Dr. Julien Anton Wolf

Postdoctoral Researcher

Astrophysicist specializing in the discovery and characterization of the earliest quasars and the formation of the first supermassive black holes. I lead JWST/NIRSpec IFU studies, develop (machine-learning) discovery pipelines for Euclid quasar searches, and have secured major PI-led programs with HST and VLT. My work combines state-of-the art observations and novel data-driven methods to push the observational frontier of the early Universe.

French & German

jwolf (a) mpia.de

https://jwolf-dinh.github.io/julien-wolf-homepage/

Max-Planck-Institute for Astronomy

Königstuhl 17, 69117 Heidelberg

WORK EXPERIENCE

POSTDOCTORAL RESEARCHER July 2023 - Today

Max-Planck-Institute for Astronomy, Heidelberg

Characterisation of distant quasars with JWST and $z > 7$ quasar searches with Euclid.
Group leader: Dr. Eduardo Bañados.

EDUCATION

PHD ASTROPHYICS Apr 2019 - Mar 2023

Max-Planck-Institute for Extraterrestrial Physics & ORIGINS Excellence Cluster, Garching

Thesis: "Tracing the Evolution of Super-Massive Black Holes through Cosmic Time with Luminous Active Galactic Nuclei". (Final Grade: 0,88 - *Magna Cum Laude*)
Supervisors: Prof. Dr. Kirpal Nandra and Dr. Mara Salvato.
High-z quasar searches with the X-ray telescope eROSITA. Survey support through multi-wavelength counterpart identification.

MSC. ASTROPHYSICS Sep 2016 - Mar 2018

Ludwig-Maximilians-Universität, University Observatory (USM), Munich

Thesis: Generating Volumetric Representations of the Dark Matter Halo Distribution Using Deep Machine Learning. (Graded: 1,0)
Supervisors: Prof. Dr. Jochen Weller and Dr. Ben Hoyle

BSC. PHYSICS PLUS ASTRONOMY Sep 2011 - May 2016

Ludwig-Maximilians-Universität, Munich

Thesis: Constraining Extra-Dimensions Using Supernovae Data. (Graded : 1,0)
Supervisor: Prof. Dr. Jochen Weller

ABITUR & BACCAULAURÉAT (OIB) Jul 2009

Lycée International, Saint-Germain-En-Laye

French and german double curriculum with major in science

PUBLICATIONS

A complete publication list is provided in Appendix A. The main CV contains only first-/second-author papers.

ORCID : **0000-0003-0643-7935**
ADS library of publications:
https://ui.adsabs.harvard.edu/public-libraries/1H0qxYTWTI-Gn77VE8E3TQ

Papers as first or second author

"JWST reveals kiloparsec-scale metal-free Balmer halo around a z=7.64 quasar", **Wolf**, Bañados, Fan et al.

A&A (submitted)

"16 new quasars at the end of the reionization unveiled by self-supervised learning", Martínez-Ramírez, **Wolf**, Belladitta et al. A&A (submitted)

"Counterpart identification and classification for eRASS1 and characterisation of the AGN content", Salvato, **Wolf**, Dwelly et al. A&A (in press.)

"The SRG/eROSITA All-Sky Survey: X-ray beacons at late cosmic dawn", **Wolf**, Salvato, Belladitta et al. A&A, 691, A30 (2024)

"X-ray emission from a rapidly accreting narrow-line Seyfert 1 galaxy at $z = 6.56$", **Wolf**, Nandra, Salvato et al. A&A, 669, A127 (2023)

“The eROSITA Final Equatorial-Depth Survey (eFEDS). Identification and characterization of the counterparts to point-like sources” Salvato, **Wolf**, Dwelly et al. A&A, 661, A3 (2022)

“First constraints on the AGN X-ray luminosity function at z 6 from an eROSITA-detected quasar” **Wolf**, Nandra, Salvato et al. A&A, 647, A5 (2021)

“Exploring the diversity of Type 1 active galactic nuclei identified in SDSS-IV/SPIDERS” **Wolf**, Salvato, Coffey et al. MNRAS, 492, 3580 (2020)

Press releases:

"Serendipitous detection of a rapidly accreting black hole in the early Universe" `https://www.mpe.mpg.de/7925669/news20230131?c=260760`

TALKS AND SEMINARS

Invited & Solicited Talks

First Results from the SRG/eROSITA All-Sky Survey, Garching, *15.09.24*: X-ray beacons at late cosmic dawn.
COSPAR 2022, Athens, *18.07.22* **Invited**: Finding high-redshift quasars with eROSITA.
Quasars Through Cosmic Times, online, *25.01.22* The hunt for X-ray luminous quasars at $z > 5.5$.

