

Sameer

Dept. of Physics and Astronomy, University of Notre Dame, Indiana 46556

🌐 sameeresque.github.io ✉ sameer@nd.edu 🔗 <https://www.linkedin.com/in/sameeraastro/>

EDUCATION

2018 – 2022	Ph.D., Pennsylvania State University , Astronomy & Astrophysics Minor in Computer Science <i>Thesis Title: Unveiling the Circumgalactic medium using Cloud-by-cloud, Multiphase, Bayesian Ionization Modeling</i>
2016 – 2018	M.S., Pennsylvania State University , Astronomy & Astrophysics
2007 – 2011	B.S., Indian Institute of Space Science & Tech. , Physical Sciences

EMPLOYMENT

2022 – 2025	Postdoctoral Research Associate University of Notre Dame, Notre Dame, Indiana, USA
2015 – 2016	Scientist - SD (Promoted; Observational Astronomer) Physical Research Laboratory, Ahmedabad, Gujarat, India
2011 – 2015	Scientist - SC (Mass Spectroscopist) Physical Research Laboratory, Ahmedabad, Gujarat, India

PUBLICATIONS ([ADS](#))(≈ 540 REFEREED CITATIONS, H-INDEX=13)

First Author

- [5] **Sameer**, Lehner, N., Howk, J. C., Fox, A. J., O’Meara, J. M., & Oppenheimer, B. D. (2024). The COS CGM Compendium. V: the dichotomy in the properties of OVI associated with the low- and high-Metallicity HI-bearing gas. *arXiv e-prints*, arXiv:2403.02374. <https://doi.org/10.48550/arXiv.2403.02374>
- [4] **Sameer**, Charlton, J. C., Wakker, B. P., Kacprzak, G. G., Nielsen, N. M., Churchill, C. W., Richter, P., Muzahid, S., Ho, S. H., Nateghi, H., Rosenwasser, B., Narayanan, A., & Ganguly, R. (2024). Cloud-by-cloud multiphase investigation of the circumgalactic medium of low-redshift galaxies. *MNRAS*. <https://doi.org/10.1093/mnras/stae962>
- [3] **Sameer**, Charlton, J. C., Kacprzak, G. G., Narayanan, A., Sankar, S., Richter, P., Wakker, B. P., Nielsen, N. M., & Churchill, C. W. (2022). Probing the physicochemical properties of the Leo Ring and the Leo I group. *MNRAS*, 510(4), 5796–5820. <https://doi.org/10.1093/mnras/stac052>
- [2] **Sameer**, Charlton, J. C., Norris, J. M., Gebhardt, M., Churchill, C. W., Kacprzak, G. G., Muzahid, S., Narayanan, A., Nielsen, N. M., Richter, P., & Wakker, B. P. (2021). Cloud-by-cloud, multiphase, Bayesian modelling: application to four weak, low-ionization absorbers. *MNRAS*, 501(2), 2112–2139. <https://doi.org/10.1093/mnras/staa3754>

- [1] **Sameer**, Brandt, W. N., Anderson, S., Hall, P. B., Vivek, M., Filiz Ak, N., Grier, C. J., Ahmed, N. S., Luo, B., Myers, A. D., Rodríguez Hidalgo, P., Ruan, J., & Schneider, D. P. (2019). X-ray and multi-epoch optical/UV investigations of BAL to non-BAL quasar transformations. *MNRAS*, *482*(1), 1121–1134. <https://doi.org/10.1093/mnras/sty2718>

