

## Yong Gao — Curriculum Vitae

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CONTACT INFORMATION	K102, Kavli Institute for Astronomy and Astrophysics Peking University, 5 Yiheyuan Road, Haidian District Beijing 100871, P. R. China	email: <a href="mailto:gaoyong.physics@pku.edu.cn">gaoyong.physics@pku.edu.cn</a> personal webpage: <a href="http://gravyong.github.io">gravyong.github.io</a> telephone: (86)13811809693
EDUCATION	<b>Ph.D. candidate, Physics</b> , Peking University, Beijing, China Thesis Advisor: Prof. Lijing Shao Thesis 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 Dissertation Advisors: Prof. Renxin Xu and Prof. Chong Li Dissertation Title: <i>The Electron Distributions of Strangelets in the Thomas-Fermi Model</i> <b>July 2018</b>	
RESEARCH INTERESTS	<b>Understanding composition and state of matter inside neutron stars (NSs).</b> Modelling gravitational waves (GWs) from NSs: tidal/spin effects in binary NS and NS-black hole systems, global non-radial oscillations of NSs, mountains on NSs. Studying dynamics and observational consequences of free/forced precession of NSs. <b>Testing strong-field gravity.</b> Modelling GW waveform from compact binaries and oscillating compact objects beyond general relativity. Constructing timing model and testing gravity with pulsar timing. Studying the structures 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 <b>National Scholarship</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>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>2018–2019</b> <b>2015–2016</b>
TEACHING EXPERIENCE	<b>Teaching Assistant</b> , Peking University <b>Electrodynamics (B)</b> <b>General Physics I</b> , *incl. Mechanics & Electromagnetism <b>Theoretical Mechanics (A)</b> , <b>Excellent Teaching Assistant Award</b>	<b>Fall 2022</b> <b>Fall 2021</b> <b>Fall 2019</b>

CO-ADVISED  
STUDENTS**Ph.D. Student**, Peking University

**Hongbo Li**, co-advised 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-advised with Prof. Lijing Shao **2021–Present**  
*Constraints on ultralight dark matter with pulsar timing*

**Huimei Wang**, co-advised with Prof. Lijing Shao **2020–2021**  
*Undergraduate Dissertation: The structure of neutron stars with anisotropic pressure*

**Jingyuan Deng**, co-advised with Prof. Lijing Shao **2020–2021**  
*Undergraduate Dissertation: Forced precession of neutron stars*

**Zexin Hu**, co-advised with Prof. Lijing Shao **2020–2021**  
*Scalarized neutron stars in massive scalar-tensor gravity*

COMPUTER SKILLS Proficient in MATHEMATICA, Python, and Matlab. Experience in C, Bash, and HPC.  
Markup languages: L<sup>A</sup>T<sub>E</sub>X, Markdown.

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

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 **KIAAGRAVITY GROUP MEETING** **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**

SUBMITTED  
PUBLICATIONS

15. H.-B. Li, **Y. Gao**, L. Shao, R.-X. Xu, *The g-mode of neutron stars in Pseudo-Newtonian gravity*, submitted to Mon. Not. R. Astron. Soc [[arXiv:2302.03856](https://arxiv.org/abs/2302.03856)].
14. G. Desvignes, P. Weltevrede, **Y. Gao**, D. I. Jones, M. Kramer, M. Caleb, R. Karuppusamy, L. Levin, K. Liu, A. G. Lyne, L. Shao, B. Stappers, *A freely precessing magnetar following an X-ray outburst*, submitted to Nature Astronomy.

ACCEPTED  
PUBLICATIONS

13. **Y. Gao**, L. Shao, G. Desvignes, D. I. Jones, M. Kramer, G. Yim, *Precession of magnetars: dynamical evolutions and modulations on polarized electromagnetic waves*, accepted by MNRAS [[arXiv:2211.17087](https://arxiv.org/abs/2211.17087)].
12. **Y. Gao**, R. Xu, L. Shao, *Precession of spheroids under Lorentz violation and observational consequences for neutron stars*, in Proceedings of the Ninth Meeting on CPT and Lorentz Symmetry, in press.

REFEREED  
PUBLICATIONS

11. **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].
10. **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].
9. **Y. Gao**, L. Shao, (2021) *Precession of triaxially deformed neutron stars*, *Astron. Nachr.* **342**, 364 [arXiv:2011.04472].
8. Z. Hu, **Y. Gao**, 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. H.-B. Li, **Y. Gao**, L. Shao, R.-X. Xu, R. Xu, (2022) *Oscillation modes and gravitational waves from strangeon stars*, *Mon. Not. R. Astron. Soc.* **516**, 6172 [arXiv:2206.09407].
6. 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].
5. 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].
4. 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].
3. 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].
2. 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].
1. 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].

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

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|---|----------------|
| 4. Yangzhou University, School of Physics Science and Technology, Seminar           | September 2022 |
| 3. Peking University, School of Physics, CuiYing Graduate Student Salon             | February 2021  |
| 2. Max Planck Institut für Gravitationsphysik Colloquium ( <i>online</i> )          | September 2020 |
| 1. University of Tartu, Theoretical Physics Laboratory Colloquium ( <i>online</i> ) | October 2020   |

CONTRIBUTED  
TALKS

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| 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  
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