Selected Contributed Talks

Highly accreting SMBHs across cosmic time, Santiago (Chile), *01.12.25* Tales of two quasars.
MBHs across Cosmic Time, Cambridge (UK), *09.09.25* Reionization-era quasar jet with JWST/NIRSpec IFU.
EAS 2025, Cork (Ireland), *25.06.25* Reionization-era quasar jet with JWST/NIRSpec IFU.
Quo Vadis Galaxy Evolution?, Heidelberg (Germany), *25.06.25* Jet driving a 20 kpc [O III] outflow at $z \sim 6$.
Probing the Genesis of SMBHs, Tokyo (Japan), *21.11.24* Kinematics in the $z = 7.6$ quasar with NIRSpec IFU.
Origin & Evolution of SMBHs, Sexten (Italy), *16.07.24* Kinematics of the most distant quasar with NIRSpec IFU.

Full list of contributed talks available in Appendix B.

TRAINING

IMPRS SUMMER SCHOOL 2023: UNRAVELING GALAXY EVOLUTION WITH JWST Sep 2023
Interdisciplinary Center for Scientific Computing, Heidelberg
School on JWST data analysis

CARL-ZEISS-STIFTUNG SCHOOL 2023 Aug 2023
Interdisciplinary Center for Scientific Computing, Heidelberg
Training on state-of-the-art deep learning tools

INTERNATIONAL MAX-PLANCK RESEARCH SCHOOL ON ASTROPHYSICS Apr 2019 - Mar 2023
Ludwig-Maximilians-Universität, Munich
Accompanying training programme. Advanced lectures in modern astrophysics and cosmology.

AHEAD X-RAY AND MULTIWAVELENGTH SCHOOL Nov 2018
Max-Planck-Institute for Extraterrestrial Physics, Garching
Training on state-of-the-art tools for astronomical surveys

ACTIVE COLLABORATIONS

- **Euclid Consortium**: Active member of the Primeval Univers Science Working Group and core member of $z > 7$ quasar discovery team

- **EREBUS**: International JWST quasar community
- **AETHER Survey**: JWST NIRSpec/IFU quasar survey (GO ID: 5645, PI: E. Farina)
- **Further collaboratios**: eROSITA (external collaborator), NewAthena, SDSS-V

STUDENT SUPERVISION

- **Laura Martínez-Ramírez** (Finishing PhD student) Co-supervision of deep learning quasar discovery project (Martínez-Ramírez, Wolf et al., submitted)
- **Sebastian Splithoff** (ongoing Master thesis) Main supervision of cosmic noon quasar discovery project using Gaia spectroscopy and Sphere-X.

FURTHER RESEARCH EXPERIENCE

SUMMER INTERN Jul 2018 - Aug 2018
Max-Planck-Institute for Extraterrestrial Physics
Statistical analysis of optical and X-ray properties of X-ray selected AGN

OBSERVING EXPERIENCE

OBSERVING RUN: LBT 8 nights
Tucson & Mt. Graham, AZ, US
Observing run at the Tucson control room and at the telescope in April 2024 and remotely in September 2025. Optical and near-infrared spectroscopy of high-redshift quasars and service observations for LBTB

OBSERVING RUN: MPG/ESO 2.2M 7 nights
La Silla, Chile
Observing time at the telescope in February 2020. Optical and near-infrared imaging of high-redshift quasar candidates with GROND. Service observations with GROND and WFI

PROPOSALS

PI of critical observing programs with HST (125 orbits) and VLT/FORS2 for quasar discovery

- HST/WFC3 (PI) Beyond the Quasar Redshift Frontier: Uncovering Rapidly Accreting Supermassive Black Holes at z>8 with HST/WFC3 and Euclid (Cycle 33, ID 18112, 125 SNAP orbits approved)
- VLT/FORS2 (PI) A new population of X-ray beacons at cosmic dawn with VLT/FORS2 (114.27Q4, 68 ks approved)
- **Chandra ACIS-S** (22700698,23700663,24700537, 133 ks approved)
- **Magellan/FIRE 6.5m** (2 nights approved)
- **eROSITA** Project on the search for high-z quasars in the eROSITA All-Sky Survey

SOFTWARE & PROGRAMMING

Code repository: `https://github.com/jwolf-dinh/`

Strong experience in **machine- and deep-learning methods** and large multi-wavelength survey datasets, including identification of multi-band counterparts to eROSITA X-ray sources (Salvato, Wolf et al. 2022, ML extension of Bayesian cross-matching framework **NWAY**, Salvato et al. 2018) and **Euclid high-z quasar discovery** using catalogue-based and **CNN image-classification** techniques.

