

Yong Gao — Curriculum Vitae

CONTACT INFORMATION	0.27, Albert Einstein Institute Am Mühlenberg 1, Golm Potsdam 14469, Germany	email: yong.gao@aei.mpg.de personal webpage: gravyong.github.io telephone: (86)13811809693
EDUCATION	Postdoctoral Researcher , Max Planck Institute for Gravitational Physics (Albert Einstein Institute), Potsdam, Germany September 2023–Present	
	Ph.D. candidate, Physics , Peking University, Beijing, China August 2018–Present Thesis Advisor: Prof. Lijing Shao Thesis Title: <i>Probing Structures of Neutron Stars with Gravitational Waves</i>	
	B.S., Physics , Dalian University of Technology, Dalian, Liaoning Province, China July 2018 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>	
RESEARCH INTERESTS	Understanding composition and state of matter inside neutron stars (NSs). 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. Numerical simulations of compact binary mergers involving NSs. Testing strong-field gravity. 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. Numerical simulations of compact binaries in alternative theories of gravity.	
HONORS AND AWARDS	Principal Scholarship , Peking University 2022–2023 Tung Scholarship , Peking University 2021–2022 Merit Student , Peking University 2021–2022 The Second Prize for Oral Presentation , Physics Five Universities April 2021 Vela Prize for Oral Presentation , FAST/Future Pulsar Symposium 9 August 2020 National Scholarship , Peking University 2019–2020 Excellent Teaching Assistant Award , Peking University 2019–2020 Principal Scholarship , Peking University 2018–2019 Learning Excellence Award (First Prize) , Dalian University of Technology 2015–2016	

TEACHING
EXPERIENCE

Lecturer , Max Planck Institute for Gravitational Physics	
Introductions to the Fundamentals of Neutron Stars	Spring 2025
Teaching Assistant , Peking University	
Electrodynamics (B)	Fall 2022
General Physics I , *incl. Mechanics & Electromagnetism	Fall 2021
Theoretical Mechanics (A) , Excellent Teaching Assistant Award	Fall 2019

CO-ADVISED
STUDENTS

Ph.D. Student , Peking University	
Hongbo Li , co-advised with Prof. Lijing Shao and Prof. Renxin Xu <i>Oscillations of neutron stars and gravitational-wave asteroseismology</i>	2021–present
Undergraduate Students , Peking University	
Haoyang Qi , co-advised with Prof. Lijing Shao <i>Constraints on ultralight dark matter with pulsar timing</i>	2021–Present
Huimei Wang , co-advised with Prof. Lijing Shao <i>Undergraduate Dissertation: The structure of neutron stars with anisotropic pressure</i>	2020–2021
Jingyuan Deng , co-advised with Prof. Lijing Shao <i>Undergraduate Dissertation: Forced precession of neutron stars</i>	2020–2021
Zexin Hu , co-advised with Prof. Lijing Shao <i>Scalarized neutron stars in massive scalar-tensor gravity</i>	2020–2021

COMPUTER SKILLS Proficient in MATHEMATICA, Julia, Fortran, Python, and Matlab. Experience in C, Bash, and HPC. Markup languages: L^AT_EX, 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)	2021–2023
Chair of conference session/group meeting	
KAGRA Future Working Group 1st Open Meeting (<i>online</i>)	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

26. M. Z. Han, **Y. Gao**, K. Kiuchi and M. Shibata, *Dependence of post-merger properties on the thermal heating efficiency in neutron star mergers*, submitted to Phys. Rev. D, [[arXiv:2504.08514](https://arxiv.org/abs/2504.08514)]
25. **Y. Gao**, K. Hayashi, K. Kiuchi, A. T. L. Lam, H. J. Kuan and M. Shibata, *Convective stability analysis of massive neutron stars formed in binary mergers*, submitted to Phys. Rev. D, [[arXiv:2501.19053](https://arxiv.org/abs/2501.19053)]

REFEREED
PUBLICATIONS

24. A. T. L. Lam, **Y. Gao**, H. J. Kuan, M. Shibata, K. Van Aelst and K. Kiuchi, *Accessing universal relations of binary neutron star waveforms in massive scalar-tensor theory*, Phys. Rev. Lett. **134**, 15, 151402 [[arXiv:2410.00137](#)]
23. Z. Wang, **Y. Gao**, D. Liang, J. Zhao and L. Shao, *Vetting quark-star models with gravitational waves in the hierarchical Bayesian framework*, JCAP **11**, 038, [[arXiv:2409.11103](#)]
22. Y. Liu, H. B. Li, **Y. Gao**, L. Shao, Z. Hu, *Effects from dark matter halos on X-ray pulsar pulse profiles*, Phys. Rev. D **110**, 083018, [[arXiv:2408.04425](#)]
21. S. C. Chen, **Y. Gao**, E. P. Zhou, R.-X. Xu, *Free energy of anisotropic strangeon stars*, Res. Astron. Astrophys. **24**, 025005, [[arXiv:2305.19687](#)].
20. E. P. Zhou, **Y. Gao**, Y. R. Zhou, X. Y. Lai, L. Shao, W. Y. Wang, S.-L. Xiong, R.-X. Xu, S. X. Yi, H. Yue, Z. Zhang, *The precursor of GRB211211A: a tide-induced giant quake?*, Res. Astron. Astrophys. **24**, 025019, [[arXiv:2305.19687](#)]
19. G. Yim, **Y. Gao**, Y. Kang, L. Shao and R. Xu, *Continuous gravitational waves from trapped magnetar ejecta and the connection to glitches and antiglitches*, Mon. Not. Roy. Astron. Soc. **527**, 2, 2379-2392, [[arXiv:2308.01588](#)]
18. C. Zhang, **Y. Gao**, C. J. Xia, R. Xu, *Rescaling strange-cluster stars and its implications on gravitational-wave echoes*, Phys. Rev. D **108**, 6, 063002 [[arXiv:2305.13323](#)]
17. Y. Kang, C. Liu, J. P. Zhu, **Y. Gao**, L. Shao, B. Zhang, H. Sun, Y. H. I. Yin and B. B. Zhang, *Prospects for detecting neutron star-white dwarf mergers with decihertz gravitational-wave observatories*, Mon. Not. Roy. Astron. Soc. **528**, 3, 5309-5322, [[arXiv:2309.16991](#)]
16. **Y. Gao**, L. Shao, Jan Steinhoff, *A tight universal relation between the shape eccentricity and the moment of inertia for rotating neutron stars*, Astrophys. J. **954**, 1, 16 [[arXiv:2303.14130](#)]
15. H.-B. Li, **Y. Gao**, L. Shao, R.-X. Xu, *The g-mode of neutron stars in Pseudo-Newtonian gravity*, Phys. Rev. D **108**, 6, 064005 [[arXiv: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*, Nature Astron. **8**, 617-627.
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*, Mon. Not. Roy. Astron. Soc. **1**, 1080-1097 [[arXiv: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, published.
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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|---|----------------|
| 5. Yangzhou University, Seminar, | December 2024 |
| 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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| 10. Brainstorming workshop: Deciphering the equation of state using gravitational waves from astrophysical sources, University of Warsaw, Poland | August 2024. |
| 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

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