Dr. Yongda Zhu

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RESEARCH INTERESTS

Galaxy formation and evolution; Reionization; Intergalactic medium (IGM); Quasars; Dark Matter

EDUCATION

Mar. 2024 Ph.D. in Physics; University of California, Riverside
 Constraining the IGM during the Later Stages of Reionization Using QSO Spectra
 Advisor: Prof. George Becker
 Dec. 2019 M.Sc. in Physics; University of California, Riverside
 Jun. 2018 B.Sc. in Astronomy; University of Science and Technology of China
 Test of Gravity Theories on the Galaxy Scale. Advisor: Prof. Xiao-Bo Dong

POSITIONS & PROFESSIONAL SERVICE

• JASPER Scholar (University of Arizona)

2025 -

- Mentors: Prof. Eiichi Egami & Prof. Xiaohui Fan
- Investigating gas-galaxy interactions across multiple scales using JWST data.

• Postdoctoral Research Associate (University of Arizona)

2024 -

- Mentors: Prof. Marcia Rieke & Prof. George Rieke
- Member of the JWST NIRCam Science Team and the MIRI U.S. Team.
- Analyzing multi-band imaging of galaxies from NIRCam.
- Built the first systematic sample of galaxies with extended emission lines and potential outflows using deep NIRCam medium-band imaging.
- Leading the reduction and analysis of one of the largest JWST/NIRSpec MSA datasets targeting cosmic noon galaxies and dust-obscured AGN candidates.

• Graduate Student Researcher (UC Riverside)

2019 - 2024

- Mentor: Prof. George Becker
- Led Keck and ALMA observations of the IGM via high-z quasars.
- Modeled the Ly α and Ly β forest using cosmological simulations.
- Provided robust evidence that cosmic reionization ended significantly later than previously thought.

• Teaching Assistant (UC Riverside)

2018-2019

- Taught intensive summer review course for PhD students preparing for the Comprehensive Exam. Classical Mechanics, Electromagnetism, Thermal and Statistical Physics
- Led undergraduate general physics laboratory courses.

• Teaching Assistant (USTC)

2016

- Taught computer programming in C/C++, including data structures and algorithms.

• Peer Reviewer:

The Astrophysical Journal, The Astrophysical Journal Letters, Open Research Europe (European Commission); telescope proposals (ALMA, Gemini).

• Collaborations: JADES, EREBUS, COSMOS-3D, SAPPHIRES, XQR-30

SELECTED GRANTS & AWARDS

MODEL ND A O CL. 1 A OL

• NSF NRAO Student Observing Support Award (\$40k)	2023
\bullet UCR HEERF Dissertation Year Program Award (\$7.2k)	2022
• Benjamin C. Shen Memorial Award for Outstanding Achievement by a First Year Graduate Student Researcher, UCR	2019
• Dean's Distinguished Fellowship, UCR	2018
• Xingquan Fund Scholarship, USTC	2017
• Outstanding Student Scholarship, USTC	2015, 2017
• Student PI, "Properties of Barred Galaxies in Numerical Simulations" Chinese Academy of Sciences (CAS) Innovation Training Programs for Undergraduates (1 yr, CNY 10k)	2017
• First Prize in China Undergraduate Physics Tournament (USTC Competition Area).	2016
 Student PI, "Testing Gravity Theories on the Galactic Scale" National Natural Science Foundation of China (NSFC) for Fostering Talented Students in Basic Sciences (2 yr, CNY 20k) Chinese Academy of Sciences (CAS) Innovation Training Programs for Undergraduates (1 yr, CNY 10k) 	2015-2017

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OBSERVING EXPERIENCE & PROPOSAL INVOLVEMENT

*PI/leading person[†]

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Selected projects:

- *ALMA Cycle 11 Galaxy over/under-densities around IGM transmission at z=5.7: a robust constraint on reionization
- *MMT-6.5m/Binospec IFU 2024B Ionization and Enrichment in the Reionization Epoch: A Pilot Study with Binospec IFU
- *ALMA Cycle 9 The Mean Free Path of Ionizing Photons at z = 5.6: A Robust Constraint on Reionization
- JWST/NIRCam WFSS Cycle 2 (PI: Becker): How Does Reionization End? A Search for [O III] Emitters in the Most Transparent Regions of the IGM Near Redshift Six
- †Keck/ESI: [2021B_U036, 2022A_U035, 2022B_U042, 2023B_U049, 2023B_U049, 2024A_U281] The Mean Free Path at z = 5.6: Insights into Ultra-Late Reionization

Selected previous allocation:

- Keck/ESI: [2019A_U014, 2020A_U121, 2021A_U039] Giant Lyα Troughs at z < 6: A Signature of Very Late Reionization?: (PI: Becker) Zhu, Y., et al. 2021, ApJ, 923, 223; Zhu, Y. et al. 2022, ApJ, 932, 76.
- Keck/LRIS [2019A_U147, 2019B_U147] The Mean Free Path at z=5: A Key Constraint on Reionization Models (PI: Becker) Becker, G. D., et al. 2021; **Zhu, Y.** et al. 2023, ApJ, 955, 115

Other allocation includes Keck/ESI [2021A, 2021B], Keck/DEIMOS [2020A], Keck/LRIS [2023B], Subaru/HSC [2020B, 2021A, 2021B, 2023B]

 \dagger The PI of Keck proposals cannot be a UC student.

Other JWST programs as Co-I:

- 8544 Rest-Frame Optical Nebular Emission Lines at Cosmic Dawn: MIRI/LRS Follow-Up for JADES-GS-z14-0
- 8060 JWST Multi-Cycle Deep Transient Survey in GOODS-S
- 8018 DIVER: Deep Insights into UV Spectroscopy at the Epoch of Reionization
- 7935 Efficient Measurement of the Emergence Rate of AGN in Legacy Deep Field
- 7436 The Last Neutral Islands at the End of Reionization? Characterizing the Nature of the Longest Dark Gaps in IGM Transmission at z∼5.3
- 7390 Probing Pair-Instability Supernovae through the Triply-lensed MACS0647-JD at z=10.17
- 7345 The Dragon survey: A Direct Probe of the Early Stellar Luminosity Function and Dark Matter through Multi-cycle Multi-cadence Microlensing at z=0.73
- 7336 Commission a new $R\sim2500$ IFU on JWST: Calibrating second-order spectra of NIRCam/WFSS through Hubble Ultra Deep Field
- 7335 Forever Blowing Bubbles: What Powers a 24-kpc Ionized Gas Nebula Around a Normal Galaxy at z=6?

SELECTED SEMINARS / COLLOQUIA / CONFERENCE TALKS	* invited
• Galaxy Origins in the JWST Era, Toledo	May, 2025
• NIRCam Science Meeting, Biosphere2	Mar, 2025
• * SO/NSF's NOIRLab Joint Colloquium, University of Arizona	Feb 27, 2025
• * Cosmology Seminar, Arizona State University	Feb 19, 2025
• Lyman-alpha Forest Workshop, Ohio State University	Oct, 2024
• JWST MIRI Science Meeting, Biosphere2	Oct, 2024
• The First Gigayear(s), Hilo, Hawaiʻi	Sep, 2024
• JADES Collaboration Meeting, University of Copenhagen	Apr, 2024
• * Galaxy Group Talk, University of Arizona	Mar, 2024
• * Galaxy Seminar, University of Michigan	Nov, 2023
• Galaxy Formation and Evolution in Southern California (GalFRESCA 2023)	Sep, 2023
• * Special Kashiwa-Mitaka Meeting (KMM) Seminar, University of Tokyo	Aug, 2023
• * Lightning Talk, First Light Conference, MIT	Jun, 2023
\bullet Reionisation in the Summer Conference, $\mathbf{MPIA},$ Heidelberg	Jun, 2023
• * Talk at Galaxy Formation Group, Northwestern University (CIERA)	Dec, 2022