Programming languages: **Python (fluent)**, ADQL/SQL(database), html, C++, FORTRAN, IDL
Spectroscopic data (space + ground): PypeIt; pyqsofit; q3dfit; custom Python tools (emission-line + continuum fitting, PSF subtraction)
Photoionization & shock simulations: Cloudy / pyCloudy; MAPPINGS; 3MDB shock grids
X-ray data analysis: eSASS, CIAO, BXA, (py)XPEC, SHERPA

SCIENTIFIC COMMUNITY WORK

- *Main initator and organizer of the Heidelberg AGN Meeting series.*
- *Refereeing work for MNRAS since 2022, ApJS since 2025.*
- *Organization of the MPIA Galaxies & Cosmology department retreat 2025.*
- *Organization of the 10th IMPRS Student Symposium (LOC).*
- *MPE outreach activities: tours + public presentations.*
- *Layman article author for Athena Science-Nugget series.*

LANGUAGE SKILLS & EXTRACURRICULAR ACTIVITIES

Native Speaker	Engineering studies (Lycée Raspail in Paris & TU München 2010-2011)
Native Speaker	Honing home-cooking skills to become local shoyu ramen overlord
Fluent	Composing for one-man, bedroom black metal project
Beginner	Music on vinyls
Beginner	Bartender at the Old Irish Pub in Munich (2017-2023)

Appendix A: Full Publication List

This appendix contains the complete list of refereed and submitted publications, including contributed papers.

Contributed to:

"Discovery of an X-ray Luminous Radio-Loud Quasar at z=3.4 : A Possible Transitional Super-Eddington Phase" Obuchi, Ichikawa, Yamada et al. (submitted) `https://arxiv.org/abs/2511.05029`

"BlazEr1: The eROSITA Blazar Catalog. Blazars and Blazar Candidates in the First eROSITA Survey" Hämmerich, Gokus, McBride et al. (submitted) `https://arxiv.org/abs/2510.25589`

"Frequent Extreme Galaxy-scale Outflows among Luminous Early Quasars" Liu, Fan, Li et al. (submitted) `https://arxiv.org/abs/2509.08793`

"Lyman-break Galaxies in the Megaparsec-scale Environments around Three z $\sim$ 7.5 Quasars with JWST Imaging" Pudoka, Wang, Fan et al. APJ, 987, 198 (2025)

"The eROSITA Final Equatorial Depth Survey (eFEDS): The hard X-ray selected sample " Nandra, Waddell, Buchner et al. A&A, 693, A212 (2025)

"PICZL: Image-based photometric redshifts for AGN" Roster, Salvato, Krippendorf et al. A&A, 692, A260 (2024)

"Fast Outflow in the Host Galaxy of the Luminous z = 7.5 Quasar J1007+2115" Liu, Fan, Yang et al. APJ, 976, 33 (2024)

"CIRCLEZ : Reliable photometric redshifts for active galactic nuclei computed solely using photometry from Legacy Survey Imaging for DESI" Saxena, Salvato, Roster et al. A&A, 690, A365 (2024)

"The eROSITA Final Equatorial Depth Survey (eFEDS): Complex absorption and soft excesses in hard X-ray–selected active galactic nuclei" Waddell, Nandra, Buchner et al. A&A, 690, A132 (2024)

"A quasar-galaxy merger at z $\sim$ 6.2: Rapid host growth via the accretion of two massive satellite galaxies" Decarli, Loiacono, Farina et al. A&A, 687, A219 (2024)

"Characterisation of the X-ray point source variability in the eROSITA south ecliptic pole field" Bogensberger, Nandra, Salvato et al. A&A, 687, A43 (2024)

"The LOFAR - eFEDS survey: The incidence of radio and X-ray AGN and the disk-jet connection" Igo, Merloni, Hoang et al. A&A, 687, A37 (2024)

"The SRG/eROSITA all-sky survey. Identifying the coronal content with HamStar" Freund, Czesla, Predehl et al. A&A, 684, A121 (2024)

"The SRG/eROSITA all-sky survey. First X-ray catalogues and data release of the western Galactic hemisphere" Merloni, Lamer, Liu et al. A&A, 682, A34 (2024)

"O Corona, where art thou? eROSITA's view of UV-optical-IR variability-selected massive black holes in low-mass galaxies" Arcodia, Merloni, Comparat et al. A&A, 681, A97 (2024)

"A new discovery space opened by eROSITA. Ionised AGN outflows from X-ray selected samples" Musiimenta, Brusa, Salvato et al. A&A, 679, A84 (2023)

"The first X-ray look at SMSS J114447.77-430859.3: the most luminous quasar in the last 9 Gyr" Kammoun, Igo, Miller et al. MNRAS, 522, 5217 (2023)

"The Eighteenth Data Release of the Sloan Digital Sky Surveys: Targeting and First Spectra from SDSS-V" Almeida, Andrés, Anderson et al. ApJS, 267, 44 (2023)

