Lorenzo Pompili

Curriculum Vitae

Max Planck Institute for Gravitational Physics (Albert Einstein Institute)
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Research interests Gravitational-wave (GW) astronomy and data analysis. GW modelling for compact binaries. Parameter estimation and tests of General Relativity with GW sources. GW accuracy requirements for next-generation detectors.

Education

Jun 2021 – Present **PhD Student**.
Max Planck Institute for Gravitational Physics, Potsdam (Germany)

PhD Thesis: *Ever more accurate effective-one-body waveforms for gravitational-wave astrophysics*. Supervisor: Prof. Alessandra Buonanno (Max Planck Institute for Gravitational Physics)

Sep 2018 – Apr 2021 **Master Degree in Theoretical Physics - 110/110 cum laude**.
Università degli Studi di Perugia, Perugia (Italy)

Master Thesis: *Near-extreme Kerr magnetospheres*. Supervisor: Prof. Marta Orselli (Università degli Studi di Perugia, Niels Bohr Institute)

Sep 2015 – Sep 2018 **Bachelor Degree in Physics - 110/110 cum laude**.
Università degli Studi di Perugia, Perugia (Italy)

Bachelor Thesis: *Relativistic hydrodynamics*. Supervisor: Prof. Gianluca Grignani (Università degli Studi di Perugia)

Talks

Invited talks marked with *.

09/2024	LIGO-Virgo-KAGRA Collaboration Meeting, Barcelona. Title: *Accounting for Numerical-Relativity Calibration Uncertainty in Gravitational-Wave Modeling and Inference*
09/2024	TEONGRAV Workshop, Rome. Title: *Inspiral-merger-ringdown waveforms in Einstein-scalar-Gauss-Bonnet gravity within the effective-one-body formalism*
09/2024	* Fundamental Physics Meets Waveforms With LISA, Potsdam. Title: *SEOBNRv5: advancements in effective-one-body gravitational waveforms towards LISA*
09/2024	* Fundamental Physics Meets Waveforms With LISA, Potsdam. Panel member: *LISA MBHB Accuracy Requirements*
09/2024	* Fundamental Physics Meets Waveforms With LISA, Potsdam. Panel member: *Impact of systematics on tests of GR*
07/2024	* PAX IX Workshop, London. Panel member: *Waveform challenges and Numerical Relativity*
03/2024	LIGO-Virgo-KAGRA Collaboration Meeting, Baton Rouge. Title: *Inspiral-merger-ringdown waveforms in Einstein-scalar-Gauss-Bonnet gravity within the effective-one-body formalism*

09/2023	LIGO-Virgo-KAGRA Collaboration Meeting, Toyama. Title: *Accounting for numerical relativity calibration uncertainty in modeling and inference of gravitational waves*
07/2023	26th Capra Meeting on Radiation Reaction in General Relativity, Copenhagen. Title: *Enhancing the SEOBNRv5 effective-one-body waveform model with second-order gravitational self-force fluxes*
09/2022	LIGO-Virgo-KAGRA Collaboration Meeting, Cardiff. Title: *Update on SEOBNR waveform development for O4a*
03/2022	DPG Spring Meeting, Heidelberg (virtual). Title: *New generation effective-one-body waveforms for binary black-holes with non-precessing spins*

Teaching experience

2022	Teaching assistant for Prof. Alessandra Buonanno's course on Gravitational Waves, *Humboldt University, Berlin*

Memberships

2024–	LISA Distributed Data Processing Center CU-WAV member
2023–	LISA Consortium full member
2022–	Einstein Telescope Collaboration member
2021–	LIGO Scientific Collaboration member

Service

2024-	Liaison between the testing General Relativity and parameter estimation subgroups of the LIGO-Virgo-KAGRA collaboration.
2023-	Referee for Phys. Rev. D

Organizational duties

09/2024	Fundamental Physics Meets Waveforms With LISA Workshop
	Local organizing committee
2023-	AEI LIGO meeting organizer
	Organized weekly meetings dedicated to LIGO science at the AEI
2021-	AEI EOB meeting organizer
	Organized weekly meetings dedicated to EOB waveform modeling at the AEI

IT Skills

Python, Cython, Mathematica, C/C++
Git, LaTeX, HTCondor, Slurm, Linux

Open source software

2021–	pySEOBNR
	Accurate and efficient gravitational wave models for compact binary coalescences using the effective-one-body (EOB) approach.