• * FLASH Seminar, University of California, Santa Cruz	Nov, 2022
• * Astronomy Lunch Talk, University of California, Los Angeles	Oct, 2022
• * Astro Lunch Talk, University of California, Santa Barbara	Sep, 2022
\bullet Reionization on a Blackboard Workshop, \mathbf{CCA}	Sep, 2022
• * Special arXiv Coffee Meeting, University of California, Davis	May, 2022
• * Physics & Astronomy Student Seminar, UC Riverside	Apr, 2022
• * High-z Group Talk, Tsinghua University	Apr, 2022
\bullet Reionization and Cosmic Dawn: Looking Forward to the Past, ${\bf UC~Berkeley}$	Mar,2022
• European Astronomical Society Annual Meeting (EAS 2021)	$\mathrm{Jul},2021$
• Summer All Zoom Epoch of Reionization Astronomy Conference (SAZERAC2)	$\mathrm{Jun},2021$
• * EURECA Seminar, University of Arizona	Feb, 2021
MENTORING	
 Undergraduate student mentored: Ms. G. Hernandez (UC Riverside) Project: Measuring the redshift evolution of the IGM effective optical depth. 	2021
 Graduate students (co-)mentored: Ms. HX. Ma (PhD student at Nagoya University, Japan) Projects: Density-based clustering algorithm for galaxy group/cluster identification Projects: Constraining the dark matter halo of the Milky Way with Gaia DR3 Mr. Seyedazim Hashemi (PhD student at UC Riverside) Project: Lyman-alpha visibility during the epoch of reionization 	
• UCR International Students & Scholar Office: 14 mentees with international backgrounds	2021-2023
 Graduate Student Mentorship Program: Dr. N Ahvazi (recently finished her PhD in Physics; dark matter and galaxies) Mr. Q Wu (now pursuing his PhD in Physics; 2D materials) 	2020
SERVICE & PUBLIC OUTREACH	
• Stargazing outreach events at Home Gardens Library, Corona, CA	Oct. 2023
• Co-organizer: UCR Physics & Astronomy Student Seminar	2022-2023
• UCR Camp Highlander instructor	Summer 2022
 Outreach courses designed for K-12 students: Multiwavelength Universe Gravity Simulator 	2022
• Virtual Stargazing (UCR & Riverside Astronomical Society) monthly live public outreach on Youtube	2020-2021
• Serving for the Riverside County Science and Engineering Fair as judge	2021-2023
• UCR Astronomy Public Outreach: Mercury Transit	Nov. 2019

SELECTED MEDIA COVERAGE

- "Astronomers Discover a Unique Quasi-Stellar Object-Dusty Star-Forming Galaxy System", American Physical Society (APS)
- "The End of the Cosmic Dawn: Settling a Two-Decade Debate", SciTechDaily
- "Can You Explain These Long, Dark Gaps in Your Cosmological Resume?", AASNova

TECHNICAL PROFICIENCIES

Programming C(and some C++), Python, Julia, GDL/IDL, CUDA

Software CASA, Gadget-4, GALAXY, FreeFem++, etc.

Hardware Raspberry Pi, Arduino

Languages English (professional), Chinese (native)

YONGDA ZHU - PUBLICATION LIST

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ADS link: https://ui.adsabs.harvard.edu/search/q=orcid%3A0000-0003-3307-7525 Google Scholar: https://scholar.google.com/citations?user=wDrSZWYAAAAJ

As of April 2025: > 1500 citations | h-index: 22

Research Interest Score is higher than 99% of ResearchGate members who first published in 2021.