"The eROSITA extragalactic CalPV serendipitous catalog" Liu, Merloni, **Wolf** et al. A&A, 664, A126 (2022)

"The eROSITA Final Equatorial-Depth Survey (eFEDS). Optical confirmation, redshifts, and properties of the

cluster and group catalog" Klein, Oguri, Mohr et al. A&A, 661, A4 (2022)

"Establishing the X-ray source detection strategy for eROSITA with simulations" Liu, Merloni, Comparat et al. A&A, 661, A27 (2022)

"The eROSITA Final Equatorial-Depth Survey (eFEDS). The first archetypal quasar in the feedback phase discovered by eROSITA" Brusa, Urrutia, Toba et al. A&A, 661, A9 (2022)

"First eROSITA study of nearby M dwarfs and the rotation-activity relation in combination with TESS" Magaudda, Stelzer, Raetz et al. A&A, 661, A29 (2022)

"The eROSITA Final Equatorial-Depth Survey (eFEDS). The AGN catalog and its X-ray spectral properties" Liu, Buchner, Nandra et al. A&A, 661, A5 (2022)

"The eROSITA Final Equatorial-Depth Survey (eFEDS). Galaxy clusters and groups in disguise" Bulbul, Liu, Pasini et al. A&A, 661, A10 (2022)

"The Seventeenth Data Release of the Sloan Digital Sky Surveys: Complete Release of MaNGA, MaStar, and APOGEE-2 Data" Abdurro'uf, Accetta, Aerts et al. ApJS, 259, 35 (2022)

"X-ray quasi-periodic eruptions from two previously quiescent galaxies" Arcodia, Merloni, Nandra et al. Nature, 592, 704 (2021)

"The final SDSS-IV/SPIDERS X-ray point source spectroscopic catalogue" Comparat, Merloni, Dwelly et al. A&A, 636, A97 (2020)

Appendix B: Full List of Talks and Seminars

This appendix contains the complete list of invited, solicited, and contributed talks, including internal and consortium presentations.

Highly accreting SMBHs across cosmic time, Santiago (Chile), *01.12.25* Tales of two quasars from deep JWST/NIRSpec IFU observations.

MBHs across Cosmic Time, Cambridge (UK), *09.09.25* First reionization-era quasar jet revealed with JWST/NIRSpec IFU.

EAS 2025, Cork (Ireland), *25.06.25* Detection of a reionization-era quasar jet with JWST/NIRSpec IFU.

Quo Vadis Galaxy Evolution?, Heidelberg (Germany), *25.06.25* ~ 2 kpc radio jet driving a 20 kpc [O III] outflow at $z \sim 6$.

Probing the Genesis of SMBHs, Tokyo (Japan), *21.11.24* Gas kinematics in the $z = 7.6$ quasar with JWST/NIRSpec IFU.

Origin & Evolution of SMBHs, Sexten (Italy), *16.07.24* Kinematics of the most distant known quasar with NIRSpec IFU.

First Results from SRG/eROSITA: From Stars to Cosmology, Garching (Germany), *15.09.24* — **Solicited talk** X-ray beacons at late cosmic dawn.

MPIA Galaxy Coffee, Heidelberg (Germany), *21.10.22* Uncovering the population of X-ray luminous quasars at $z > 5.7$ with eROSITA.

COSPAR 2022, Athens (Greece), *18.07.22* — **Invited talk** Finding high-redshift quasars with eROSITA.

EAS 2022, Valencia (Spain), *30.06.22* Detection of $z > 5.5$ quasars with eROSITA.

MPE Scientific Advisory Board 2022, Garching (Germany), *14.06.22* The detection of $z > 5.5$ quasars with eROSITA.

Quasars Through Cosmic Times, online, *25.01.22* The hunt for X-ray luminous quasars at $z > 5.5$.

Australian/eROSITA_DE Workshop, online, *21.02.22* $z > 5.5$ quasars detected with eROSITA.

EAS 2021, online, *30.06.21* First constraints on the AGN X-ray luminosity function at $z \sim 6$ from an eROSITA quasar.

Contributed talks at *eROSITA Consortium Meetings* (*01.21*, *06.21*, *01.22*) High-z quasars and machine-learning methods in survey science.

ORIGINS Science Afternoons, online, *25.11.20* Finding high-redshift quasars with eROSITA.

Two talks at the *IMPRS Student Symposium* (*11.20*, *11.21*) High-z quasars and machine-learning approaches for large surveys.

SDSS-IV/V Collaboration Meeting, online, *24.06.20* Exploring the diversity of Type 1 AGN in SDSS-IV/SPIDERS.

HSC–eROSITA_DE Meeting, MPE, Garching (Germany), *14.05.19* Searching for high-redshift AGN in the eFEDS field.