

Abhijeet Anand, PhD

Postdoctoral Fellow, Lawrence Berkeley National Lab, CA, USA

AbhijeetAnand@lbl.gov, <https://abhi0395.github.io/>, [Google Scholar](#)

Research Interests

Astrophysicist specializing in galaxy formation, the circumgalactic/intergalactic medium, and quasar absorption lines. My work combines large-scale surveys (DESI, SDSS) with data science and computational methods to understand cosmic gas flows and the metal cycle in the Universe at different epochs. My long-term vision is to build an independent research program at the intersection of large surveys, data-intensive pipelines, and galaxyCGM/IGM connections.

Professional Experience

Sep 2022 - present: Postdoctoral Fellow, Lawrence Berkeley National Lab, Berkeley, CA, USA

- *Leading/Led independent projects on metal absorbers in and around galaxies using DESI, producing the largest metal absorber catalogs.*
- *Developer and support scientist for the DESI spectroscopic pipeline; improved galaxy redshift estimation algorithms, reducing catastrophic failures by $\sim 30\%$.*
- *Contributed to high-impact DESI collaboration papers, while also initiating independent science projects within and outside the collaboration.*

Sep 2018 - Jul 2022: PhD Fellow, Max Planck Institute for Astrophysics, Garching, Germany

- *Conducted extensive studies on the gas distribution in the circumgalactic and intracluster medium using data from SDSS and DESI.*
- *Developed the quasar absorber finder, [qsoabsfind](#), a tool used for detecting and analyzing metal absorbers in quasar spectra.*

Sep 2017 - Jul 2018: UGC - JRF¹, National Institute of Advanced Studies, Bangalore, India

Education

Sep 2018 - Jul 2022: PhD in Astrophysics, Ludwig Maximilian University - Max Planck Institute for Astrophysics (MPA), Germany.

- Thesis: [Probing cool and warm circumgalactic gas in galaxies and clusters with large spectroscopic and imaging surveys](#)
- Advisors: [Prof. Dr. Guinevere Kauffmann](#) & [Dr. Dylan Nelson](#)

Jul 2016 - Jul 2017: MS, Physics, Indian Institute of Science (IISc), Bangalore, India.

- Thesis: [A sensitive search for HI 21 cm emission from super disks in radio galaxies](#)
- Advisor: [Prof. Nirupam Roy](#)

Aug 2012 - June 2016: BSc (Research), Physics, Indian Institute of Science, Bangalore, India.

- Thesis: [Sources of Continuum Opacity in Hydrogen deficient stars](#)
- Advisors: [Prof. Gajendra Pandey](#), Indian Institute of Astrophysics (IIA)

¹University Grants Commission, Govt. of India - Junior Research Fellowship

Selected visits, talks and conferences

ⁱInvited Talks, ^cContributed Talks, ^sSchools & Workshops

- ⁱ June 2025: *Astro Webinar*, Raman Research Institute, Bangalore, India, June 23, 2025 (*Virtual*)
- ⁱ May 2025: *Astro Lunch seminar*, University of Washington, Seattle, USA, May 20, 2025 (*talk*)
- ⁱ Dec 2024: *Joint Astronomy Program Seminar*, IISc, Bangalore, India, Dec 11, 2024 (*talk*)
- ^c Dec 2024: *Baryons Beyond Galactic Boundaries*, IUCAA Pune, India, Dec 2 - Dec 6, 2024 (*talk*)
- ^c Nov 2024: *ISSAC Conference*, St. Stephen's College, New Delhi, Nov 20 - Nov 22, 2024 (*talk*)
- ⁱ Feb 2024: *Extragalactic Seminar*, MPA Garching, Germany, Feb 29, 2024 (*talk*).
- ⁱ Feb 2024: *Cosmology Seminar*, MPA Garching, Germany, Feb 27, 2024 (*talk*).
- ⁱ Mar 2022: *Computational Galaxy Formation and Evolution Group*, ZAH/ITA, University of Heidelberg, 14-16 Mar 2022 (*Visitor*).
- ⁱ Feb 2022: *High Energy Group Seminar*, MPE Garching, 15 Feb, 2022 (*Virtual*).
- ⁱ Feb 2022: *DESI Group Seminar*, Berkeley Lab, 1 Feb, 2022 (*Virtual*).
- ⁱ Dec 2021: *Galaxies & Cosmology Seminar*, CfA Harvard, 13 Dec, 2021 (*Virtual*).
- ⁱ Sep 2021: *STARs lab*, Arizona State University, 24 Sep, 2021 (*Virtual*).

