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 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 Akademischeer 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	...	9
Parallel conference talk/poster	...	10
Number of first author articles	...	11
Refereed Articles	...	17
Preprints/journal sumissoions	...	2
h index (HEP-SPIRES)	...	10

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

Oct 9 "**On the finite-size imprints on waveforms of binary neutron star mergers**", talk, Observatoire de Paris - site de Meudon, France.

Aug 1 "**On the finite-size imprints on waveforms of binary neutron star mergers**", invited seminar, UIUC.

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 "**Gravitaional 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 Electromagnetism (2022 Summer)

Publication List

Refereed Article

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. 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 resonances 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.

Pre-print

1. A. G. Suvorov, **H.-J. Kuan**, K. D. Kokkotas. Premerger phenomena in neutron-star binary coalescences. arXiv:2408.16283
2. A. T.-L. Lam, **H.-J. Kuan**, M. Shibata, K. Van Aelst, K. Kiuchi. Binary neutron star mergers in massive scalar-tensor theory: Properties of post-merger remnants. arXiv:2406.05211

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. Kenta Kiuchi**
  Max-Planck-Institut für Gravitationsphysik (Albert-Einstein-Institut)
  Am Mühlenberg 1, 14476 Potsdam, Germany
  e-mail: kenta.kiuchi@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

Golm

September 14, 2024

Hao-Jui Kuan