

Hao-Jui Kuan

Curriculum Vitae

Personal information

Date of birth 13 July 1995
Nationality Taiwan
Email/web hao-jui.kuan@aei.mpg.de, hao-jui.github.io
Address Albert-Einstein-Institut, Am Mühlenberg 1, 14476 Potsdam

Education

2019 - 2022 **PhD in Theoretical Astrophysics with “summa cum laude” (excellent)**
University of Tübingen, Tübingen, Germany. *Advisor: Kostas D. Kokkotas*
2017 - 2022 **PhD in Physics (joint degree)**
National Tsing Hua University, Hsinchu, Taiwan. *Advisor: Chao-Qiang Geng*
2013 - 2017 **B.Sc Double major in Physics and Mathematics**

Professional experience

2023 - Postdoc at the Max Planck Institute for Gravitational Physics (Albert Einstein Institute)

Awards, Honors, Fellowships & Grants

Grants

2020 - 2021 Principal Investigator of Sandwich-Scholarship Programme;
13,500 euro, funded by Deutscher Akademischer Austauschdienst (DAAD), and Ministry of
Science and Technology, Taiwan (MOST) with funding ID being JYP 109-2927-I-007-503.

Awards/Honors

2023 Honorable Mention in GWIC-BRACCINI Thesis Prize ([website](#))
2023 Dr. Friedrich Förster Prize from
2023 Student Outstanding Paper Award from NCTS, Taiwan

Scholarship

2017 - 2020 Presidential Scholarship of National Tsing Hua University, Taiwan

Scientific summary

Plenary conference talk	...	1
Invited seminar	...	5
Parallel conference talk/poster	...	8
Number of first author articles	...	11
Refereed Articles	...	15
h index (HEP-SPIRES)	...	8

Reviewing Activities

Reviewer for Journals: Physical Review D, International Journal of Modern Physics D

Full Presentations/Seminar List

2023

- Oct 26 **"Binary neutron star mergers in massive scalar-tensor theory: an adiabatic look"**, poster, GravityShapePisa 2023, Pisa, Italy.
- April 5 **"Dynamical Scalarization during BNS mergers in scalar-Gauss-Bonnet"**, talk, CoCoNut meeting, Potsdam, Germany.
- March 22 **"Packed Message delivered by Tides in Binary Neutron Star Mergers"**, parallel talk, SMuK2023, Technical University Dresden, Germany.
- March 16 **"Dynamical Scalarization during Neutron Star Mergers in scalar-Gauss-Bonnet Theory"**, invited seminar, University of Tübingen, Germany.
- February 3 **"Developing waveform involving dynamical tides"**, invited seminar, Academia Sinica, Taipei, Taiwan.
- February 2 **"Gravitational Phase Transition in Massive Scalar-tensor Theory"**, invited seminar, National Center for Theoretical Sciences, Hsinchu, Taiwan.

2022

- Sep 10 **"Premerger Neutron Star Physics"**, plenary talk, Eleventh Aegean summer school, Syros, Greece.
- Sep 08 **"Gravitational Phase Transition"**, parallel talk, Eleventh Aegean summer school, Syros, Greece.
- May 16-19 **"Tidal effects in the pre-merger stage of coalescing binary neutron stars"**, e-poster, PHAROS: The multi-messenger physics and astrophysics of neutron stars, Roma, Italy.
- Mar 3 **"Resonance shattering as triggers for precursors of SGRBs"**, parallel talk, DPG Meeting of the Matter and Cosmos Section (SMuK), Heidelberg, Germany. (remotely)

2021

- Aug30 - Sep3 **"Tidal g -mode resonances in coalescing binaries of neutron stars as triggers for precursor flares of short gamma-ray bursts"**, parallel talk
DPG Meeting of the Matter and Cosmos Section (SMuK), Bad Honnef, Germany. (remotely)
- July 27 **" g -mode resonances as triggers for precursors of SGRBs"**, invited talk
Grav@zon group seminar, Federal University of Pará, Pará, Brazil. (remotely)
- Jun 22 **"Dynamical formation of scalarized black holes and neutron stars through stellar core collapse"**, invited seminar
cosmo/GW journal club, Johns Hopkins University, Maryland, USA. (remotely)

2020

- Feb 24-28 **"Inverse-Chirp Imprint of GW in Scalar Tensor Theory"**, parallel talk
56th Karpacz Winter School in Theoretical Physics, Karpacz, Poland.

