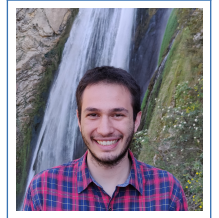


# Lorenzo Speri

PhD Student

in Gravitational-Wave Physics

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Born: 26/01/1996



## Education

- September 2020 - **PhD**, Max Planck Institute for Gravitational Physics (Albert Einstein Institute).  
LISA data analysis with focus on Extreme Mass Ratio Inspirals sources.  
Statistical and data analysis methods for LISA sources with applications in Cosmology.
- 2018 - 2020 **Master of Theoretical Physics MSc**, University of Heidelberg and Max Planck Institute for Gravitational Physics (Albert Einstein Institute).  
Core specialization in General Relativity and Theoretical Physics.  
Master thesis: *Effective Resonance Model: a small step for the constants of motion, a giant leap for biases in EMRI parameter estimation* jointly supervised by Prof. Jonathan Gair (Max Planck Institute for Gravitational Physics) and Prof. Matthias Bartelmann (University of Heidelberg). The goal of the project is to assess how transient resonances of Extreme Mass Ratio Inspirals influence the gravitational wave signals and their possible detectability with LISA.
- 2015 - 2018 **Bachelor of Physics BSc**, University of Trento.  
Erasmus+ Programme Scholarship: 10 months as an exchange student at the University of Oslo (2017/2018).  
Thesis: *Analyzing Gravitational Waves through Numerical Simulations of Compact Binaries*.  
I performed simulations of 6 binary black hole systems with different initial conditions and a binary neutron star system and I analyzed the emitted gravitational waves and their spectra. The thesis was carried out under the supervision of Prof. Bruno Giacomazzo and by using the computer cluster at the University of Oslo.  
<https://github.com/lorenzsp/Bachelor-Thesis>  
Degree examination: 110/110

## Conferences, Workshops and Schools

- 1-3/09/20 **LISA Symposium XIII**, Online.
- 25-27/05/20 **BHPToolkit Spring 2020 workshop**, Online.
- 20-24/05/19 **The Mysterious Universe: Dark Matter - Dark Energy - Cosmic Magnetic Fields**, Mainz Institute for Theoretical Physics, Johannes Gutenberg University.
- 13-15/05/19 **LISA Waveform Working Group Meeting**, Max Planck Institute for Gravitational Physics (Albert Einstein Institute), Potsdam.
- 8-12/04/19 **Advanced Workshop on Accelerating the Search for Dark Matter with Machine Learning**, ICTP, Trieste.
- 11-22/03/19 **Theoretical Aspects of Astroparticle Physics, Cosmology and Gravitation**, Galileo Galilei Institute, Firenze.  
Neutrino physics (F. Feruglio), Galactic cosmic rays and multimessenger astronomy (F. Donato), Gravitational waves and compact binaries (E. Barausse), Cosmological perturbation theory and structure formation (V. Desjacques)
- 09/2018 **Gaia Data & Science**, University of Heidelberg.  
Summer School at the International Max Planck Research School for Astronomy & Cosmic Physics
- 04/2018 **Spring workshop in nuclear and particle physics**, CERN.  
The workshop seminars covered: Heavy ion physics, Astroparticle physics and Dark matter, Radioactive Ion Beams for Medical Applications, Particle accelerators, Electroweak interactions, and the discovery of the Higgs boson.
- 09/2014 **Discovering high-mass particles with CMS**, University of Padova.  
The purpose of the workshop was to estimate the mass of the Z boson, using basic experimental particle physics and data analysis. The work was supervised by Mia Tosi and Prof. Franco Simonetto

## Awards

September **Merit Award**, *University of Trento*.

2019 Students who have achieved remarkable results at the end of their degree

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## Memberships and Organisational Duties

2020 - **LISA Consortium member**.

09/2020 **AEI LISA meeting organiser**.

In charge of organising monthly meetings broadly related to LISA science.

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## Talks

02/09/2018 **Cosmological Evidences of Dark Matter from the CMB**, *University of Heidelberg*.

Physics of the Cosmological Microwave Background and the cosmological evidence of dark matter through the analysis of the CMB fluctuations within the  $\Lambda$ CDM model.

25/02/2020 **Effects of transient resonances on Gravitational Waves from EMRIs**, *University of Heidelberg*.

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## Work Experience

2014 - 2017 **Private tutor of Physics and Mathematics**.

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## IT Skills

### C/C++ Scientific Programming.

Numerical simulations of Extreme Mass Ratio Inspirals, prediction of Hubble expansion function with measurements of SuperNovae Type Ia using function basis series, parallelized Monte Carlo sampling, Crank-Nicolson algorithm for solving 2d diffusion equation, ODE solvers.

### Python, Matlab.

Basic Machine Learning algorithms, Data Cleaning and Data Visualization.

### EinsteinToolkit, Cactus Framework.

Numerical relativistic simulations of compact binaries.

The codes of the numerical simulations, the scripts of the data analysis and data visualization are available on my GitHub address <https://github.com/lorenzsp>

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## Language Skills

Italian Native language

English Fluent

German Internationalen Studien Zentrums der Universität Heidelberg: B1

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## Other

**Academic Website**, <https://www.aei.mpg.de/person/102224>.

**GitHub Website**, <https://github.com/lorenzsp>.

### Personal Interests.

I play piano and I love listening to classical music. I have played rugby for six years, but I also like swimming, skiing and climbing.

In compliance with the Italian Legislative Decree no. 196 dated 30/06/2003, I hereby authorize the recipient of this document to use and process my personal details for the purpose of recruiting and selecting staff and I confirm to be informed of my rights in accordance to art. 7 of the above mentioned decree.