

# Abhijeet Anand, PhD

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## Research Interest

My research primarily revolves around investigating gas flows within the galaxy halo, commonly referred to as the circumgalactic medium, using quasar absorption lines. I explore the connection between these gas flows and the formation and evolution of galaxies across different epochs. Furthermore, I am deeply interested in developing and learning innovative methodologies for fitting and analysing astronomical spectra coming from large spectroscopic surveys. Additionally, fostering a healthy environment where individuals from diverse backgrounds and perspectives can thrive collectively is a core aspect of my professional values.

## Positions

Sep'22 - present: Postdoctoral Scientist, Lawrence Berkeley National Lab, Berkeley, CA, USA

Aug'22: Bridge Postdoctoral Fellow, Max Planck Institute for Astrophysics, Garching, Germany

Sep'18 - Jul'22: IMPRS PhD Fellow, Max Planck Institute for Astrophysics, Garching, Germany

Sep'17 - Jul'18: UGC - JRF<sup>1</sup>, 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)

## Publications

Total: 14 / refereed: 7 / first author: 4 / citations: 669 / h-index: 9 (2024-07-21)

### Refereed publications

- <sup>7</sup> 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](https://arxiv.org/abs/2306.06308)) [154 citations]

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<sup>1</sup>University Grants Commission, Govt. of India - Junior Research Fellowship

- 6 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) [116 citations]
- 5 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) [9 citations]
- 4 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) [12 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) [17 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) [25 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**, 83 (arXiv:1812.06875) [2 citations]

### Preprints & white papers

- 7 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*, ArXiv (arXiv:2405.08314)
- 6 **Anand, Abhijeet**; Guy, Julien; Bailey, Stephen; Moustakas, John; Aguilar, J.; *et al.*, 2024, *Archetype-Based Redshift Estimation for the Dark Energy Spectroscopic Instrument Survey*, ArXiv (arXiv:2405.19288)
- 5 Ross, A. J.; Aguilar, J.; Ahlen, S.; Alam, S.; **Anand, Abhijeet**; *et al.*, 2024, *The Construction of Large-scale Structure Catalogs for the Dark Energy Spectroscopic Instrument*, ArXiv (arXiv:2405.16593) [2 citations]
- 4 DESI Collaboration; Adame, A. G.; Aguilar, J.; Ahlen, S.; Alam, S.; *et al.* (incl. **A. Anand**), 2024, *DESI 2024 III: Baryon Acoustic Oscillations from Galaxies and Quasars*, ArXiv (arXiv:2404.03000) [73 citations]
- 3 DESI Collaboration; Adame, A. G.; Aguilar, J.; Ahlen, S.; Alam, S.; *et al.* (incl. **A. Anand**), 2024, *DESI 2024 VI: Cosmological Constraints from the Measurements of Baryon Acoustic Oscillations*, ArXiv (arXiv:2404.03002) [190 citations]
- 2 DESI Collaboration; Adame, A. G.; Aguilar, J.; Ahlen, S.; Alam, S.; *et al.* (incl. **A. Anand**), 2024, *DESI 2024 IV: Baryon Acoustic Oscillations from the Lyman Alpha Forest*, ArXiv (arXiv:2404.03001) [66 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) [3 citations]

## Selected visits, talks and conferences

<sup>i</sup>Invited Talks, <sup>c</sup>Contributed Talks, <sup>s</sup>Schools & Workshops