First-author:

- 9. Zhu, Y., Rieke, M. J., Ho, L. C., Sun, Y., Rieke, G. H., Yuan, F., Bakx, T. J. L. C., Becker, G. D., Yang, J., Bañados, E., Bischetti, M., Cain, C., Fan, X., Fudamoto, Y., Hashemi, S., Ikeda, R., Ji, Z., Jin, X., Liu, W., Liu, Y., Lyu, J., Ma, H.-X., Takeuchi, T. T., Umehata, H., Wang, F., and Tee, W. L., 2025. Nuclear Winds Drive Large-Scale Cold Gas Outflows in Quasars during the Reionization Epoch, Nature Astronomy, under review, arXiv:2504.02305.
- 8. **Zhu, Y.**, Bakx, T. J. L. C., Ikeda, R., Umehata, H., Becker, G. D., Cain, C., Champagne, J. B., Fan, X., Fudamoto, Y., Jin, X., Ma, H.-X., Sun, Y., Takeuchi, T. T., and Tee, W. L., **2024**. Discovery of a Unique Close Quasar-DSFG Pair Linked by a [C II] Bridge at z=5.63, RNAAS, 8, 284.
- 7. **Zhu, Y.**, Alberts, S., Lyu, J., Morrison, J., Rieke, G. H., Sun, Y., Helton, J. M., Ji, Z., Bhatawdekar, R., Bonaventura, N., Bunker, A. J., Lin, X., Rieke, M. J., Rinaldi, P., Shivaei, I., Willmer, C. N. A., and Zhang, J., **2024**. *SMILES: Potentially Higher Ionizing Photon Production Efficiency in Overdense Regions*, The Astrophysical Journal, in press.
- 6. Zhu, Y., Rieke, M. J., Ji, Z., Simmonds, C., Sun, F., Sun, Y., Alberts, S., Bhatawdekar, R., Bunker, A. J., Cargile, P. A., Carniani, S., de Graaff, A., Hainline, K., Helton, J. M., Jones, G. C., Lyu, J., Rieke, G. H., Rinaldi, P., Robertson, B., Scholtz, J., Übler, H., Williams, C. C., and Willmer, C. N. A., 2024. A Systematic Search for Galaxies with Extended Emission Line and Potential Outflows in JADES Medium-Band Images, The Astrophysical Journal, in press.
- 5. **Zhu, Y.**, Becker, G.D., Bosman, S. E. I., Cain, C., Keating, L. C., Nasir, F., D'Odorico, V., Bañados, E., Bian, F., Bischetti, M., Bolton, J. S., Chen, H., D'Aloisio, A., Davies, F. B., Davies, R. L., Eilers, A.-C., Fan, X., Gaikwad, P., Greig, B., Haehnelt, M. G., Kulkarni, G., Lai, S.,

- Puchwein, E., Qin, Y., Ryan-Weber, E. V., Satyavolu, S., Spina, B., Walter, F., Wang, F., Wolfson, M., and Yang, J., **2024**. Damping Wing-Like Features in the Stacked Ly α Forest: Potential Neutral Hydrogen Islands at z < 6. Monthly Notices of the Royal Astronomical Society: Letters, 533, L49
- 4. Zhu, Y., Becker, G.D., Christenson, H.M., D'Aloisio, A., Bosman, S.E.I., Bakx, T., D'Odorico, V., Bischetti, M., Cain, C., Davies, F.B., Davies, R.L., Eilers, A.-C., Fan, X., Gaikwad, P., Haehnelt, M.G., Keating, L.C., Kulkarni, G., Lai, S., Ma, H.-X., Mesinger, A., Qin, Y., Satyavolu, S., Takeuchi, T.T., Umehata, H., and Yang, J., 2023. Probing Ultra-late Reionization: Direct Measurements of the Mean Free Path over 5 < z < 6. The Astrophysical Journal, 955, 115.</p>
- 3. **Zhu, Y.**, Ma, H.-X. (co-first author), Dong, X.-B., Huang, Y., Mistele, T., Peng, B., Long, Q., Wang T., Chang L., and Jin X., **2023**. *How Close Dark Matter Halos and MOND Are to Each Other: Three-Dimensional Tests Based on Gaia DR2*. Monthly Notices of the Royal Astronomical Society, 519, 4479.
- 2. Zhu, Y., Becker G.D., Bosman S.E.I., Keating L.C., D'Odorico V., Davies R.L., Christenson H.M., Bañados E., Bian F., Bischetti M., Chen H., Davies F.B., Eilers A.-C., Fan X., Gaikwad P., Greig B., Haehnelt M.G., Kulkarni G., Lai S., Pallottini A., Qin Y., Ryan-Weber E.V., Walter F., Wang F., and Yang J., 2022. Long Dark Gaps in the Lyβ Forest at z < 6: Evidence of Ultra Late Reionization from XQR-30 Spectra. The Astrophysical Journal, 932 76.</p>
- Zhu, Y., Becker, G.D., Bosman, S.E.I., Keating, L.C., Christenson, H.M., Bañados, E., Bian, F., Davies, F.B., D'Odorico, V., Eilers, A.-C., Fan, X., Haehnelt, M.G., Kulkarni, G., Pallottini, A., Qin, Y., Wang, F., Yang, J., 2021. Chasing the Tail of Cosmic Reionization with Dark Gap Statistics in the Lyα Forest over 5 < z < 6. The Astrophysical Journal 923, 223.

