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Elia Pizzati

Curriculum Vitae

PhD student at Leiden Observatory. Working on constraining the growth and properties of Super-Massive Black Holes in the early Universe using large-volume cosmological simulations. Publications on a broad range of topics, from galaxy evolution to gravitational waves and protoplanetary discs.

10 refereed publications, of which 5 as a first-author; total of >110 first-author citations (>250 total). A complete publication list is enclosed and available on NASA/ADS.

Education

2021–present **PhD in Astrophysics**, *Leiden Observatory*, Leiden.
Supervisors: Prof. Joe Hennawi and Prof. Joop Schaye.

2019–2021 **Master's Degree in Physics**, *University of Pisa*, Pisa.
Final grade: *110/110 cum Laude*, with a special mention from the committee (*Abbraccio accademico*) for the "remarkable grades and exceptional thesis work". GPA: *30.0/30*

2016–2022 **Diploma in Physics**, *Scuola Normale Superiore*, Pisa.
Best Italian University for Physics; admits on merit only about ten physics students per year out of several hundred applications. Final Grade: 100/100. GPA: *28.5/30*

2016–2019 **Bachelor's Degree in Physics**, *University of Pisa*, Pisa.
Final grade: *110/110 cum Laude.* GPA: *29.7/30*

2011–2016 **High School Diploma**, *Liceo Scientifico Galileo Galilei*, Dolo (VE).
Final grade: *100/100 cum Laude.*

Research experience

2021-2024 **PhD project**, *Leiden Observatory*.
Several projects on high-z quasar and galaxy clustering, supermassive black hole growth, coevolution between supermassive black holes and galaxies, and quasar proximity zones.

2019-2021 **Bachelor's and Master's Theses**, *SNS and University of Pisa*.
Supervisors: Prof. Andrea Ferrara and Dr. Andrea Pallottini; worked on a model of outflows in young galaxies; published two papers in MNRAS with a total of more than 55 citations.

2020 **INFN/LIGO Exchange Program**, *IGC, Pennsylvania State University*.
Worked with Prof. Bangalore Sathyaprakash on parameter inference in the context of third-generation detectors' tools development; published a paper with more than 40 citations.

2019 **LEAPS Program**, *Leiden Observatory*.
Worked with Prof. Giovanni Rosotti on a model for gauging the strength of turbulence in protoplanetary discs; published a paper with ∼7 citations in less than one year.

Teaching and mentoring experience

2023-2024 **Master's student supervision:**, Boyi Ding.
Supervised a project on "massive black holes in the FLAMINGO cosmological simulation"; a paper is in preparation.

2022-2025 **Teaching Assistant at Leiden University**.
Teaching the courses "Galaxies and Cosmology", "Galaxies: Structure and Dynamics" for Bachelor's and Master's students in the Astronomy department.

Achievements

2022 **"Geppina Coppola" Prize for the best Master's Thesis in Astrophysics**.
Winner of a 1,500€ prize for the best Astrophysics Thesis in Italy out of more than 50 candidates; held a public seminar discussing my work at the Naples' Astronomical Observatory.

2022 **"Carlo Azeglio Ciampi" Prize for the best Italian Master's Thesis**.
Winner of a 3,500€ prize for the best scientific Master's Thesis in the period 2020-2022.

2019 **NSF/INFN Exchange Program**.
Winner of a 5,000€ scholarship within the NSF/INFN Exchange Program.

2019 **LEAPS Scholarship**.
Selected for the LEAPS program at Leiden Observatory; full scholarship of around 4,000€.

2016 **Scuola Normale Superiore Admission Test**.
Admitted to the Science Class (2016–2021); won a full scholarship of about 15,000€ per year.

Extracurricular activities

2020-2021 **Tutoring and teaching at SNS**.
Tutor for Physics students at my university; contributed to holding a lecture within the "SNS Internship in Physics for High School Students".

2016 **National Physics Olympiad and National Astronomy Olympiad**.
Took part in the national phase of the Physics Olympiad in 2016 and of the Astronomy Olympiad in 2015. I won a bronze medal in Physics and a gold medal in Astronomy.

2015–2016 **National Philosophical Debate Tournament**.
Won a team competition of philosophical debate organised by the University of Padua. I was awarded the title of "Best Orator" and performed a public debate at EXPO 2015 in Milano.

2006–2017 **Scout and volunteering experience**.
I have been part of the Scout association for more than 10 years. I lived several volunteering experiences; I organised 3-days full immersions in astronomy for teenagers; I was responsible of a group of entertainers working with more than one-hundred children.

Talks

Invited Talks and Colloquia

Dec. 2023 **Cosmo-Talk**, *Scuola Normale Superiore (SNS)*, Pisa, Italy.