Mentoring

- Mentored Joanne Tan (MPA PhD): project on metal absorbers in TNG-100 simulations (manuscript in prep. for MNRAS).
- Supervised Shivansh Tiwari (UG, Delhi University): developed QSO continuum models for DESI data analysis, 2025-present.

Honors & Awards

- Core member of the DESI Data Team; the DESI Collaboration awarded the 2026 [Berkeley Prize](#) of American Astronomical Society.
- [DESI Builder Award \(2025\)](#) for outstanding contributions to the data systems operations.
- DESI Early Career Travel Grant (USD 5000).
- [IMPRS PhD Fellowship](#), 2018–2022.
- University Grants Commission - Junior Research Fellowship of Govt. of India, 2017-2018.
- Department of Science & Technology, Govt. of India - Higher Studies Scholarship, 2012-2017.

Programming skills

Programming Language —

- Python (numpy, scipy, astropy, scikit-learn, matplotlib), bash, SQL with focus on high-performance, large-scale survey pipelines.

Tools & Workflows —

- Git, Jupyter, slurm (NERSC), LaTeX, Unix/Linux

Open-source Contributions —

- [qsoabsfind](#): QSO metal absorber finder (*Developer*)
- [redrock](#): Redshift fitter for DESI (*Contributor*).
- [desispec](#): DESI spectroscopic pipeline (*Contributor*).

Professional services & activities

Referee —

- Astronomy & Astrophysics (2023-), Astrophysical Journal (2023-), Internal Reviewer for DESI papers (2022-)

Member & Organizer—

- Core committee member, [DESI Professional Development Committee](#), (202425), contributed to early-career support and mentoring initiatives.
- Organizer, [INPA Weekly Seminar](#), Physics Division, LBNL (2023-2024).

Teaching Experience —

- Served as online physics tutor at E-acharya (>20 students)² from June 2017 to Aug 2018.

Outreach activities

Press releases —

- My papers (I, II) featured in the monthly research highlight of MPA and appeared on [astrobites](#).

Interviews & podcast —

- Interviewed by [Vidpeds podcast](#) to discuss my astronomy journey and how people from small cities can become successful astronomers.
- Gave [interview](#) to [The Interview Portal](#) to help Indian college students plan their careers.

Publications

Total: 35 / refereed: 23 / first author: 5 / citations: 3,950 / h-index: 17 (Last updated: 2025-11-01), List attached below

First-author publications

- ⁵ **Anand, Abhijeet**; Aguilar, J.; Ahlen, S.; Bianchi, D.; Brodzeller, A.; *et al.*, 2025, *The Cosmic Evolution of C IV Absorbers at $1.4 < z < 4.5$: Insights from 100,000 Systems in DESI Quasars*, The Astrophysical Journal, **990**, 151 ([arXiv:2504.20299](#)) [1 citations]
- ⁴ **Anand, Abhijeet**; Guy, Julien; Bailey, Stephen; Moustakas, John; Aguilar, J.; *et al.*, 2024, *Archetype-based Redshift Estimation for the Dark Energy Spectroscopic Instrument Survey*, The Astronomical Journal, **168**, 124 ([arXiv:2405.19288](#)) [26 citations]
- ³ **Anand, Abhijeet**; Kauffmann, Guinevere; & Nelson, Dylan, 2022, *Cool circumgalactic gas in galaxy clusters: connecting the DESI legacy imaging survey and SDSS DR16 Mg II absorbers*, Monthly Notices of the Royal Astronomical Society, **513**, 3210 ([arXiv:2201.07811](#)) [26 citations]
- ² **Anand, Abhijeet**; Nelson, Dylan; & Kauffmann, Guinevere, 2021, *Characterizing the abundance, properties, and kinematics of the cool circumgalactic medium of galaxies in absorption with SDSS DR16*, Monthly Notices of the Royal Astronomical Society, **504**, 65 ([arXiv:2103.15842](#)) [52 citations]
- ¹ **Anand, Abhijeet**; Roy, Nirupam; & Gopal-Krishna, 2019, *Search for H I emission from superdisk candidates associated with radio galaxies*, Research in Astronomy and Astrophysics, **19**, 083 ([arXiv:1812.06875](#)) [2 citations]