Co-author:

- 48. Baker, W. M., Lim, S., D'Eugenio, F., Maiolino, R., Ji, Z., Arribas, S., Bunker, A. J., Carniani, S., Charlot, S., de Graaff, A., Hainline, K., Looser, T. J., Lyu, J., Rinaldi, P., Robertson, B., Schaller, M., Schaye, J., Scholtz, J., Übler, H., Williams, C. C., Willmer, C. N. A., Willott, C., and **Zhu**, **Y.**, **2025**. The abundance and nature of high-redshift quiescent galaxies from JADES spectroscopy and the FLAMINGO simulations, Monthly Notices of the Royal Astronomical Society, 539, 557.
- 47. Rinaldi, P., Pérez-González, P. G., Rieke, G. H., Lyu, J., D'Eugenio, F., Wu, Z., Carniani, S., Looser, T. J., Shivaei, I., Boogaard, L. A., Diaz-Santos, T., Colina, L., Östlin, G., Alberts, S., Álvarez-Márquez, J., Annuziatella, M., Aravena, M., Bhatawdekar, R., Bunker, A. J., Caputi, K. I., Charlot, S., Crespo Gómez, A., Curti, M., Eckart, A., Gillman, S., Hainline, K., Kumari, N., Hjorth, J., Iani, E., Inami, H., Ji, Z., Johnson, B. D., Jones, G. C., Labiano, Á., Maiolino, R., Melinder, J., Moutard, T., Peißker, F., Rieke, M., Robertson, B., Scholtz, J., Tacchella, S., van der Werf, P. P., Walter, F., Williams, C. C., Willott, C., Witstok, J., Übler, H., and Zhu, Y., 2025. Deciphering the Nature of Virgil: An Obscured AGN Lurking Within an Apparently Normal Lyman-α Emitter During Cosmic Reionization, arXiv e-prints, arXiv:2504.01852.
- 46. Ji, Z., Alberts, S., **Zhu, Y.**, Vanzella, E., Giavalisco, M., Hainline, K., Baker, W. M., Bunker, A. J., Helton, J. M., Lyu, J., Rinaldi, P., Robertson, B., Simmonds, C., Tacchella, S., Williams, C. C., Willmer, C. N. A., and Witstok, J., **2025**. *The Importance of Dust Distribution in Ionizing-photon Escape: NIRCam and MIRI Imaging of a Lyman Continuum-emitting Galaxy at z 3.8*, arXiv e-prints, arXiv:2504.01067.
- 45. Sun, Y., Rieke, G. H., Lyu, J., Stone, M. A., Ji, Z., Rinaldi, P., Willmer, C. N. A., and **Zhu, Y.**, **2025**. Evolution of the M^*/MBH Relation from $z \sim 6$ to the Present Epoch, The Astrophysical Journal, 983, 165.

