

# Lavinia Paiella

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## Research interests

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I am strongly interested in **compact objects** and their **multi-messenger** emissions. I am currently investigating the role of **star clusters** in producing **heavy intermediate-mass black holes** using semi-analytic **population synthesis codes** and their potential detection with current and future **gravitational-wave** interferometers.

## Education

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### Ph.D. program

*Astroparticle Physics*

Supervisors: Prof. Manuel Arca Sedda, Prof. Gor Oganessian

**keywords:** intermediate mass black holes, star clusters, population codes, gravitational waves

**Gran Sasso Science Institute**

*Nov 2022 - Present*

### Master degree

*Astrophysics, 110/110 w.h.*

**keywords:** neutron star binaries, gravitational waves, kilonovae

**La Sapienza University**

*Sep 2020 - Sep 2022*

### Bachelor Degree

*Physics, 110/110 w.h.*

**keywords:** machine learning, galaxy surveys

**La Sapienza University**

*Sep 2017 - Sep 2020*

## Awards and Honours

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### Transnational Visitor Programme Grant

*Awarded by AHEAD2020, ~ 2.5k euros*

*April 2024*

Grant for short-term visitor programmes aimed at the realization of projects in high energy astrophysics.

### Milla Baldo Ceolin National Prize

*Awarded by INFN, ~ 1k euros*

*July 2023*

National award for the 10 best master theses in Theoretical Physics written by women.

## Scientific visits

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### Short term stay (AHEAD2020)

*Barcelona, Spain*

**ICCUB**

*22 Sept - 13 Oct 2024*

Project on the formation of black hole - neutron star binaries and their potential as gamma-ray bursts progenitors. Supervision of Dr. Sara Rastello and Prof. Mark Gieles.

### Short term stay

*Baltimore, USA*

**Johns Hopkins University**

*25 Oct - 23 Nov 2023*

Hosted by Prof. Emanuele Berti's research group in the context of ITA-USA Bilateral Agreement between GSSI and Johns Hopkins University.

## Publications (short-author)

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- [1]: **Paiella L.**, Arca Sedda M., Mestichelli B., Ugolini C., *Seeds to success: growing heavy black holes in dense star clusters*, *arXiv preprint*, arXiv:2511.00200
- [2]: **Paiella, L.**, Ugolini, C., Spera, M., Branchesi, M., and Arca Sedda, M., *Assembling GW231123 in star clusters through the combination of stellar binary evolution and hierarchical mergers*, *ApJL*, accepted, 2025, arXiv:2509.10609
- [3]: Mestichelli B., Mapelli M., Santoliquido F., Arca Sedda M., Branchesi M., **Paiella L.**, Costa G., Iorio G., Mould M. and Lipatova V., *et al.*, *Black Hole - Neutron Star and Binary Neutron Star Mergers from Population III and II stars*, *arXiv preprint*, arXiv:2506.13870
- [4]: Toubiana, A., Gerosa, D., Mould, M., Rinaldi, S., Arca Sedda, M., Bruel, T., Buscicchio, R., Gair, J., **Paiella, L.**, Santoliquido, F., Tenorio, R., Ugolini, C., *Comparing astrophysical models to gravitational-wave data in the observable space*, *arXiv preprint*, arXiv:2507.13249
- [5]: Cozzumbo, A., Mestichelli, B., Mirabile, M., **Paiella, L.**, Tissino, J., and Harms, J., *Opportunities and limits of lunar gravitational-wave detection*, *Phil. Trans. R. Soc. A*, 2023, rsta.2023.0066

## Seminars & Talks

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### Seminars.....

#### Galaxy Evolution Coffee

Garching, Germany

**ESO**

13 Nov 2025

#### APC Seminars

Trieste, Italy

**SISSA**

19 March 2025

#### Pizza Seminars

Barcelona, Spain

**ICE - CSIC**

11 Oct 2024

### Contributed talks.....

#### EAS 2025

Cork, Ireland

**University College Cork**

23-27 June 2025

#### MODEST 2025

Seoul, South Korea

**Seoul National University**

16-20 June 2025

#### ET Symposium 2025

Bologna, Italy

**CNR center**

26-30 May 2025

#### Unveiling massive black hole evolution with gravitational waves and light

Paris, France

**APC Paris**

19-23 May 2025

#### MODEST 2024

Warsaw, Poland

**Nicolaus Copernicus Astronomical Center**

19 -23 Aug 2024

### Short talks.....

#### Challenges and future perspectives in GW astronomy

Leiden, Netherlands

**Lorentz center**

14 -18 Oct 2024

## Outreach

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### European Researchers' Night

*L'Aquila, Italy*

Volunteered at the activities organized by Gran Sasso Science Institute.

**Gran Sasso Science Institute**

*26 Sep 2025*

### Space Explorers

*L'Aquila, Italy*

Outreach event organized by the Astrophysics and Cosmology Group of Gran Sasso Science Institute for elementary schools in L'Aquila.

**Gran Sasso Science Institute**

*2023 - Present*

### European Researchers' Night

*L'Aquila, Italy*

Volunteered at the activities organized by Gran Sasso Science Institute.

**Gran Sasso Science Institute**

*29-30 Sep 2023*

## Technical skills

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**Programming:** Python (advanced),  
C/C++ (intermediate),  
Mathematica, Fortran (beginner)

**O.S.:** Linux, Windows (advanced)

**Other:**  $\text{\LaTeX}$ , Office (advanced),  
Matlab (beginner)

## Languages

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**Italian:** Native

**English:** Proficient

*IELTS Certificate, average score: 8 (January 2022)*