- <sup>c</sup> Jul 2024: *DESI Collaboration Summer Meeting*, Marseille, France, Jul 9 - Jul 12, 2024 (Virtual talk).
- <sup>i</sup> Feb 2024: *Extragalactic Seminar*, MPA Garching, Germany, Feb 29, 2024 (Talk).
- <sup>i</sup> Feb 2024: *Cosmology Seminar*, MPA Garching, Germany, Feb 27, 2024 (Talk).
- <sup>c</sup> Dec 2023: *DESI Collaboration Winter Meeting*, Kona, Hawaii, Dec 11 - Dec 14, 2023 (Virtual talk).
- <sup>c</sup> Jul 2023: *DESI Collaboration Summer Meeting*, Durham, UK, Jul 17 - Jul 21, 2023 (Talk).
- <sup>c</sup> Mar 2023: *DESI Absorber Science Workshop*, Mar 28, 2023 (Virtual Talk).
- <sup>c</sup> Dec 2022: *DESI Collaboration Winter Meeting*, Cancun, Mexico, 5-9 Dec, 2022 (Talk).
- <sup>c</sup> May 2022: *Gas Flows around Galaxies*, MPA, Garching, 24 May, 2022 (Talk).
- <sup>c</sup> Apr 2022: *Galaxy Clusters 2022*, STScI 25-29 Apr, 2022 (e-Poster).
- <sup>i</sup> Mar 2022: *Computational Galaxy Formation and Evolution Group*, ZAH/ITA, University of Heidelberg, 14-16 Mar, 2022 (Visitor).
- <sup>i</sup> Feb 2022: *High Energy Group Seminar*, MPE Garching, 15 Feb, 2022 (Virtual).
- <sup>i</sup> Feb 2022: *DESI Group Seminar*, Berkeley Lab, 1 Feb, 2022 (Virtual).
- <sup>i</sup> Dec 2021: *Galaxies & Cosmology Seminar*, CfA Harvard, 13 Dec, 2021 (Virtual).
- <sup>i</sup> Sep 2021: *STARs lab*, Arizona State University, 24 Sep, 2021 (Virtual).
- <sup>c</sup> Nov 2021: *e-Poster & talk, KooGiG-Junior'21*, KIAA, Peking University, 1-5 Nov, 2021 (Virtual).
- <sup>c</sup> Sep 2021: *German Astronomical Society Meeting 2021*, 16 Sep, 2021 (Virtual)
- <sup>c</sup> Aug 2021: *SDSS-IV Collaboration Meeting 2021*, 12 Aug, 2021 (Virtual + e-poster)
- <sup>s</sup> Jul 2021: *MIAPP Workshop: High-Energy Plasma Physics Phenomena in Astrophysics*, MIAPP, Garching, Jul 19 - 30, 2021 (Virtual participant).
- <sup>c</sup> Jun 2021: *MPA Galaxy Group Retreat*, Fraueninsel, Chiemsee, 14-17 June, 2021 (Talk).
- <sup>s</sup> Jan 2021: *Fundamental of Gaseous Halos*, KITP, UCSB, 11 Jan - 5 Mar, 2021 (Virtual participant).
- <sup>c</sup> Oct 2020: *Galaxy Introductory Symposium*, MPA, Garching, 27 Oct, 2020 (Virtual).
- <sup>c</sup> Oct 2020: *Institute Seminar*, MPA, Garching, 26 Oct, 2020 (Virtual).
- <sup>c</sup> Oct 2019: *CGM 2019: CGM Conference*, Berlin, 3 Oct - 5 Oct 2019 (Participation).
- <sup>s</sup> Aug 2019: *Summer School: Galaxy Formation*, AKSS, Spetses, 28 Aug - 5 Sept 2019.
- <sup>s</sup> Nov 2018: *Python for HPC*, attended at MPCDF, Garching, 20-21 Nov 2018.

## Observing experience

Jul 2024: Support Observing Scientist for DESI, Kitt Peak National Observatory, Jul 2-5, 2024 (four nights).

## Mentoring

Joanne Tan (MPA Garching PhD) (CGM absorbers in TNG-100), 2024-present  
 Corey Dodeson (UC Berkeley UG) (short-term reading project on CGM), 2023  
 Dylan Green (UC Irvine PhD) (as part of DESI mentorship program), 2023

## Honors & Awards

DESI Early Career Travel Grant (USD 4000).

DESI Postdoc Fellow, 2022-2025.

IMPRS PhD Fellowship, 2018–2022.

UGC - Junior Research Fellowship, 2017-2018 (INR 390,000).

DST<sup>2</sup> - Higher Studies Scholarship, 2012-2017.

## Computer skills

Language/Packages — python, numpy, matplotlib, scipy, astropy

OS/Tools — Linux, Mac, L<sup>A</sup>T<sub>E</sub>X, bash scripting, jupyter notebooks, slurm manager, git

Member & contributor (github repo) —

[redrock](#): Redshift fitting for spectroperfectionism.

[desihub](#): Public code associated with DESI.

## Professional service & activities

Active Referee — [A&A](#) , [ApJ](#), Internal Reviewer for DESI collaboration papers

Collaboration — [Dark Energy Survey Instrument \(DESI\)](#), NANCY

Organizer — [INPA Weekly Seminar](#), Physics Division, LBNL

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

Gave [interview](#) to [The Interview Portal](#) to help Indian college students plan their careers.

Member of Local organizing Committee of VII<sup>th</sup> IMPRS Student Symposium, 4-5 Apr, 2019.

Served as online physics tutor at E-acharya (more than 20 students)<sup>3</sup> from June 2017 - Aug 2018.

Advanced Physics tutor at Chegg India from Jul 2016 - Dec 2017. Solving advance physics problems and clearing doubts of students from all over the world.

Organized and coordinated scientific and technical workshops (~ 150 participants) in *Pravega*<sup>4</sup>, in Jan'14.

Conducted experiments and demonstrations for open day celebration at IISc during my undergraduate.

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<sup>2</sup>Department of Science & Technology, Govt. of India

<sup>3</sup>an initiative to help poor students in sub-urban and rural areas of Bihar, India.

<sup>4</sup>Annual Science Festival of IISc