

Elia Pizzati

Curriculum Vitae

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PhD student at Leiden Observatory working on constraining the growth and properties of Super-Massive Black Holes in the early Universe. Use of theoretical models and cosmological simulations. Publications on various topics (galaxy evolution, gravitational waves, protoplanetary discs).

12 papers, of which 7 as a first-author; >140 first-author citations (>300 total).

A complete publication list is enclosed and available on [NASA/ADS](#).

Education

- 2021–2025 **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.
Supervisors: Prof. Andrea Ferrara and Dr. Andrea Pallottini.
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

- 2021–2025 **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 lightcurves.
- 2019–2023 **Bachelor's and Master's Theses**, *SNS and University of Pisa*.
Worked on modeling outflows and gas transport in young galaxies. Showed that catastrophic cooling outflows can explain the extended emission observed in [CII] by ALMA.
- 2020–2022 **INFN/LIGO Exchange Program**, *IGC, Pennsylvania State University*.
Worked on parameter inference in the context of third-generation detectors' tools development. First work exploring the effects of overlapping signals on standard parameter inference pipelines.
- 2019–2023 **LEAPS Program**, *Leiden Observatory*.
Worked on a model for gauging the strength of turbulence in protoplanetary discs. Applied the method to study discs' morphology and turbulence levels for the entire DSHARP sample.

Teaching and mentoring experience

- 2023–2024 **Master's student supervision**: Boyi Ding, *Leiden Observatory*.
Supervised a project on "massive black holes in the FLAMINGO cosmological simulation"; a paper will be submitted soon (Ding, Pizzati+24, *in prep.*).
- 2022–2025 **Teaching Assistant at Leiden University** (≈ 400 hours per year).
Teaching the courses "Galaxies and Cosmology", "Galaxies: Structure and Dynamics", "Large Scale Structure" 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.

Other activities and Service

- 2022-2023 **Borrel Committee at Leiden Observatory.**
Organizer of weekly social gatherings for the colleagues in Leiden. Responsible for providing food and drinks, scheduling activities, and inviting people to the events.
- 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".
- 2015-2016 **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.
- 2006–2020 **Scout and volunteering experience.**
I have been part of the Scout Association and a children's entertainer for more than 10 years. I had several volunteering experiences; I organised 3-days full immersions in astronomy for teenagers; I was responsible for a group entertaining more than one-hundred children.

Recent/Upcoming Talks

Conference Talks

- Aug. 2024 **Cosmic Dawn Revealed by JWST**, KITP, UC Santa Barbara, USA.
- Jul. 2024 **The Origin and Evolution of Supermassive Black Holes**, Sexten, Italy.
- Jun. 2024 **Unveiling Black Hole Growth across Cosmic Time**, EAS Padova, Italy.
- Jun. 2024 **From Galaxies to Quasars and back**, EAS Padova, Italy.
- May 2024 **First Stars VII**, Simons Foundation, NYC, USA.
- Apr. 2024 **Massive Black Holes in the First Billion Years**, Kinsale, Ireland.
- Nov. 2023 **NOVA Fall School**, ASTRON, Dwingeloo, The Netherlands.
- Jul. 2023 **Reionization in the summer**, MPA, Heidelberg, Germany.
- Jun. 2023 **First Light Conference**, MIT, Cambridge, USA.
- Nov. 2022 **Life-cycle of AGN**, ESA Madrid, Spain.

Seminars and Colloquia

- Sep. 2024 **Cosmology Seminar**, UC Berkeley, USA.
- May 2024 **Galaxy Formation Meeting**, Center for Computational Astrophysics, NYC, USA.
- May 2024 **Cosmology Talk**, Princeton University, USA.

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

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

Public Talks

Dec. 2023 **Cerimonia dei Diplomi**, *Scuola Normale Superiore (SNS)*, Pisa, Italy.

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

Computing skills

Working knowledge of Python, L^AT_EX, Git, bash

Good knowledge of C, C++, Fortran.

References (alphabetical order)

Anna-Christina Eilers, MIT

eilers@mit.edu

Andrea Ferrara, *Scuola Normale Superiore (SNS)*

andrea.ferrara@sns.it

Joe Hennawi, *UCSB and Leiden Observatory*

joe@physics.ucsb.edu

Andrea Pallottini, *Scuola Normale Superiore (SNS)*

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Giovanni Rosotti, *University of Milano*

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Bangalore Sathyaprakash, *Penn State University*

bss25@psu.edu

Matthieu Schaller, *Leiden Observatory*

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Joop Schaye, *Leiden Observatory*

schaye@strw.leidenuniv.nl

Publications

First author

1. **Elia Pizzati**, Joseph F Hennawi, Joop Schaye, Anna-Christina Eilers, Jiamu Huang, Jan-Torge Schindler, Feige Wang, “*Little Red Dots*” cannot reside in the same dark matter halos as comparably luminous unobscured quasars, submitted to MNRAS
2. **Elia Pizzati**, Joseph F Hennawi, Joop Schaye, Matthieu Schaller, Anna-Christina Eilers, et al., *A unified model for the clustering of quasars and galaxies at $z \approx 6$* , arXiv, arXiv:2403.12140, March 2024, doi:10.48550/arXiv.2403.12140
3. **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, doi.org/10.1093/mnras/stae329
4. **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, doi.org/10.1093/mnras/stad2057
5. **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, doi.org/10.1093/mnras/stac3816
6. **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
7. **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, doi.org/10.1093/mnras/staa1163

Contributing author

1. X Lin, F Wang, X Fan, Z Cai, et al. (incl. **E Pizzati**), *A SPectroscopic survey of biased halos In the Reionization Era (ASPIRE): Broad-line AGN at $z=4-5$ revealed by JWST/NIRCam WFSS*, arXiv, arXiv:2407.17570, July 2024, doi:10.48550/arXiv.2407.17570
2. 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
3. L Sommovigo, A Ferrara, S Carniani, A Pallottini, P Dayal, **E Pizzati**, et al., *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>
4. Y Fudamoto, R Smit, R A A Bowler, P A Oesch, et al. (incl. **E Pizzati**), *The ALMA REBELS Survey: Average [C II] $158 \mu\text{m}$ Sizes of Star-forming Galaxies from $z \approx 7$ to $z \approx 4$* , The Astrophysical Journal, vol. 934, no. 2, 2022. doi:10.3847/1538-4357/ac7a47
5. 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, doi.org/10.1093/mnras/stac1281