Co-author with major contribution

- [5] Hafen, Z., **Sameer**, Hummels, C., Charlton, J., Mandelker, N., Wijers, N., Bullock, J., Faerman, Y., Lehner, N., & Stern, J. (2024). The Halo21 absorption modelling challenge: lessons from ‘observing’ synthetic circumgalactic absorption spectra. *MNRAS*, *528*(1), 39–60. <https://doi.org/10.1093/mnras/stad3889>
- [4] Nielsen, N. M., Kacprzak, G. G., **Sameer**, Murphy, M. T., Nateghi, H., Charlton, J. C., & Churchill, C. W. (2022). A complex multiphase DLA associated with a compact group at $z = 2.431$ traces accretion, outflows, and tidal streams. *MNRAS*, *514*(4), 6074–6101. <https://doi.org/10.1093/mnras/stac1824>
- [3] Narayanan, A., **Sameer**, Muzahid, S., Johnson, S. D., Udhwani, P., Charlton, J. C., Mauerhofer, V., Schaye, J., & Yadav, M. (2021). A partial Lyman limit system tracing intragroup gas at $z \approx 0.8$ towards HE 1003 + 0149. *MNRAS*, *505*(1), 738–754. <https://doi.org/10.1093/mnras/stab1315>
- [2] Kaur, N., **Sameer**, Baliyan, K. S., & Ganesh, S. (2017). Optical intra-day variability in 3C 66A: A decade of observations. *MNRAS*, *469*(2), 2305–2312. <https://doi.org/10.1093/mnras/stx965>
- [1] Mishra, R. K., Marhas, K. K., & **Sameer**. (2016). Abundance of ^{60}Fe inferred from nanoSIMS study of QUE 97008 (L3.05) chondrules. *Earth and Planetary Science Letters*, *436*, 71–81. <https://doi.org/10.1016/j.epsl.2015.12.007>

Other co-authored selected publications

- [15] Nateghi et al. (including **Sameer**) (2024). “Signatures of Gas Flows-II: Connecting the kinematics of the multiphase circumgalactic medium to galaxy rotation”. *MNRAS*, tmp, tmp. <https://doi.org/10.1093/mnras/stae2129>
- [14] Nateghi et al. (including **Sameer**) (2024). “Signatures of gas flows - I. Connecting the kinematics of the H I circumgalactic medium to galaxy rotation”. *MNRAS*, *533*, 1321–1340. <https://doi.org/10.1093/mnras/stae1843>
- [13] Fernández-Figueroa et al. (including **Sameer**) (2024). “Unveiling the complex circumgalactic medium: a comparative study of merging and non-interacting galaxy groups”. *MNRAS*, *531*, 3658–3677. <https://doi.org/10.1093/mnras/stae1332>
- [12] Dorigo Jones et al. (including **Sameer**) (2022). “Improving blazar redshift constraints with the edge of the Ly α forest: 1ES 1553+113 and implications for observations of the WHIM”. *MNRAS*, *509*, 4330–4343. <https://doi.org/10.1093/mnras/stab3331>

- [11] Marra et al. (including **Sameer**) (2021). “Using cosmological simulations and synthetic absorption spectra to assess the accuracy of observationally derived CGM metallicities”. MNRAS, 508, 4938–4951. <https://doi.org/10.1093/mnras/stab2896>
- [10] Pradeep et al. (including **Sameer**) (2020). “Solar-metallicity gas in the extended halo of a galaxy at $z \sim 0.12$ ”. MNRAS, 493, 250–266. <https://doi.org/10.1093/mnras/staa184>
- [9] Yi et al. (including **Sameer**) (2019). “Broad Absorption Line Disappearance/Emergence in Multiple Ions in a Weak Emission-line Quasar”. ApJ, 870, L25. <https://doi.org/10.3847/2041-8213/aafc1d>
- [8] Dey et al. (including **Sameer**) (2018). “Authenticating the Presence of a Relativistic Massive Black Hole Binary in OJ 287 Using Its General Relativity Centenary Flare: Improved Orbital Parameters”. ApJ, 866, 11. <https://doi.org/10.3847/1538-4357/aadd95>
- [7] Goyal et al. (including **Sameer**) (2018). “Stochastic Modeling of Multiwavelength Variability of the Classical BL Lac Object OJ 287 on Timescales Ranging from Decades to Hours”. ApJ, 863, 175. <https://doi.org/10.3847/1538-4357/aad2de>
- [6] Kaur et al. (including **Sameer**) (2018). “Optical Variability in IBL S5 0716+714 during the 2013-2015 Outbursts”. AJ, 156, 36. <https://doi.org/10.3847/1538-3881/aac5e4>
- [5] Kaur, Chandra, et al. (including **Sameer**) (2017). “A Multiwavelength Study of Flaring Activity in the High-energy Peaked BL Lac Object 1ES 1959+650 During 2015-2016”. ApJ, 846, 158. <https://doi.org/10.3847/1538-4357/aa86b0>
- [4] Ahnen et al. (including **Sameer**) (2017). “Multiwavelength observations of a VHE gamma-ray flare from PKS 1510-089 in 2015”. A&A, 603, A29. <https://doi.org/10.1051/0004-6361/201629960>
- [3] Zola et al. (including **Sameer**) (2016). “A Search for QPOs in the Blazar OJ287: Preliminary Results from the 2015/2016 Observing Campaign”. *Galaxies*, 4, 41. <https://doi.org/10.3390/galaxies4040041>
- [2] Baliyan, Kaur, et al. (including **Sameer**) (2016). “Multi-wavelength Study of Blazars Using Variability as a Tool”. *Journal of Astronomy and Space Sciences*, 33, 177–183. <https://doi.org/10.5140/JASS.2016.33.3.177>
- [1] Valtonen et al. (including **Sameer**) (2016). “Primary Black Hole Spin in OJ 287 as Determined by the General Relativity Centenary Flare”. ApJ, 819, L37. <https://doi.org/10.3847/2041-8205/819/2/L37>

