Maria Paola Vaccaro

Born on July 11th, 1997
in Larino (CB), Italy

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Scientific interests

○ Computational astrophysics
○ Compact objects
○ Stellar evolution
○ Gravitational waves sources
○ Black holes dynamics
○ Stellar clusters

Numerical tools

Python ● ● ● ●
C ● ● ● ○
Matlab ● ● ● ○

Operating systems

Linux/Unix ● ● ● ○
Windows ● ● ● ○

Languages

Italian (mother tongue)
English (fluent, level C1)
Spanish (basic, level A2)

Education

Oct. 2020 – Sep. 2022 **Master degree in Astrophysics**
At Università degli Studi di Padova, Padua (PD), Italy
Final grade: 110/110 *cum laude*, GPA: 29.4/30
Supervisor: Prof. Michela Mapelli - Thesis title: "Hierarchical Black Holes Mergers in Active Galactic Nuclei"

Sep. 2019 – Jul. 2020 **Master course in Matter Physics**
At Università di Pisa, Pisa (PI), Italy - GPA: 28.8/30

Sep. 2016 – Sep. 2019 **Bachelor degree in Physics**
At Università di Pisa, Pisa (PI), Italy
Final grade: 110/110 *cum laude*, GPA: 28.6/30
Supervisor: Prof. Pier Giorgio Prada Moroni - Thesis title: "Evoluzione di raffreddamento delle nane bianche e cosmocronologia" (i.e. "Cooling evolution of white dwarfs and cosmochronology")

Sep. 2011 – Jul. 2016 **High school diploma**
At Liceo Scientifico Alfano da Termoli, Termoli (CB), Italy
Final grade: 100/100 *cum laude*

Aug. 2014 – Jul. 2015 **High school exchange year**
At Mead High School in Mead, Colorado, USA
GPA: 4.0/4 - ACT score: 33/36

Current activity

I am a computational astrophysicist, working in the field of gravitational-wave astronomy and black hole dynamics.

In particular, I am currently developing a semi-analytical model of the active galactic nucleus (AGN) disk scenario for hierarchical black hole mergers. The AGN environment enhances interactions among black holes, with consequent efficient binary formation and rapid merger. The merger remnants are usually retained in the system and they can often go through multiple episodes of pair-up and merger. Hence, AGNs are promising environments for the formation of black holes in the upper mass gap with masses $M_{\mathrm{BH}} \in [50,\, 130]\, M_{\odot}$ and intermediate-mass black holes with masses $M_{\mathrm{BH}} \in \left[10^2,\, 10^5\right] M_{\odot}$.

Funding

February 1st – August 31st, 2023 **Pre-doctoral fellowship**, DEMOBLACK ERC Team

For the research project entitled "Hierarchical evolution of stellar-sized binary black holes in active galactic nuclei" under the supervision of Prof. Michela Mapelli at Università degli Studi di Padova, Padua (PD), Italy.

October 1st – December 31st 2022 **Fellowship** in Gravitational Waves Physics at IFAE-UAB, Barcelona, Spain under the supervision of Prof. Mario Martinez Perez and Dr. Lluïsa-Maria Mir i Martínez

Invited talks

June 26th – 30th, 2023 Poster presentation at the workshop "**The Renaissance of Stellar Black-Hole Detections in The Local Group**" hosted by Lorentz Center, Leiden, Netherlands

April 19th – 21st, 2023 Invited Speaker, "**Physics of Data Workshop**", invited talk about "How do black holes grow? Active galactic nuclei as a breeding ground for intermediate-mass black holes", Venezia, Italy

Publications submitted

- The Hitchhiker's guide to the galaxy catalog approach for gravitational wave cosmology, Jonathan R. Gair, Archisman Ghosh, Rachel Gray, ..., Maria Paola Vaccaro et al., 2022, *ApJ*, arXiv:2212.08694

Recent courses and conference attendance

- IAU-IAA Astrostatistics and Astroinformatic Seminar Series
  - "Machine-learning Bayesian inference with Gaussian processes", Jesùs Torrado - May 9th, 2023
  - "Bayesian inference of astronomical populations", Daniel Mortlick - April 11th, 2023
- 4th G2Net Training School "A network for Gravitational Waves, Geophysics and Machine Learning" hosted by Aristotle University of Thessaloniki (remote attendance) - March 28th-30th, 2023
- Python Course (level advanced) hosted by ICFO in Barcelona, Spain - November 24th-30th, 2022
- Einstein Telescope Annual Meeting hosted by EGO, Pisa, Italy (attended remotely) - November 15th-17th, 2022
- GW Open Data Workshop hosted by GWOSC (online event) - May 23rd-25th, 2022
- IFPU colloquium "Massive black hole pairs and binaries in the cosmos", Marta Volonteri - March 25th, 2022
- IPAM Workshop III: Source inference and parameter estimation in Gravitational Wave Astronomy (remote attendance) - November 15th-19th, 2021

Outreach

- Member of the cultural association Scholé based in Roccella Ionica (RC), Italy since 2020.
- Member of the organizing committee for the Scholé "School of physics" 2023: a series of lectures held by university professors in the high school Liceo Volta in Reggio Calabria (RC), Italy.

Awards and other activities

- Don Peppe Presutto award from Circolo CFR Serracapriola for academic achievements - 2016, 2020, 2023
- Aupair program in Cork, Ireland for language enhancement - Summer 2018
- Lions Club Tifernus award and scholarship for educational achievements - 2016
- Internship in the local newspaper Termolionline in Termoli (CB), Italy - June 2014