

Lavinia Paiella

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Research interests

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

Ph.D. program

Astroparticle Physics

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

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

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

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)

- [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

Seminars

Galaxy Evolution Coffee <i>Garching, Germany</i>	ESO 13 Nov 2025
APC Seminars <i>Trieste, Italy</i>	SISSA 19 March 2025
Pizza Seminars <i>Barcelona, Spain</i>	ICE - CSIC 11 Oct 2024

Contributed talks

EAS 2025 <i>Cork, Ireland</i>	University College Cork 23-27 June 2025
MODEST 2025 <i>Seoul, South Korea</i>	Seoul National University 16-20 June 2025
ET Symposium 2025 <i>Bologna, Italy</i>	CNR center 26-30 May 2025
Unveiling massive black hole evolution with gravitational waves and light <i>Paris, France</i>	APC Paris 19-23 May 2025
MODEST 2024 <i>Warsaw, Poland</i>	Nicolaus Copernicus Astronomical Center 19 -23 Aug 2024

Short talks

Challenges and future perspectives in GW astronomy <i>Leiden, Netherlands</i>	Lorentz center 14 -18 Oct 2024
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Outreach

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

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

O.S.: Linux, Windows (advanced)

Other: L^AT_EX, Office (advanced),
Matlab (beginner)

Languages

Italian: Native

English: Proficient

IELTS Certificate, average score: 8 (January 2022)