellipsoidal neutron stars*, *Galaxies* **9**, 12 [[arXiv:2101.09431](#)].

POPULAR SCIENCE  
ARTICLES

3. **Y. Gao**, L. Shao, R.-X. Xu, (2019) *The waltz of a binary neutron star system* (an article about GW170817, *in Chinese*).
2. **Y. Gao**, (2022) *The structures of neutron stars* (an article about dense matter in neutron stars, *in Chinese*).
1. **Y. Gao**, L. Shao, (2022) *Does Einstein's theory of gravity hold up to the latest LIGO/VIRGO/KAGRA observations?* (**translated** from *the English version*).

## INVITED TALKS

- |    |  |                |
|----|--|----------------|
| 3. | School of Physics in Peking University, CuiYing Graduate Student Salon           | February 2021  |
| 2. | Max Planck Institut f. Gravitationsphysik Colloquium ( <i>online</i> )           | September 2020 |
| 1. | University of Tartu, Theoretical Physics Laboratory Colloquium ( <i>online</i> ) | October 2020   |

CONTRIBUTED  
TALKS

- |    |   |               |
|----|---|---------------|
| 9. | SKA Pulsar Science Symposium 2022                                   | August 2022   |
| 8. | FAST/Future Pulsar Symposium 11                                     | August 2022   |
| 7. | Summer Science Day, KIAA, Peking University                         | July 2022     |
| 6. | The 60th Anniversary of X-Ray Astronomy ( <i>online</i> )           | June 2022     |
| 5. | Ninth Meeting on CPT and Lorentz Symmetry ( <i>online</i> )         | May 2022      |
| 4. | FAST/Future Pulsar Symposium 10                                     | July 2021     |
| 3. | Gravitation and Relativistic Astrophysics, Chinese Physical Society | April 2021    |
| 2. | Gravitation and Cosmology Symposium                                 | December 2020 |
| 1. | FAST/Future Pulsar Symposium 9                                      | August 2020   |

## REFERENCES

**Lijing Shao**, Assistant Professor of Kavli Institute for Astronomy and Astrophysics, Peking University  
K217, Kavli Institute for Astronomy and Astrophysics  
Yiheyuan Rd. 5, Haidian District  
Beijing, P. R. China, 100871  
email: [lishao@pku.edu.cn](mailto:lishao@pku.edu.cn)  
office phone: +86-(0)10-6275-8461

**Renxin Xu**, Professor of Physics, Peking University  
2912, Science Teaching Building No. 2, Department of Astronomy  
Yiheyuan Rd. 5, Haidian District  
Beijing, P. R. China, 100871  
email: [r.x.xu@pku.edu.cn](mailto:r.x.xu@pku.edu.cn)  
office phone: 86-10-62758631