²an initiative to help poor students in suburban and rural areas of Bihar, India.

Significant contributions

- 5 Wu, Xuanyi; Cai, Z.; Lan, T.-W.; Zou, S.; **Anand, Abhijeet**; et al., 2025, *Tracing the Evolution of the Cool Gas in CGM and IGM Environments through Mg II Absorption from Redshift $z = 0.75$ to $z = 1.65$ Using DESI-Y1 Data*, The Astrophysical Journal, **983**, 186 (arXiv:2407.17809) [7 citations]
- 4 Chang, Yu-Ling; Lan, Ting-Wen; Prochaska, J. Xavier; Napolitano, Lucas; **Anand, Abhijeet**; et al., 2024, *Probing the Impact of Radio-mode Feedback on the Properties of the Cool Circumgalactic Medium*, The Astrophysical Journal, **974**, 191 (arXiv:2405.08314) [5 citations]
- 3 Galiullin, Ilkham; Rodriguez, Antonio C.; El-Badry, Kareem; Szkody, Paula; **Anand, Abhijeet**; et al., 2024, *Searching for new cataclysmic variables in the Chandra Source Catalog*, Astronomy and Astrophysics, **690**, A374 (arXiv:2408.00078) [5 citations]
- 2 Napolitano, Lucas; Pandey, Agnesh; Myers, Adam D.; Lan, Ting-Wen; **Anand, Abhijeet**; et al., 2023, *Detecting and Characterizing Mg II Absorption in DESI Survey Validation Quasar Spectra*, The Astronomical Journal, **166**, 99 (arXiv:2305.20016) [21 citations]
- 1 Ayromlou, Mohammadreza; Kauffmann, Guinevere; **Anand, Abhijeet**; & White, Simon D. M., 2023, *The physical origin of galactic conformity: from theory to observation*, Monthly Notices of the Royal Astronomical Society, **519**, 1913 (arXiv:2207.02218) [25 citations]

