CURRICULUM VITAE

Hao-Jui Kuan

Personal information

Date of birth : 13 July 1995
Nationality : Taiwan
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Professional experience

2023 - Postdoc in the Computational Relativistic Astrophysics division at the Max Planck Institute for Gravitational Physics (Albert Einstein Institute)

Education

2019 - 2022 University of Tübingen, Tübingen, Germany. *Advisor: Kostas D. Kokkotas*
Ph.D. in Theoretical Astrophysics. Summa Cum Laude (excellent; about 1 in 50 graduates).

2017 - 2022 National Tsing Hua University, Taiwan. *Advisor: Chao-Qiang Geng*
PhD in Physics (joint degree).

2013 - 2017 National Tsing Hua University, Taiwan.
B.Sc Double major in Physics and Mathematics.

Honors and Awards

2023 Honorable Mention in the Gravitational Wave International Committee (GWIC)-Braccini Thesis Prize
2023 Dr. Friedrich Förster Prize, one awardee in Faculty of Science in University of Tübingen, €1,000.
2023 Student Outstanding Paper Award from NCTS (Taiwan), converted as ∼ 620 USD.

Funded Grant Activity

2020 - 2021 "Neutron stars as gravitational wave sources", Sandwich-Scholarship Programme, DAAD and MOST (Taiwan), €13,500.
2017 - 2020 Presidential Scholarship of National Tsing Hua University (Taiwan), converted as ∼18,700 USD.

Reviewing Activities

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

List of Presentations

Plenary Talks at Conferences and Workshops

2022

Sep 10 "**Premerger Neutron Star Physics**", Eleventh Aegean summer school, Syros, Greece.

Invited Seminars

2024

Aug 1 "**On the finite-size imprints on waveforms of binary neutron star mergers**", UIUC.
July 11 "**Imprints of matter and scalar effects on waveforms from binary neutron star mergers**", online-seminar-in-mathematical-numerical-relativity (website).
April 24 "**Imprints of matter and scalar effects on waveforms from binary neutron star mergers**", Institute for Gravitational and Subatomic Physics (GRASP), Utrecht University.
April 8 "**(Dynamical) Tidal Effects in the Binary Neutron Star mergers**", AstroParticle and Cosmology laboratory (APC), Paris, France.

2023

March 16 "**Dynamical Scalarization during Neutron Star Mergers in scalar-Gauss-Bonnet Theory**", University of Tübingen, Germany.
February 3 "**Developing waveform involving dynamical tides**", Academia Sinica, Taipei, Taiwan.
February 2 "**Gravitational Phase Transition in Massive Scalar-tensor Theory**", National Center for Theoretical Sciences, Hsinchu, Taiwan.

2021

July 27 "g**-mode resonances as triggers for precursors of SGRBs**",

Grav@zon group, Federal University of Pará, Pará, Brazil.

Jun 22 "**Dynamical formation of scalarized black holes and neutron stars through stellar core collapse**",
cosmo/GW journal club, Johns Hopkins University, Maryland, USA.

Contributed Talks

2024

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

Feb 28 "**Binary neutron star mergers in massive scalar-tensor theory**",
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**",
CoCoNut meeting, Potsdam, Germany.

March 22 "**Packed Message delivered by Tides in Binary Neutron Star Mergers**",
SMuK2023, Technical University Dresden, Germany.

2022

Sep 08 "**Gravitaional Phase Transition**", 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**",
DPG Meeting of the Matter and Cosmos section (SMuK), Heidelberg, Germany.

2021

Aug30 - Sep3 "**Tidal g-mode resonances in coalescing binaries of neutron stars as triggers for precursor flares of short gamma-ray bursts**",
DPG Meeting of the Matter and Cosmos section (SMuK), Bad Honnef, Germany.

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

Teaching Activities

Teaching assistant

At Tsing Hua	General Relativity (2016 Fall, 2018 Fall)
	Mathematical Physics (2017-2018)
	Thermal Physics (2016-2017)
	Calculus (2018-2019)
At Tübingen	Physical Practical (2021 Summer & Winter)
	Grundkurs Electromagnetism (2022 Summer)

Publication Statisitc

Number of first author articles	...	11
Refereed Articles	...	18
Preprints/journal sumissoions	...	3
Citations	...	222
h index (HEP-SPIRES)	...	10

First-author refereed/under-review publications

1. **H.-J. Kuan**, K. Kiuchi, M. Shibata. Tidal Resonance in Binary Neutron Star Inspiral: A High-Precision Study in Numerical Relativity. arXiv:2411.xxxxx.

2. **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.

3. **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.

4. **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.

5. **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.

6. (*) **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.

7. **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.

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.

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. 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.

11. (*) **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.

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 - I. Theoretical framework and crust breaking. MNRAS, 506(2):2985–2998, September 2021.

Second-author refereed/under-review publications

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. Phys.Rev.D 110:104018, November 2024.

3. 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.

4. A. G. Suvorov, **H.-J. Kuan**, Alexis Reboul-Salze and K. D. Kokkotas. Magnetic amplification in premerger neutron stars through resonance-induced magnetorotational instabilities. Phys.Rev.D 109:103023, May 2024.

5. 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.

6. 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.

7. 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.

8. 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.

Other co-authored refereed/under-review publications

1. A. T.-L. Lam, Yong Gao, **H.-J. Kuan**, M. Shibata, K. Van Aelst, K. Kiuchi. Accessing universal relations of binary neutron star waveforms in massive scalar-tensor theory. arXiv:2410.00137