

ULYANA DUPLETSA - CV

PhD in Astroparticle Physics

ABOUT ME

I am an astrophysicist focused on studying gravitational waves from compact binaries, namely binary black hole and binary neutron star systems. My research involves both current detectors, such as the LIGO-Virgo-KAGRA Collaboration, and future instruments like the Einstein Telescope. My areas of interest include data analysis -Fisher forecasts and Bayesian statistics-, cosmology, and multi-messenger astrophysics.

CONTACT INFO

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GitHub  <https://github.com/u-dupletsa>
Website <https://ulyanadupletsa.github.io/>

CURRENT POSITION

Postdoctoral Research Fellow **Mar 2025-current**
HEPHY, ÖAW | Vienna, Austria

EDUCATION

PhD Student in Astroparticle Physics **Nov 2020-Feb 2025**
Gran Sasso Science Institute | L'Aquila, Italy

- PhD Thesis on "*Cosmic Chirps: Extracting Cosmological and Astrophysical Information from Compact Binary Mergers*", defended on 16th May 2025
- Supervisor: Prof. Jan Harms
- Co-Supervisors: Prof. Marica Branchesi, Dr. Riccardo Murgia

Master's degree in Theoretical Physics - 110/110 cum Laude **2017-2019**
University of Milano Bicocca | Milan, Italy

- Thesis on "*Thermodynamic Aspects of AdS_4 Black Holes in $N = 2$ Gauged Supergravity*" supervised by Prof. Alberto Zaffaroni

Bachelor's Degree in Physics - 110/110 cum Laude **2013-2017**
The University of Milano Bicocca | Milan, Italy

- Thesis on "*Supermassive Binary Black Holes and their Dynamics in Galactic Nuclei*" supervised by Prof. Monica Colpi

VISITINGS

University of Cagliari **22-26 Apr, 2024**
Cagliari, Italy

- **Invited seminar** on '*ET forecasts on cosmological growth of BH masses*'

Johns Hopkins University **Oct-Nov, 2023**
Baltimore, United States

- Collaboration with Emanuele Berti's group (mainly with Dr. Ken Ng) as part of the exchange program MAECI MUR organized by Andrea Maselli, resulted in the publication of [Dupletsa et al. 2025](#)

PHD SCHOOLS

Computing and High Performance Computing in Astronomy and Astrophysics [link] <i>Bologna, Italy</i>	24 Jun-5 Jul, 2024
International School for Subnuclear Physics 2024 [link] <i>'Ettore Majorana Foundation' - Erice, Italy</i>	14-23 Jun, 2024
<ul style="list-style-type: none">• Winner of New Talents: Giazotto prize 🏆• Prize for Best Presentation in Theoretical Physics 🏆	
Scientific Communication in Astronomy School [link] <i>Bertinoro, Italy</i>	2-6 Oct, 2023
<ul style="list-style-type: none">• Winner of the school prize (3rd place) 🏆	
First EuCapt School in Cosmology [link] <i>Valencia, Spain</i>	18-22 Sep, 2023
Amaldi Research Center Summer School [link] <i>Paestum, Italy</i>	5-9 Sep, 2022
The Onassis Foundation Science Lectures in Physics: Gravitational Waves [link] <i>Heraklion, Crete</i>	25-29 Jul, 2022

INVITED TALKS

LXVI Congresso nazionale della Società Astronomica Italiana [link] <i>Firenze, Italy</i>	3-6 Jun, 2025
<ul style="list-style-type: none">• Talk on: 'Le sirene delle onde gravitazionali: calibrazione di un nuovo metodo per stimare H_0'	
GraSP24 - Gravity Shape Pisa 2024 [link] <i>Pisa, Italy</i>	23-25 Oct, 2024
<ul style="list-style-type: none">• Talk on: 'Forecasting detection and parameter estimation capabilities for the Einstein Telescope'	
Seminar at HEPHY [link] <i>Vienna, Austria</i>	10 Sep, 2024
<ul style="list-style-type: none">• Talk on: 'Forecasting detection and parameter estimation capabilities for the Einstein Telescope'	
The Seventeenth Marcel Grossmann Meeting [link] <i>Pescara, Italy</i>	7-12 Jul, 2024
<ul style="list-style-type: none">• Talk on 'How to do multi-messenger forecasts in the Einstein Telescope era: addressing present and future challenges'	
ET: Scienza e Tecnologia in Italia [link] <i>Assisi, Italy</i>	20-23 Feb, 2024
<ul style="list-style-type: none">• Panelist in "Science and data analysis challenges"	

GWADW - Gravitational Wave Advanced Detector Workshop [\[link\]](#) **22-26 May, 2023**
Isola d'Elba, Italy

- Talk on: "Forecasting the Detection and Parameter Estimation Capabilities for different ET Designs"

XIII ET Symposium [\[link\]](#) **8-12 May, 2023**
Cagliari, Italy

- Talk on: "Fisher Information Matrix for ET Forecasts: How Informative is it?"