Teaching experience

- At NTHU** Teaching assistant for General Relativity (2016 Fall, 2018 Fall), Mathematical Physics (2017-2018), Thermal Physics (2016-2017), Calculus (2018-2019)
- At IAAT** Teaching assistant for Physical Practical (2021 Summer & Winter)
Teaching assistant for Grundkurs Elektromagnetismus (2022 Summer)

Miscellaneous

Computer skills Programming: Python, Fortran

Scientific software: Matlab, Mathematica, Gnuplot
Language English (fluent), Mandarin (Mother tongue), Japanese (fluent)

Publication List

1. **H.-J. Kuan** and K. D. Kokkotas. Last three seconds: Packed message delivered by tides in binary neutron star mergers. *Phys. Rev. D* 108:063026, September 2023. doi:[10.1103/PhysRevD.108.063026](https://doi.org/10.1103/PhysRevD.108.063026).
2. **H.-J. Kuan**, K. V. Van Aelst, A. T. L. Lam and M. Shibata. Binary neutron star mergers in massive scalar-tensor theory: Quasiequilibrium states and dynamical enhancement of the scalarization. *Phys. Rev. D* 108:064057, September 2023. doi:[10.1103/PhysRevD.108.064057](https://doi.org/10.1103/PhysRevD.108.064057).
3. **H.-J. Kuan**, A. G. Suvorov and K. D. Kokkotas. Measuring spin in coalescing binaries of neutron stars showing double precursors. *Astron. Astrophys.*, 676(2):A59, June 2023. doi:[10.1051/0004-6361/202346658](https://doi.org/10.1051/0004-6361/202346658).
4. **H.-J. Kuan**, A. T. L. Lam, D. D. Doneva, S. S. Yazadjiev, M. Shibata and K. Kiuchi. Dynamical scalarization during neutron star mergers in scalar-Gauss-Bonnet theory. *Phys. Rev. D* 108:063033, September 2023. doi:[10.1103/PhysRevD.108.063033](https://doi.org/10.1103/PhysRevD.108.063033).
5. **H.-J. Kuan** and K. D. Kokkotas. f -mode imprints on gravitational waves from coalescing binaries involving aligned spinning neutron stars. *Phys. Rev. D* 106:064052, September 2022. doi:[10.1103/PhysRevD.106.064052](https://doi.org/10.1103/PhysRevD.106.064052).
6. **H.-J. Kuan**, A. G. Suvorov, D. D. Doneva and S. S. Yazadjiev. Gravitational Waves from Accretion-Induced Descalarization in Massive Scalar-Tensor Theory. *Phys. Rev. Lett.* 129:121104, September 2022. doi:[10.1103/PhysRevLett.129.121104](https://doi.org/10.1103/PhysRevLett.129.121104).
7. A. G. Suvorov, **H.-J. Kuan** and K. D. Kokkotas. Quasi-periodic oscillations in precursor flares via seismic aftershocks from resonant shattering. *Astron. Astrophys.* 664:A177, August 2022. doi:[10.1051/0004-6361/202244082](https://doi.org/10.1051/0004-6361/202244082).
8. **H.-J. Kuan**, C. J. Krüger, A. G. Suvorov and K. D. Kokkotas. Constraining equation of state groups from g -mode asteroseismology. *MNRAS*, 513(3):4045-4056, April 2022. doi:[10.1093/mnras/stac1101](https://doi.org/10.1093/mnras/stac1101).
9. **H.-J. Kuan**, J. Singh, D. D. Doneva, S. S. Yazadjiev, and K. D. Kokkotas. Nonlinear evolution and nonuniqueness of scalarized neutron stars. *Phys. Rev. D*, 104:124013, December 2021. doi:[10.1103/PhysRevD.104.124013](https://doi.org/10.1103/PhysRevD.104.124013).
10. **H.-J. Kuan**, A. G. Suvorov and K. D. Kokkotas. General-relativistic treatment of tidal g -mode resonances in coalescing binaries of neutron stars. II. As triggers for precursor flares of short gamma-ray bursts. *MNRAS*, 508(2):1732-1744, December 2021. doi:[10.1093/mnras/stab2658](https://doi.org/10.1093/mnras/stab2658).
11. D. Huang, C. Q. Geng, and **H.-J. Kuan**. Scalar gravitational wave signals from core collapse in massive scalar-tensor gravity with triple-scalar interactions. *Class. Quant. Grav.*, 38:245006, November 2021. doi:[10.1088/1361-6382/ac35ab](https://doi.org/10.1088/1361-6382/ac35ab).
12. **H.-J. Kuan**, D. D. Doneva, and S. S. Yazadjiev. Dynamical Formation of Scalarized Black Holes and Neutron Stars through Stellar Core Collapse. *Phys. Rev. Lett.*, 127:161103, October 2021. doi:[10.1103/PhysRevLett.127.161103](https://doi.org/10.1103/PhysRevLett.127.161103).
13. **H.-J. Kuan**, A. G. Suvorov, and K. D. Kokkotas. General-relativistic treatment of tidal g -mode resonances in coalescing binaries of neutron stars - I. Theoretical framework and crust breaking. *MNRAS*, 506(2):2985-2998, September 2021. doi:[10.1093/mnras/stab1898](https://doi.org/10.1093/mnras/stab1898).
14. C. Q. Geng, **H.-J. Kuan**, and L. W. Luo. Inverse-chirp imprint of gravitational wave signals in scalar tensor theory. *Eur. Phys. J. C*, 80:780, August 2020. doi:[10.1140/epjc/s10052-020-8359-y](https://doi.org/10.1140/epjc/s10052-020-8359-y).
15. C. Q. Geng, **H.-J. Kuan**, and L. W. Luo. Viable Constraint on Scalar Field in Scalar-Tensor Theory. *Class. Quant. Grav.*, 37:115001, May 2020. doi:[10.1088/1361-6382/ab86fb](https://doi.org/10.1088/1361-6382/ab86fb).