Collaboration Papers

- 25 Abdul Karim, M.; Aguilar, J.; Ahlen, S.; Alam, S.; Allen, L.; et al. (incl. **A. Anand**), 2025, *DESI DR2 results. II. Measurements of baryon acoustic oscillations and cosmological constraints*, Physical Review D, **112**, 083515 (arXiv:2503.14738) [544 citations]
- 24 Abdul Karim, M.; Aguilar, J.; Ahlen, S.; Allende Prieto, C.; Alves, O.; et al., 2025, *DESI DR2 results. I. Baryon acoustic oscillations from the Lyman alpha forest*, Physical Review D, **112**, 083514 (arXiv:2503.14739) [107 citations]
- 23 Brodzeller, A.; Wolfson, M.; Santos, D. M.; Ho, M.; Tan, T.; et al. (incl. **A. Anand**), 2025, *Construction of the damped $Ly\alpha$ absorber catalog for DESI DR2*, Physical Review D, **112**, 083510 (arXiv:2503.14740) [15 citations]
- 22 Zaborowski, E. A.; Taylor, P.; Honscheid, K.; Cuceu, A.; de Mattia, A.; et al. (incl. **A. Anand**), 2025, *H_0 Without the Sound Horizon (or Supernovae): A 2% Measurement in DESI DR1*, ArXiv, arXiv:2510.19149 (arXiv:2510.19149)
- 21 Adame, A. G.; Aguilar, J.; Ahlen, S.; Alam, S.; Alexander, D. M.; et al. (incl. **A. Anand**), 2025, *DESI 2024 V: Full-Shape galaxy clustering from galaxies and quasars*, Journal of Cosmology and Astroparticle Physics, **2025**, 008 (arXiv:2411.12021) [111 citations]
- 20 Treiber, Helena; Amon, Alexandra; Wechsler, Risa H.; Manwadkar, Viraj; Myles, Justin; et al. (incl. **A. Anand**), 2025, *Dwarf galaxy halo masses from spectroscopic and photometric lensing in DESI and DES*, ArXiv, arXiv:2509.20434 (arXiv:2509.20434)
- 19 Cuceu, Andrei; Herrera-Alcantar, Hiram K.; Gordon, Calum; Ramírez-Pérez, César; Armengaud, E.; et al. (incl. **A. Anand**), 2025, *DESI DR1 $Ly\alpha$ forest: 3D full-shape analysis and cosmological constraints*, ArXiv, arXiv:2509.15308 (arXiv:2509.15308) [2 citations]

