

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 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

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*, 2025, 10.3847/2041-8213/ae1447
- [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*, *A&A*, 10.1051/0004-6361/202555951
- [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

Garching, Germany

ESO

13 Nov 2025

APC Seminars

Trieste, Italy

SISSA

19 March 2025

Pizza Seminars

Barcelona, Spain

ICE - CSIC

11 Oct 2024

Invited talks.....

GRaviCon2026

Pisa, Italy

Scuola Normale Superiore

22-24 April 2026

Contributed talks.....

Lisa Astro-WG Meeting

Geneva, Switzerland

Campus Biotech

15-17 Dec 2025

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

Ricerca Fuori Campo

L'Aquila, Italy

Event moderator of public discussion on the representation and role of researchers in society.

Gran Sasso Science Institute

24 Nov 2025

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)