Sameer

Dept. of Physics and Astronomy, University of Oklahoma, OK 73019

sameeresque.github.io sameer@ou.edu sameerastro 0000-0001-9966-6790

EDUCATION

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

EMPLOYMENT

2025 –	**Postdoctoral Research Associate** University of Oklahoma, Norman, Oklahoma, USA
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

GRANTS & AWARDED RESEARCH PROGRAMS

2025	**HST program 18146, PI** (Cycle 33) A Complete Characterization of Multiphase Circumgalactic Gas in the Cosmic Afternoon through Forward Modeling
2025	**HST program 18053, Co-I** (Cycle 33) The Size Scale and Baryonic Content of Low Redshift Intergalactic Absorbers
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?

AWARDS AND HONORS

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

TEACHING EXPERIENCE

Fall 2024	**Physics Teaching Practicum (Guest Lectures)** Kaneb Center for Teaching Excellence, Notre Dame
Spring 2024	• Electricity & Magnetism "Separation of Variables in Spherical Coordinates", Oct 17 • Engineering Physics II "Magnetic Field Energy & RL Circuits", Apr 4 • Modern Physics from Quarks to Quasars "Intro to Quantum Mechanics & The Photoelectric Effect", Feb 27
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
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 Advised thesis research

INVITED TALKS

2025	**1. Project AMIGA: Physicochemical Properties of the Circumgalactic Gas of Andromeda Galaxy** (Jul 18) Osmania University, Hyderabad
2025	**2. Project AMIGA: Physicochemical Properties of the Circumgalactic Gas of Andromeda Galaxy** (Mar 27) University of Michigan, Michigan
2024	**3. Tracing Galaxy Environments using Metal Absorption Signatures across Cosmic History** (Feb 20) University of Washington, Seattle
2022	**4. Probing the physicochemical properties of the Leo Ring and the Leo I group** (Jan 27) Carnegie Tea Talk, Virtual, Carnegie Observatories
2021	**5. 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	**6. Unveiling the nature of the circumgalactic medium** (Oct 29) Data Science Consortium, Virtual, University of Michigan **7. 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

2025	1. Project AMIGA: Physicochemical Properties of the Circumgalactic Gas of Andromeda Galaxy (Mar 25), University of Notre Dame
2024	2. Discussion lead (Sept 11) - Bridging CGM observations, models, and simulations
	3. Discussion lead (Sept 10) - Cold Gas in the CGM A Holistic Understanding of the Multi-scale, Multiphase CGM, Aspen Center for Physics (Sept 1 – 15), Colorado
	4. Resolving the CGM in Theory & Observations (Aug 21 – 23), Harvard University
	5. FOGGIE Retreat (May 06 – 09), Michigan State
2023	6. Oases in the Cosmic Desert: Understanding the Structure of the Circumgalactic Medium (Feb 21 – 23), Arizona State University
2022	7. Dissertation Talk (Jun 16), AAS 240, Pasadena
	8. Thesis Defense Talk (Jun 10), Penn State
2021	9. STARs Lab Meeting (Nov 5), Virtual, Arizona State University
	10. Milky Way Halo Research Group Meeting (Oct 15), Virtual, STScI
	11. Lunch Talk (Sep 21), Virtual, Penn State
	12. Galread Extragalactic Discussion Group (Apr 5), Virtual, Princeton
	13. High Energy Astro Group Seminar (Mar 25), Virtual, MIT
	14. Lunch Talk (Mar 23), Virtual, Penn State
	15. Tutorial contributor & presenter (Jan 20) Fundamentals of Gaseous Halos (Jan 11 – Mar 5), Virtual, UCSB

OBSERVING EXPERIENCE

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

SUPERCOMPUTING ALLOCATIONS

2024 – 2025	**ACCESS Allocation, PI** (3130 node-hours) PHY240292: Forward Modeling of Absorption Spectra
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

PUBLICATIONS (ADS)(603 REFEREED CITATIONS, H-INDEX=14)

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 of OVI Associated with Low- and High-metallicity Cool Gas at z < 1. *The Astrophysical Journal*, *975*(2), 264. https://doi.org/10.3847/1538-4357/ad7af2

[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

Second and Third Author

[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 ≈ 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

[16] Lehner et al. (including **Sameer**) (2025). "Project AMIGA: The Inner Circumgalactic Medium of Andromeda from Thick Disk to Halo". *arXiv e-prints*, **volume**, arXiv:2506.16573. https://doi.org/10.48550/arXiv.2506.16573

[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 Collabortion, 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

In Review

[1] Richter, P., Charlton, J., Fox, A., **Sameer**, & Wakker, B. (2025). Studying the gaseous outskirts of galaxy groups with coherent Lyα absorption patterns. *Under review in A & A*

[0] Udhwani, P., **Sameer**, Narayanan, A., Muzahid, S., Charlton, J., & Cantalupo, S. (2025). Kinematic analysis of an Ultra-Strong Mg II absorber at z $\approx$ 1.13 linking to Circumgalactic Gas Structures. *Under review in AAS journals*