Nov. 2022 **Una stella del cielo**, *Osservatorio Astronomico di Capodimonte*, Napoli, Italy.

Seminar Talks and Conference Contributions

Jul. 2024 **The Origin and Evolution of Supermassive Black Holes**, Sexten, Italy.

May 2024 **First Stars VII**, *Center for Computational Astrophysics*, NYC, USA.

May 2024 **Monday Afternoon Talks**, *MIT*, Cambridge, USA.

Apr. 2024 **Massive Black Holes in the First Billion Years**, Kinsale, Ireland.

Jul. 2023 **Reionization in the summer**, *MPIA*, Heidelberg, Germany.

Jun. 2023 **First Light Conference**, *MIT*, Cambridge, USA.

Nov. 2022 **Reionization in the summer**, Madrid, Spain.

Computing skills

Working knowledge of Python, LaTeX, Git, bash

Good knowledge of C, C++, Fortran.

Extensive use of Python for numerous projects (including Bayesian analysis, MCMC, data analysis and visualization); familiarity with cosmological simulations and HPC.

Publications

First author

1. **Elia Pizzati**, Joseph F Hennawi, Joop Schaye, Matthieu Schaller, Anna-Christina Eilers, et al., A unified model for the clustering of quasars ad galaxies at $z \approx 6$, arXiv, arXiv:2403.12140, March 2024, doi:10.48550/arXiv.2403.12140
2. **Elia Pizzati**, Joseph F Hennawi, Joop Schaye, Matthieu Schaller, Revisiting the extreme clustering of $z \approx 4$ quasars with large volume cosmological simulations, Monthly Notices of the Royal Astronomical Society, Volume 528, Issue 3, March 2024, Pages 4466–4489, https://doi.org/10.1093/mnras/stae329
3. **Elia Pizzati**, Giovanni P Rosotti, Benoît Tabone, Constraining turbulence in protoplanetary discs using the gap contrast: an application to the DSHARP sample, Monthly Notices of the Royal Astronomical Society, Volume 524, Issue 2, September 2023, Pages 3184–3200, https://doi.org/10.1093/mnras/stad2057
4. **E Pizzati**, A Ferrara, A Pallottini, L Sommovigo, M Kohandel, S Carniani, [CII] Haloes in ALPINE galaxies: smoking-gun of galactic outflows?, Monthly Notices of the Royal Astronomical Society, Volume 519, Issue 3, March 2023, Pages 4608–4621, https://doi.org/10.1093/mnras/stac3816
5. **Elia Pizzati**, Surabhi Sachdev, Anuradha Gupta, and Bangalore Sathyaprakash. "Toward inference of overlapping gravitational-wave signals", Physical Review D, vol. 105, no. 10, 2022. doi:10.1103/PhysRevD.105.104016.
6. **E Pizzati**, A Ferrara, A Pallottini, S Gallerani, L Vallini, D Decataldo, S Fujimoto, Outflows and extended [CII] haloes in high-redshift galaxies, Monthly Notices of the Royal Astronomical Society, Volume 495, Issue 1, June 2020, Pages 160–172, https://doi.org/10.1093/mnras/staa1163

Contributing author

1. Anna-Christina Eilers, Ruari Mackenzie, **Elia Pizzati**, Jorryt Matthee, Joseph F Hennawi, et al., EIGER VI. The Correlation Function, Host Halo Mass and Duty Cycle of Luminous Quasars at $z \approx 6$, arXiv, arXiv:2403.07986, March 2024, doi:10.48550/arXiv.2403.07986
2. L Sommovigo, A Ferrara, S Carniani, A Pallottini, P Dayal, **E Pizzati**, M Ginolfi, V Markov, A Faisst, A new look at the infrared properties of $z \sim 5$ galaxies, Monthly Notices of the Royal Astronomical Society, Volume 517, Issue 4, December 2022, Pages 5930–5941, https://doi.org/10.1093/mnras/stac2997
3. Y Fudamoto, R Smit, R A A Bowler, P A Oesch, et al. (incl. **E Pizzati**), "The ALMA REBELS Survey: Average [C II] 158 μm Sizes of Star-forming Galaxies from z≈7 to z≈4", The Astrophysical Journal, vol. 934, no. 2, 2022. doi:10.3847/1538-4357/ac7a47.
4. A Pallottini, A Ferrara, S Gallerani, C Behrens, M Kohandel, et al. (incl. **E Pizzati**) , A survey of high-z galaxies: SERRA simulations, Monthly Notices of the Royal Astronomical Society, Volume 513, Issue 4, July 2022, Pages 5621–5641, https://doi.org/10.1093/mnras/stac1281