Publications (short author-list)

Short author-list publications in reversed chronological order.

[10] **Lorenzo Pompili**, Alessandra Buonanno and Michael Pürrer, *Accounting for Numerical-Relativity Calibration Uncertainty in Gravitational-Wave Modeling and Inference*
Submitted to Phys.Rev.Lett., arXiv:2410.16859

[9] Félix-Louis Julié, **Lorenzo Pompili**, Alessandra Buonanno, *Inspiral-merger-ringdown waveforms in Einstein-scalar-Gauss-Bonnet gravity within the effective-one-body formalism*
Submitted to Phys.Rev.D., arXiv:2406.13654

[8] Alessandra Buonanno, Gustav Mogull, Raj Patil, **Lorenzo Pompili**, *Post-Minkowskian Theory Meets the Spinning Effective-One-Body Approach for Bound-Orbit Waveforms*
Accpted in Phys.Rev.Lett., arXiv:2405.19181

[7] Arnab Dhani et al. (inc. **Lorenzo Pompili**), *Systematic Biases in Estimating the Properties of Black Holes Due to Inaccurate Gravitational-Wave Models*
Submitted to Phys.Rev.X, arXiv:2404.05811

[6] Alexandre Toubiana, **Lorenzo Pompili** et al., *Measuring source properties and quasi-normal-mode frequencies of heavy massive black-hole binaries with LISA*
Phys. Rev. D 109 (2024) 10, 104019, arXiv:2307.15086

[5] Deyan P. Mihaylov et al. (inc. **Lorenzo Pompili**), *pySEOBNR: a software package for the next generation of effective-one-body multipolar waveform models*
Submitted to SoftwareX, arXiv:2303.18203

[4] Maarten van de Meent et al. (inc. **Lorenzo Pompili**), *Enhancing the SEOBNRv5 effective-one-body waveform model with second-order gravitational self-force fluxes*
Phys.Rev.D 108 (2023) 12, 124038, arXiv:2303.18026

[3] Antoni Ramos-Buades et al. (inc. **Lorenzo Pompili**), *SEOBNRv5PHM: Next generation of accurate and efficient multipolar precessing-spin effective-one-body waveforms for binary black holes*
Phys.Rev.D 108 (2023) 12, 124037, arXiv:2303.18046

[2] Mohammed Khalil et al. (inc. **Lorenzo Pompili**), *Theoretical groundwork supporting the precessing-spin two-body dynamics of the effective-one-body waveform models SEOBNRv5*
Phys.Rev.D 108 (2023) 12, 124036, arXiv:2303.18143

[1] **Lorenzo Pompili** et al., *Laying the foundation of the effective-one-body waveform models SEOBNRv5: improved accuracy and efficiency for spinning non-precessing binary black holes*
Phys.Rev.D 108 (2023) 12, 124035, arXiv:2303.18039

Publications (long author-list)

Long author-list publications with substantial personal contribution, in reversed chronological order. As a member of the LIGO Scientific Collaboration, I am a co-author on several full-collaboration papers, see INSPIRE for a full list.

[3] Anuradha Gupta et al. (inc. **Lorenzo Pompili**), *Possible Causes of False General Relativity Violations in Gravitational Wave Observations*
Submitted to SciPost Physics Community Reports, arxiv:2405.02197

[2] LIGO-Virgo-KAGRA Collaboration (inc. **Lorenzo Pompili**), *Observation of Gravitational Waves from the Coalescence of a $\sim 2.5-5 M_\odot$ Compact Object and a Neutron Star*
Astrophys.J.Lett. 970 (2024) 2, L34, arXiv:2404.04248

[1] LISA Consortium Waveform Working Group (inc. **Lorenzo Pompili**), *Waveform Modelling for the Laser Interferometer Space Antenna*
Submitted to Living Rev.Rel., arXiv:2311.01300