Conference Proceedings

- [6] Sitarek, J., Becerra Gonzalez, J., Fallah Ramazani, V., Lindfors, E., ..., **Sameer**, Vazquez Acosta, M., Larsson, S., MAGIC Collaboration, Fermi-Lat Collaboration, Baliyan, K., Kaur, N., Jorstad, S. G., & Raiteri, C. (2017). MAGIC observations of variable very-high-energy gamma-ray emission from PKS1510-089 during May 2015 outburst. *35th International Cosmic Ray Conference (ICRC2017)*, 301, Article 657, 657

- [5] Baliyan, K. S., Chandra, S., Kaur, N., Ganesh, S., **Sameer**, Srivastava, M., Bisht, V., Jatin, & Kumar, R. (2016). Optical/NIR Observations of HBL 1ES 1959+625 from Mt Abu IR Observatory(MIRO), India. *The Astronomer's Telegram*, 9070, 1
- [4] **Sameer**, Kaur, N., Ganesh, S., Kumar, V., & Baliyan, K. S. (2015). ATel 7495: Near Infrared flaring of the blazar FSRQ PKS 1510-089: MIRO Observations. *The Astronomer's Telegram*, 7495, 1
- [3] **Sameer**, Ganesh, S., Kaur, N., Kumar, V., & Baliyan, K. S. (2015). ATel 7494: FSRQ B2 1156+29: NIR follow up observations from MIRO. *The Astronomer's Telegram*, 7494, 1
- [2] Baliyan, K. S., Kaur, N., **Sameer**, Ganesh, S., & Chandra, S. (2015). Study of AGNs using Blazar Variability as a tool. *Astronomical Society of India Conference Series*, 12, 101–104
- [1] Sarbadhikari, A. B., Marhas, K. K., **Sameer**, & Goswami, J. N. (2013). Water Content in Melt Inclusions and Apatites in low Titaniumlunar Mare Basalt 15555. *44th Annual Lunar and Planetary Science Conference*, 2813

Under Review

- [1] Udhwani, P., **Sameer**, Narayanan, A., Muzahid, S., Charlton, J., & Cantalupo, S. (2024). Kinematic analysis of an Ultra-Strong Mg II absorber at $z \approx 1.13$ linking to Circumgalactic Gas Structures. *under review in AAS journals*

AWARDS

2023	International Travel Grant American Astronomical Society
2022	Postdoctoral Lightning Talk Competition - Department Prize College of Science, University of Notre Dame
2018, 2019, 2021	Zaccheus Daniel Fellowship Penn State
2016	Homer F. Braddock/Nellie H. and Oscar L. Roberts Fellowship Penn State
2011	Academic Excellence Award Indian Institute of Space Science & Technology
2007 – 2011	Full-tuition scholarship Indian Institute of Space Science & Technology