References

- **Prof. Dr. Kostas Kokkotas**
Theoretical Astrophysics (IAAT)
Eberhard Karls Universität Tübingen
Auf der Morgenstelle 10, 72076 Tübingen, Germany
e-mail: kostas.kokkotas@uni-tuebingen.de
- **Prof. Dr. Masaru Shibata**
Max-Planck-Institut für Gravitationsphysik (Albert-Einstein-Institut)
Am Mühlenberg 1, 14476 Potsdam, Germany
e-mail: masaru.shibata@aei.mpg.de
- **Dr. Daniela Doneva**
Theoretical Astrophysics (IAAT)
Eberhard Karls Universität Tübingen
Auf der Morgenstelle 10, 72076 Tübingen, Germany
e-mail: daniela.doneva@uni-tuebingen.de
- **Dr. Arthur Suvorov**
Manly Astrophysics
5/41-42 East Esplanade, Manly, NSW 2095, Australia
e-mail: arthur.suvorov@manlyastrophysics.org
- **Prof. Dr. Stoytcho Yazadjiev**
Sofia University St Kliment Ohridski
15 Tsar Osvoboditel Boulevard
BG-Sofia 1504, Bulgaria
e-mail: yazad@phys.uni-sofia.bg

Golm

January 22, 2024

Hao-Jui Kuan