

JAVIER MORÁN FRAILE

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WORK EXPERIENCE

Postdoctoral Researcher, Heidelberg Institute for Theoretical Studies

May. 2024 - Ongoing

EDUCATION

PhD in physics, University of Heidelberg

Oct. 2019 - Apr. 2024

Dissertation: *Simulating the dynamical interaction of white dwarf stars in binaries*

Main advisors: Prof. F. Röpke & Dr. F. Schneider

Joint MSc in Physics and Astronomy, UvA & VU Amsterdam

Aug. 2017 - Aug. 2019

Dissertation: *Effects of accretion induced Chemically Homogeneous Evolution on the binary black hole Population*

Main advisors: Prof. S. E. de Mink & Prof. S. Justham

BSc in Physics, University of Valladolid

Sep. 2012 - Jul. 2017

Dissertation: *Simulating charge diffusion in materials of extremely low electrical conductivity*

Main advisors: Prof. J. M. Muñoz-Castañeda, Prof. O. Alejos

GRANTS, FELLOWSHIPS AND AWARDS

Awarded: 12 000 000 CPU hours “Hydrodynamical simulations of stellar binary interaction”, Baden-Württemberg High Performance Computing center, BinAC cluster.

Project Bw20B011.

Feb. 2020- Feb. 2024

International Max Planck Research School fellowship Max Planck institute for astronomy & cosmic physics at the University of Heidelberg.

Oct. 2019- Dec. 2023

Award: Best MSc Thesis presentation, University of Amsterdam

Jul. 2019

SELECTED TALKS

International conferences and meetings

- Common Envelope Physics and Outcomes (CEPO) Sep. 2021. Haifa, Israel
Gravitational waves from common-envelopes
- European Astronomical Society (EAS) annual meeting Jul 2023. Krakow, Poland
Simulating common-envelope mergers in 3D

Invited seminars

- Joint seminar in the groups of Dr. Seitenzahl and Dr. Ruiter, **UNSW - Canberra, Australia**
3DMHD simulations of compact object mergers Dec. 2022
- Seminar in the research group of Dr. Lopez-Camara, **UNAM - Mexico City, Mexico**
Gravitational Wave Emission from Dynamical Stellar Interactions Mar. 2023 (online)

TEACHING EXPERIENCE

TA for the MSc lecture “Computational Astrophysics”, University of Heidelberg, (2020 & 2022)

LANGUAGES

Spanish: Native speaker

English: Fluent

German: Good command

French: Basic communication skills

REFERENCES

Prof. Dr. Friedrich Röpke	HITS, PhD advisor	friedrich.roepke@h-its.org
Dr. Ruediger Pakmor	MPA, collaborator	rpakmor@mpa-garching.mpg.de
Dr. Fabian Schneider	HITS, PhD advisor	fabian.schneider@h-its.org
Prof. Selma E. de Mink	MPA, MSc supervisor	sedemink@mpa-garching.mpg.de
Prof. S. Justham	CAS, MSc supervisor	sjustham@mpa-garching.mpg.de

Publication List

- 2024: Parameswaran, A.; Seoane, A. **Morán-Fraile, J.**; et al.; **Submitted to JCAP**; *The Lunar Gravitational-wave Antenna: Mission Studies and Science Case*.
Contribution: Generated the waveforms and estimated detectability of gravitational waves from neutron star - white dwarf mergers with this proposed instrument and produced the corresponding figures.
- 2024: Korol, V.; Buscicchio, R.; Pakmor, R.; **Morán-Fraile, J.**; Moore, C. J. ; de Mink, S. E.; **Submitted to A&A**; *Expected insights on type Ia supernovae from LISA's gravitational wave observations*.
Contribution: Implemented the computation of GW in the code that was used for all the simulations analyzed in this study, and produced one of the simulations studied. Analyzed the time domain data and produced corresponding figures.
- 2024: Pakmor, R.; Pelisoli, I.; Justham, S.; Rajamuthukumar, A. S.; Röpke, F. K.; Schneider, F. R. N.; de Mink, S. E.; Ohlmann, S. T.; Podsiadlowski, P.; **Morán-Fraile, J.**; Vetter, M. ; Andrassy, R.; **Submitted to A&A**; *Large-scale ordered magnetic fields generated in mergers of helium white dwarfs*
Contribution: Discussed methods, analysis, and results during the production of the simulations and the writing of the manuscript.
- 2024: **Morán-Fraile, J.**; Holas, A.; F. K. Röpke; R. Pakmor; F. R. N. Schneider; **A&A, 683 A44**; *Faint calcium-rich transient from a double-detonation of a $0.6 M_{\odot}$ carbon-oxygen white dwarf*
- 2024: **Morán-Fraile, J.**; F. K. Röpke; R. Pakmor; M. A. Aloy; S. T. Ohlmann; F. R. N. Schneider; G. Leidi; **A&A, 681 A41**; *Self-consistent MHD simulation of jet launching in a neutron star - white dwarf merger*
- 2024: A. Kozyreva; **Morán-Fraile, J.**; A. Holas; V. A. Bronner; F. K. Röpke; N. Pavlyuk; D. Tsvetkov; **A&A, 684 A97**; *Thermonuclear explosions as Type II supernovae*
Contribution: Author of the hydrodynamic simulation, gravitational waves and neutrino computation.
- 2023: **Morán-Fraile, J.**; F. R. N. Schneider; F. K. Röpke; S. T. Ohlmann; R. Pakmor; T. Sultanis; A. Bauswein; **A&A, 672 A9**; *Gravitational Wave emission from dynamical stellar interactions*
- 2020: Van Son, L. A. C.; De Mink, S. E.; Broekgaarden, F. S.; Renzo, M.; Justham, S.; Laplace, E.; **Morán-Fraile, J.**; Hendriks, D. D.; Farmer, R.; **ApJ 897, 100V**; *Polluting the pair-instability mass gap for binary black holes through super-Eddington accretion in isolated binaries*
Contribution: Helped to develop the code implementation.