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Elia Pizzati

Curriculum Vitae

PhD student at Leiden Observatory working on constraining the growth and properties of supermassive black holes in the early Universe. Bridging theoretical and numerical models with observations. Publications on various topics (galaxy evolution, gravitational waves, protoplanetary discs).

12 papers, of which 7 as a first-author; >350 total citations (*h-index*: 9), of which >150 first-author (*first-author h-index*: 6). 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.

2019-2022 **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 **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 **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** (≈300 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.

2016 **Prize scholarship "Meggiato-Moresco-Zotti-Savella-Carleo"**
Assigned to the best students to recognize an outstanding educational track.

Other activities and Service

2022-2023 **Borrel Committee at Leiden Observatory**
Organizer of weekly social gatherings (*borrels*) 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

International Conference Contributions

Dec. 2024 **40th IAP Symposium: Unveiling the physics of early galaxy and black hole formation with JWST**, *IAP, Paris*, France

Nov. 2024 **Probing the Genesis of Supermassive Black Holes**, *Kavli IPMU*, Japan

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**, *MPIA*, 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, LaTeX, 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)* — *andrea.pallottini@sns.it*
Giovanni Rosotti, *University of Milano* — *giovanni.rosotti@unimi.it*
Bangalore Sathyaprakash, *Penn State University* — *bss25@psu.edu*
Matthieu Schaller, *Leiden Observatory* — *schaller@strw.leidenuniv.nl*
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*, arXiv, arXiv:2409.18208, March 2024, doi:10.48550/arXiv.2409.18208; *submitted for publication to MNRAS*
2. **Elia Pizzati**, Joseph F Hennawi, Joop Schaye, Matthieu Schaller, Anna-Christina Eilers, et al. (15 authors), *A unified model for the clustering of quasars and galaxies at* $z \approx 6$, MNRAS, *in press*, arXiv:2403.12140, March 2024, doi.org/10.1093/mnras/stae2307;
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.org/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**; 36 authors), *A SPectroscopic survey of biased halos In the Reionization Era (ASPIRE): Broad-line AGN at z=4-5 revealed by JWST/NIRCam WFSS*, The Astrophysical Journal, vol. 974, no. 147, 2024. doi.org/10.3847/1538-4357/ad6565
2. Anna-Christina Eilers, Ruari Mackenzie, **Elia Pizzati**, Jorryt Matthee, Joseph F Hennawi, et al. (16 authors), *EIGER VI. The Correlation Function, Host Halo Mass and Duty Cycle of Luminous Quasars at $z \approx 6$*, The Astrophysical Journal, vol. 974, no. 275, 2024. doi.org/10.3847/1538-4357/ad778b
3. L Sommovigo, A Ferrara, S Carniani, A Pallottini, P Dayal, **E Pizzati**, et al. (9 authors), *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, doi.org/10.1093/mnras/stac2997
4. Y Fudamoto, R Smit, R A A Bowler, P A Oesch, et al. (incl. **E Pizzati**; 40 authors), *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.org/10.3847/1538-4357/ac7a47
5. A Pallottini, A Ferrara, S Gallerani, C Behrens, M Kohandel, et al. (incl. **E Pizzati**; 13 authors), *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