GRANTS & AWARDED RESEARCH PROGRAMS

2024	HST program 17862, Co-I (Cycle 32) Illuminating the Dark Ages of Metal Evolution: An HST Legacy Survey at Cosmic Noon
------	---

- 2022 **GBT program 22B-350, Co-I**
Project AMIGA: The Circumgalactic Medium of M31 – Mapping the inner halo
- 2022 **HST program 17051, Co-I (Cycle 30)**
A ULLYSES Survey of the Magellanic Clouds: a Laboratory for the Physics of Interfaces between Hot and Cold Gas
- 2021 **HST program 16607, Co-PI (\$295,000) (Cycle 29)**
Is There a Relationship Between the Metallicity of the Circumgalactic Medium and the Galaxy Orientation?

INVITED TALKS

- 2024 **1. Tracing Galaxy Environments using Metal Absorption Signatures across Cosmic History** (Feb 20)
University of Washington, Seattle
- 2022 **2. Probing the physicochemical properties of the Leo Ring and the Leo I group** (Jan 27)
Carnegie Tea Talk, Virtual, Carnegie Observatories
- 2021 **3. Investigating the origin of multiphase, multicomponent absorption in an Ultrastrong Mg II absorber using the CMBM approach** (Aug 19)
Baltimore Winds Workshop, Johns Hopkins University
- 2020 **4. Unveiling the nature of the circumgalactic medium** (Oct 29)
Data Science Consortium, Virtual, University of Michigan
- 5. Automated extraction of multiphase conditions of QALs using Bayesian Modeling with cloudy** (Jun 19)
Department Colloquium, Astronomy & Astrophysics, Virtual, New Mexico State University

CONTRIBUTED TALKS

- 2024 1. Discussion lead (Sept 11) - Bridging CGM observations, models, and simulations
(Sept 10) - Cold Gas in the CGM
A Holistic Understanding of the Multi-scale, Multiphase CGM, Aspen Center for Physics (Sept 1 – 15), CO
2. Resolving the CGM in Theory & Observations (Aug 21 – 23), Harvard University
3. FOGGIE Retreat (May 06 – 09), Michigan State
- 2023 4. Oases in the Cosmic Desert: Understanding the Structure of the Circumgalactic Medium (Feb 21 – 23), Arizona State University
- 2022 5. Dissertation Talk (Jun 16), AAS 240, Pasadena

- | | |
|------|--|
| | 6. Thesis Defense Talk (Jun 10), Penn State |
| 2021 | 7. STARs Lab Meeting (Nov 5), Virtual, Arizona State University |
| | 8. Milky Way Halo Research Group Meeting (Oct 15), Virtual, STScI |
| | 9. Lunch Talk (Sep 21), Virtual, Penn State |
| | 10. Galread Extragalactic Discussion Group (Apr 5), Virtual, Princeton |
| | 11. High Energy Astro Group Seminar (Mar 25), Virtual, MIT |
| | 12. Lunch Talk (Mar 23), Virtual, Penn State |
| | 13. Tutorial contributor & presenter (Jan 20) |
| | Fundamentals of Gaseous Halos (Jan 11 – Mar 5), Virtual, UCSB |
| 2018 | 14. Central Pennsylvania Consortium Astronomers' Meeting (Apr 19), Dickinson College, PA |
| | 15. Lunch Talk (Feb 27), Penn State |

POSTER PRESENTATIONS

- | | |
|------|--|
| 2021 | 1. Statistical Challenges in Modern Astronomy VII (June 9)
Virtual, Penn State |
| | 2. American Astronomical Society (Jan 11 – 15), Virtual |
| 2019 | 3. American Astronomical Society (Jan 6 – 10), University of Washington |
| 2018 | 4. Astrophysical Frontiers in the Next Decade and Beyond (Jun 26 – 29), Portland, Oregon |