CONTRIBUTED TALKS

2025 SKAO General Science Meeting[\[link\]](#) **16-20 Jun, 2025**
Görlitz, Germany

- Talk on: 'Mapping the Universe's Expansion with Gravitational Waves and Neutral Hydrogen'

XV ET Symposium [\[link\]](#) **26-30 May, 2025**
Bologna, Italy

- Plenary talk (shared with Mikhail Korobko) on: 'OSB work for the Task Force'

LIGO-Virgo-KAGRA Collaboration Meeting [\[link\]](#) **24-27 Mar, 2023**
[online]

- Talk (shared with Gregoire Pierra) on: "Latest results from the GWTC-4 cosmology paper"

1st GSSI-JHU MAECI Meeting on Gravitational Wave Astrophysics **16-18 Dec, 2024**
[\[link\]](#)
L'Aquila, Italy

- Talk on: 'Dark sirens cosmology'

AHEAD2024 2nd General Meeting [\[link\]](#) **26-27 Nov, 2024**
Rome, Italy

- Talk on: 'Parameter estimation catalogs for binary neutron star mergers detected with next-generation gravitational wave detectors'

LIGO-Virgo-KAGRA Collaboration Meeting [\[link\]](#) **23-26 Sept, 2024**
Barcelona, Spain

- Talk (shared with Suvodip Mukherjee) on: "Updates on Mock Data Challenge - Analysis with icarogw"

ModIC 2024 - Model-Independent Cosmology with gravitational waves, large-scale structure, and high-energy surveys [\[link\]](#) **13-17 May, 2024**
IFPU Trieste, Italy

- Talk on: 'Dark Sirens Cosmology with neutral hydrogen intensity mapping'

XIV ET Symposium [\[link\]](#) **6-10 May, 2024**
Maastricht, Netherlands

- Talk on: 'Enhancing Fisher Matrix Results with Physically Motivated Priors'

- Second Cosmic Explorer Symposium** [[link](#)] **23-25 Apr, 2024**
[online]
- Short talk (1 minute 1 slide) on: 'Enhancing Fisher Matrix Results with Physically Motivated Priors'
- Linking Advances in our Understanding of Theoretical Astrophysics and Relativity to Observations (LAUTARO)** [[link](#)] **17-19 Apr, 2024**
Milano-Bicocca, Italy
- Talk on: 'Enhancing Fisher Matrix Results with Physically Motivated Priors'
- LIGO-Virgo-KAGRA Collaboration Meeting** [[link](#)] **11-14 Sept, 2023**
Toyama, Japan
- Talk (shared with Suvodip Mukherjee) on: "Mock Data Challenge - Analysis with icarogw"
- Amaldi 15** [[link](#)] **17-21 Jul, 2023**
[online]
- Talk on: "Forecasting detection and parameter estimation capabilities for different ET designs in a multi-messenger context"
- Gravitational-wave populations: what's next? Workshop** [[link](#)] **10-14 Jul, 2023**
Milan, Italy
- Short talk on: "GWFish - a Fisher Matrix Software"
- OSB - Population Studies, Monthly meeting** **14 Mar, 2023**
[online]
- Talk on: "GWFish - a Fisher Matrix Analysis Software"
- OSB - Common Tools, Monthly meeting** **10 Mar, 2023**
[online]
- Talk on: "Fisher Matrix Analysis - adding Priors"
- LIGO-Virgo-KAGRA Collaboration Meeting** **12-16 Sep, 2022**
Cardiff
- Poster on: "GWFish - A simulation software to evaluate parameter-estimation capabilities of gravitational-wave detector networks"

LECTURES & TUTORIALS

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- PhD school on "Gravitational Waves: from theory to detection"** **7-18 Jul, 2025**
[[link](#)]
Vienna, Austria
- Hands-on session on 'Metrics and tools for assessing the performance of future gravitational wave detectors'
- 'Gravitational Waves and their detection' master course -by Gianluca Inguglia- at the Technical University of Vienna** **4 Jun, 2025**
Vienna, Austria
- Lecture on 'Gravitational wave cosmology' [90 minutes]

OTHER CONFERENCES & WORKSHOPS

ModIC 2024 - Model-Independent Cosmology with gravitational waves, large-scale structure, and high-energy surveys [\[link\]](#)

IFPU Trieste, Italy

13-17 May, 2024

- Hands-on session on GWFish with and without priors

ET: Scienza e Tecnologia in Italia [\[link\]](#)