- 18 Hsu, Yuan-Ming; Huang, Xiaosheng; Storfer, Christopher J.; Inchausti, Jose Carlos; Schlegel, David; *et al.* (incl. **A. Anand**), 2025, *A New Way to Discover Strong Gravitational Lenses: Pair-wise Spectroscopic Search from DESI DR1*, ArXiv, arXiv:2509.16033 (arXiv:2509.16033)
- 17 Ebina, H.; White, M.; Raichoor, A.; Dey, Arjun; Schlegel, D.; *et al.* (incl. **A. Anand**), 2025, *Clustering analysis of medium-band selected high-redshift galaxies*, ArXiv, arXiv:2509.26467 (arXiv:2509.26467)
- 16 Turner, Wynne; Cuceu, Andrei; Martini, Paul; Aguilar, J.; Ahlen, S.; *et al.*, 2025, *Probing the limits of cosmological information from the Lyman- α forest 2-point correlation functions*, ArXiv, arXiv:2509.14322 (arXiv:2509.14322)
- 15 Karaçaylı, N. G.; Ravoux, C.; Martini, P.; Le Goff, J. M.; Armengaud, E.; *et al.* (incl. **A. Anand**), 2025, *DESI DR1 Ly α 1D power spectrum: Validation of estimators*, ArXiv, arXiv:2509.13593 (arXiv:2509.13593) [2 citations]
- 14 Medina, Gustavo E.; Li, Ting S.; Eadie, Gwendolyn M.; Riley, Alexander H.; Valluri, Monica; *et al.* (incl. **A. Anand**), 2025, *The mass of the Milky Way from outer halo stars measured by DESI DR1*, ArXiv, arXiv:2508.19351 (arXiv:2508.19351) [2 citations]
- 13 Rashkovetskyi, M.; Eisenstein, D. J.; Aguilar, J.; Ahlen, S.; **Anand, Abhijeet**; *et al.*, 2025, *Clustering of DESI galaxies split by thermal Sunyaev-Zeldovich effect*, ArXiv, arXiv:2508.20904 (arXiv:2508.20904)
- 12 Adame, A. G.; Aguilar, J.; Ahlen, S.; Alam, S.; Alexander, D. M.; *et al.* (incl. **A. Anand**), 2025, *DESI 2024 VII: cosmological constraints from the full-shape modeling of clustering measurements*, Journal of Cosmology and Astroparticle Physics, **2025**, 028 (arXiv:2411.12022) [193 citations]
- 11 Adame, A. G.; Aguilar, J.; Ahlen, S.; Alam, S.; Alexander, D. M.; *et al.* (incl. **A. Anand**), 2025, *DESI 2024 II: sample definitions, characteristics, and two-point clustering statistics*, Journal of Cosmology and Astroparticle Physics, **2025**, 017 (arXiv:2411.12020) [74 citations]
- 10 Herrera-Alcantar, Hiram K.; Armengaud, Eric; Yèche, Christophe; Gordon, Calum; Casas, Laura; *et al.* (incl. **A. Anand**), 2025, *The Lyman- α Forest from LBGs: First 3D Correlation Measurement with DESI and Prospects for Cosmology*, ArXiv, arXiv:2507.21852 (arXiv:2507.21852) [1 citations]
- 9 Adame, A. G.; Aguilar, J.; Ahlen, S.; Alam, S.; Alexander, D. M.; *et al.* (incl. **A. Anand**), 2025, *DESI 2024 III: baryon acoustic oscillations from galaxies and quasars*, Journal of Cosmology and Astroparticle Physics, **2025**, 012 (arXiv:2404.03000) [384 citations]
- 8 DESI Collaboration; Abdul-Karim, M.; Adame, A. G.; Aguado, D.; Aguilar, J.; *et al.* (incl. **A. Anand**), 2025, *Data Release 1 of the Dark Energy Spectroscopic Instrument*, ArXiv, arXiv:2503.14745 (arXiv:2503.14745) [178 citations]
- 7 Adame, A. G.; Aguilar, J.; Ahlen, S.; Alam, S.; Alexander, D. M.; *et al.* (incl. **A. Anand**), 2025, *DESI 2024 VI: cosmological constraints from the measurements of baryon acoustic oscillations*, Journal of Cosmology and Astroparticle Physics, **2025**, 021 (arXiv:2404.03002) [1163 citations]
- 6 Adame, A. G.; Aguilar, J.; Ahlen, S.; Alam, S.; Alexander, D. M.; *et al.* (incl. **A. Anand**), 2025, *DESI 2024 IV: Baryon Acoustic Oscillations from the Lyman alpha forest*, Journal of Cosmology and Astroparticle Physics, **2025**, 124 (arXiv:2404.03001) [293 citations]
- 5 Ross, A. J.; Aguilar, J.; Ahlen, S.; Alam, S.; **Anand, Abhijeet**; *et al.*, 2025, *The construction of large-scale structure catalogs for the Dark Energy Spectroscopic Instrument*, Journal of Cosmology and Astroparticle Physics, **2025**, 125 (arXiv:2405.16593) [36 citations]
- 4 Scholte, Dirk; Saintonge, Amélie; Moustakas, John; Catinella, Barbara; Zou, Hu; *et al.* (incl. **A. Anand**), 2024, *The atomic gas sequence and mass-metallicity relation from dwarfs to massive*

galaxies, Monthly Notices of the Royal Astronomical Society, **535**, 2341 ([arXiv:2408.03996](#)) [13 citations]

- ³ DESI Collaboration; Adame, A. G.; Aguilar, J.; Ahlen, S.; Alam, S.; *et al.* (incl. **A. Anand**), 2024, *The Early Data Release of the Dark Energy Spectroscopic Instrument*, The Astronomical Journal, **168**, 58 ([arXiv:2306.06308](#)) [422 citations]
- ² DESI Collaboration; Adame, A. G.; Aguilar, J.; Ahlen, S.; Alam, S.; *et al.* (incl. **A. Anand**), 2024, *Validation of the Scientific Program for the Dark Energy Spectroscopic Instrument*, The Astronomical Journal, **167**, 62 ([arXiv:2306.06307](#)) [233 citations]
- ¹ Han, Jiwon Jesse; Dey, Arjun; Price-Whelan, Adrian M.; Najita, Joan; Schlafly, Edward F.; *et al.* (incl. **A. Anand**), 2023, *NANCY: Next-generation All-sky Near-infrared Community survey*, ArXiv, [arXiv:2306.11784](#) ([arXiv:2306.11784](#)) [7 citations]