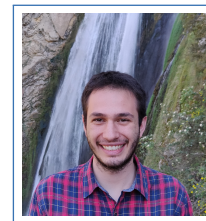


# Lorenzo Speri

*Master Student in Theoretical Physics*

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Born: 26/01/1996



## Education

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 (1.0).

I am currently working on my master thesis 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 develop a model for transient resonances of Extreme Mass Ratio Inspirals and analyse how they affect the gravitational wave signals.

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 has been carried out under the supervision of prof. Bruno Giacomazzo and by using the cluster of the University of Oslo.

<https://github.com/lorenzsp/Bachelor-Thesis>

Degree examination: 110/110

## Workshops and Schools

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.

Fall 2014 **Arduino Programming Course**, *Institute L. Calabrese - P. Levi.*

Spring 2014 **Mente e Cervello**, *University of Verona.*

Neurobiology of emotions and memory

## Awards

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

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

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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.

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## Work Experience

- 2014 - 2017 **Private tutor of scientific subjects.**

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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 to obtain gravitational wave signals.

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.