

Hao-Jui Kuan

Curriculum Vitae

Personal information

Date of birth 13 July 1995
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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 in the Computational Relativistic Astrophysics division 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 University of Tübingen
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	...	7
Parallel conference talk/poster	...	9
Number of first author articles	...	11
Refereed Articles	...	6
Preprints/journal submissions	...	1
h index (HEP-SPIRES)	...	9

Reviewing Activities

Reviewer for Journals: Physical Review D, International Journal of Modern Physics D, Monthly Notices of the Royal Astronomical Society, European Physical Journal C

Full Presentations/Seminar List

2024

- July 11 “**Imprints of matter and scalar effects on waveforms from binary neutron star mergers**”, invited seminar, online-seminar-in-mathematical-numerical-relativity ([website](#)).
- April 24 “**Imprints of matter and scalar effects on waveforms from binary neutron star mergers**”, invited seminar, Institute for Gravitational and Subatomic Physics (GRASP), Department of Physics, Utrecht University
- April 8 “**(Dynamical) Tidal Effects in the Binary Neutron Star mergers**”, invited seminar, the gravitation group in the AstroParticle and Cosmology laboratory (APC), Paris, France (remotely).
- Feb 28 “**Binary neutron star mergers in massive scalar-tensor theory**”, talk, Gravity and Cosmology 2024, Yukawa Institute for Theoretical Physics, Kyoto, Japan.

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)

Publication List

1. V. Brdar, T. Cheng, **H.-J. Kuan**, and Y.-Y. Li. Magnetar-powered neutrinos and magnetic moment signatures at IceCube. [JCAP 07:026, July 2024](#).
2. A. G. Suvorov, **H.-J. Kuan**, Alexis Reboul-Salze and K. D. Kokkotas. Magnetic amplification in pre-merger neutron stars through resonance-induced magnetorotational instabilities. [Phys.Rev.D 109:103023, May 2024](#).
3. **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](#).
4. **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](#).
5. **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](#).
6. **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](#).
7. **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](#).
8. **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](#).
9. 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](#).
10. **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](#).
11. **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](#).
12. **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](#).
13. 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](#).
14. **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](#).
15. **H.-J. Kuan**, A. G. Suvorov, and K. D. Kokkotas. General-relativistic treatment of tidal g -mode reso-

- nances in coalescing binaries of neutron stars - I. Theoretical framework and crust breaking. *MNRAS*, 506(2):2985–2998, September 2021.
16. 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.
17. 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.

References

- **Prof. Dr. Kostas Kokkotas**
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Golm
July 19, 2024

Hao-Jui Kuan