Assisi, Italy

20-23 Feb, 2024

- School lecture (in collaboration with Jacopo Tissino) on ‘*GWFish: Simulation of gravitational-wave detector networks with Fisher-matrix PE*’

XIII ET Symposium [\[link\]](#)

Cagliari, Italy

8-12 May, 2023

- Tutorial session on “*GWFish - a Fisher Matrix Analysis Software*”

ETO Task Force Meeting (III) [\[link\]](#)

CERN, Switzerland

5-7 May, 2025

- *Talks and discussions on: ‘Noise budget and science case of ET’*

ETO Task Force Meeting (II) [\[link\]](#)

Nikhef, Amsterdam

18-20 Mar, 2025

- *Talks and discussions on: ‘Noise budget and science case of ET’*

ETO Task Force Meeting (I) [\[link\]](#)

[online]

18-20 Feb, 2025

- *Talks and discussions on: ‘Noise budget and science case of ET’*

XII ET Symposium - The birth of the ET Collaboration [\[link\]](#)

Budapest, Hungary

7-8 Jun, 2022

PUBLICATION LIST

A detailed list of publications is provided separately

REFeree

Referee for the Astrophysical Journal (ApJ)

MEMBERSHIPS

LIGO-Virgo-KAGRA (LVK) Collaboration

CBC Cosmology Group member

- Member of both analysis, with the *icarogw* pipeline, and paper writing teams for the Mock Data Challenge short-author [Collaboration paper](#)
- Member of both the analysis, with the *icarogw* pipeline, and the writing teams for the O4a Cosmology Collaboration paper (*in preparation*)

Einstein Telescope (ET) Collaboration

Observational Science Board (OSB) member

- Member of the following divisions: Common Tools, Multi-Messenger Observations and Cosmology
- Comparison and testing of Fisher matrix codes within the *Common Tools* division
- Key contribution to the Cost and Benefit Analysis (CoBA) work published in Branchesi et al. 2023: forecast analysis of binary neutron star population with GWFish, cross-checks of the binary black hole population results
- Key contribution to the *Blue Book*, a more-detailed scientific follow-up of Branchesi et al. 2023: part of the editorial and writing team of the *Common Tools* division chapter, and part of the writing team for the *Multi-Messenger Observations* division chapter
- OSB liaison, together with Francesco Iacovelli and Archisman Ghosh, for the ETO Task Force detector layouts study: coordination and analyses work to assess the scientific risks of different sensitivity curves for the ET project

SKILLS

Programming languages	<ul style="list-style-type: none">• Python, Bash (advanced), C/C++, Mathematica (intermediate), MATLAB, SQL (basic)
Software and Tools	<ul style="list-style-type: none">• L^AT_EX, git, condor, slurm
Languages	<ul style="list-style-type: none">• Italian (native), Ukrainian (native), English (advanced)

GRANTS

APPHEAL Project	2025
<i>Advanced Platform for Processing Heavy Elements Libraries</i>	
<ul style="list-style-type: none">• Principal Investigator: Dr. Eleonora Loffredo• Description: 20k project funded by the Italian National Institute for Astrophysics• Role: Co-Investigator	

OUTREACH ACTIVITIES

IDeAS | L'Aquila, Italy

- member of IDeAS
- IDeAS is partner of Museo Nivola of Organi, GSSI, GSSI Alumni, INFN Cagliari, University of Cagliari, and INAF-OAC, in the realization of the project "*On the edge of the eyelid*", winner of *Strategia Fotografica 2024* from *Ministero della Cultura*
- Public seminar on "*Seeing the Unseen*", in collaboration with Matteo Schulz and Andrea Cozzumbo, on 30th January 2025

SHARPER | L'Aquila, Italy

- Yearly participation on behalf of GSSI to the outreach activities of the European Researchers' Night (24 September 2021, 30 September 2022, 29 September 2023 and 27 September 2024)

Cosmic Explorers | L'Aquila, Italy

- Series of lectures by Prof. Marica Branchesi to elementary school kids
- Contribution to organization of activities and experiments with the kids; three days in March, April and June 2023

PhTea Talks | *L'Aquila, Italy*

- Co-organizer and co-founder of informal talks for PhD students at GSSI
- Talk "*A Hitchhiker's Guide to hush annoying Flat Earthers*" in March 2023
- Talk "*Sip back and relax: it's tea time!*" in April 2024

Scienza in Bidda | *Jerzu, Sardinia*

- Event organized by Dr. Riccardo Murgia in 2023, in correspondence of the ET Symposium in Cagliari
- Part of the outreach project to talk about the relevance of the Einstein Telescope in Sardinia

Premio Asimov | *L'Aquila, Italy*

- Project organized by Prof. Francesco Vissani
- Part of reviewing committee for the years 2021, 2022, 2023, 2024, 2025