TEACHING EXPERIENCE

- | | |
|---------------|--|
| Spring 2024 – | Physics Teaching Practicum
Kaneb Center for Teaching Excellence, Notre Dame <ul style="list-style-type: none"> • Modern Physics from Quarks to Quasars • Engineering Physics II • Electricity & Magnetism |
| Fall 2019 | Course Grader , ASTRO 7N
Artistic Universe - Concepts of astronomy through gaming, Penn State |
| Summer 2019 | Canvas Web Development , ASTRO 10
Elementary Astronomy, Penn State |
| Fall 2018, | Course Grader , ASTRO 451
Astrophysical Techniques, Penn State |

Spring 2018, Spring 2017, Fall 2016	Instructor , ASTRO 11 Astronomy for non-science majors, Penn State
Spring 2018	Course Grader , ASTRO 292 Astronomy of the Distant Universe, Penn State
Fall 2017	Course Grader , ASTRO 291 Astronomical Methods and the Solar System, Penn State
Spring 2017	Course Grader , ASTRO 130 Black Holes in the Universe, Penn State
Fall 2016	Lab Supervisor & Course Grader , ASTRO 320 Observational Astronomy & Experimental Physics, Penn State

MENTORING EXPERIENCE

2024 –	Kshitij Chavan , Graduate student Inter-University Center for Astronomy & Astrophysics, Pune, India Advising research
2023 –	Enosh Kallely , Undergraduate student Dept. of Physics & Astronomy, Notre Dame Directing undergraduate non-thesis research & Advising research
2022 –	Purvi Udhwani , Graduate student Dept. of Astronomy & Astrophysics, Australian National University Advising research
2021 – 2023	Shengdi You , Undergraduate student Dept. of Astronomy & Astrophysics, Penn State Advised undergraduate thesis research
2015 – 2016	Navpreet Kaur , Graduate student Astronomy & Astrophysics Division, Physical Research Laboratory, India Mentored thesis research

OBSERVING EXPERIENCE

2015 – 2016	1.2-metre Telescope, Mt. Abu, Rajasthan, India Monitoring of blazar variability using optical and infrared photometric imaging.
-------------	--

SUPERCOMPUTING ALLOCATIONS

2022 – 2024	ACCESS Allocation, PI (8900 node-hours) PHY220103: Development of Emulators for Accurate and Faster Ionization Modeling of Absorption Line Systems
2019 – 2022	XSEDE Allocation, Co-PI (1280 node-hours) PHY210047: Multiphase, Cloud-by-Cloud, Bayesian Analysis of the Relationship Between the Metallicity of the Circumgalactic Medium and Galaxy Orientation

PROFESSIONAL SERVICE & OUTREACH

2023 –	Referee for MNRAS, ApJ, JCAP
2021 –	Outreach talks Space Telescope Science Institute Public Outreach, Virtual
2021	AAS Chambliss Judge Judge for iPoster presentations, Virtual
2016 – 2019	ASTROFEST Organizing and setting up telescopes for public viewing at Penn State
2011 – 2014	Conducted mass spectroscopy demonstrations and presented meteorite exhibits NanoSIMS Lab, Physical Research Laboratory

PRESS COVERAGE

Black & bright: PRL joins world to gauge black hole spin. Times of India, May 2016

REFERENCES

Nicolas Lehner
Research Professor
Department of Physics and Astronomy
University of Notre Dame
✉ nlehner@nd.edu
☎ +1 574-220-2927

Jay Christopher Howk
Professor
Department of Physics and Astronomy
University of Notre Dame
✉ jhowk@nd.edu
☎ +1 574-631-8594

Jane C. Charlton
Professor
Department of Astronomy and Astrophysics
Pennsylvania State University
✉ jcc12@psu.edu
☎ +1 814-571-7226

Christopher W. Churchill
Professor
Department of Astronomy
New Mexico State University
✉ cwc@nmsu.edu
☎ +1 575-636-3808

Glenn G. Kacprzak
Associate Professor
Centre for Astrophysics and Supercomputing
Swinburne University of Technology
✉ gkacprzak@swin.edu.au
☎ +61 3 9214 5439

Anand Narayanan
Professor
Department of Earth and Space Sciences
Indian Institute of Space Science and Tech.
✉ anand@iist.ac.in
☎ +91 94959 60960