- 44. Fudamoto, Y., Helton, J. M., Lin, X., Sun, F., Behroozi, P., Hsiao, T. Y.-Y., Egami, E., Bunker, A. J., Harikane, Y., Ouchi, M., Liu, Y., Liu, W., Maiolino, R., Ji, Z., Jin, X., Tee, W. L., Wang, F., Willmer, C. N. A., Xu, Y., and **Zhu, Y.**, **2025**. *SAPPHIRES: A Galaxy Over-Density in the Heart of Cosmic Reionization at z* = 8.47, arXiv e-prints, arXiv:2503.15597.
- 43. D'Eugenio, F., Helton, J. M., Hainline, K., Sun, F., Maiolino, R., Pérez-González, P. G., Juodžbalis, I., Arribas, S., Bunker, A. J., Carniani, S., Curtis-Lake, E., Egami, E., Eisenstein, D. J., Johnson, B. D., Robertson, B., Tacchella, S., Willmer, C. N. A., Willott, C., Baker, W. M., Danhaive, A. L., Duan, Q., Fudamoto, Y., Jones, G. C., Lin, X., Liu, W., Perna, M., Puskás, D., Rinaldi, P., Scholtz, J., Sun, Y., Trussler, J. A. A., Übler, H., Venturi, G., Williams, C. C., and Zhu, Y., 2025. JADES and SAPPHIRES: Galaxy Metamorphosis Amidst a Huge, Luminous Emission-line Region, arXiv e-prints, arXiv:2503.15590.
- 42. Sun, F., Fudamoto, Y., Lin, X., Helton, J. M., Hsiao, T. Y.-Y., Egami, E., Akhtarkavan, A., Bunker, A. J., Cai, Z., DeCoursey, C., Eisenstein, D. J., Fan, X., Harikane, Y., Ji, Z., Jin, X., Liu, W., Liu, Y., Ma, Z., Maiolino, R., Ouchi, M., Tee, W. L., Wang, F., Willmer, C. N. A., Wu, Y., Xu, Y., Yang, J., Zhang, J., and Zhu, Y., 2025. Slitless Areal Pure-Parallel HIgh-Redshift Emission Survey (SAPPHIRES): Early Data Release of Deep JWST/NIRCam Images and Spectra in MACS J0416 Parallel Field, arXiv e-prints, arXiv:2503.15587.
- 41. Fu, S., Sun, F., Jiang, L., Lin, X., Diego, J. M., Furtak, L. J., Jauzac, M., Koekemoer, A. M., Li, M., Oguri, M., Patel, N. R., Willmer, C. N. A., Windhorst, R. A., Zitrin, A., Bauer, F. E., Chen, C.-C., Chen, W., Cheng, C., Conselice, C. J., Eisenstein, D. J., Egami, E., Espada, D., Fan, X., Fujimoto, S., Hsiao, T. Y.-Y., Jin, X., Kohno, K., Lagattuta, D. J., Li, Z., Liu, W., Miralda-Escudé, J., Ning, Y., Tacchella, S., Tee, W. L., Umehata, H., Wang, F., Yan, H., and Zhu, Y., 2025. Medium-band Astrophysics with the Grism of NIRCam In Frontier fields (MAGNIF): Spectroscopic Census of Hα Luminosity Functions and Cosmic Star Formation at z ~ 4.5 and 6.3, arXiv e-prints, arXiv:2503.03829.
- 40. Witstok, J., Jakobsen, P., Maiolino, R., Helton, J. M., Johnson, B. D., Robertson, B. E., Tacchella, S., Cameron, A. J., Smit, R., Bunker, A. J., Saxena, A., Sun, F., Alberts, S., Arribas, S., Baker, W. M., Bhatawdekar, R., Boyett, K., Cargile, P. A., Carniani, S., Charlot, S., Chevallard, J., Curti, M., Curtis-Lake, E., D'Eugenio, F., Eisenstein, D. J., Hainline, K. N., Jones, G. C., Kumari, N., Maseda, M. V., Pérez-González, P. G., Rinaldi, P., Scholtz, J., Übler, H., Williams, C. C., Willmer, C. N. A., Willott, C., and Zhu, Y., 2025. Witnessing the onset of reionization through Lyman-α emission at redshift 13, Nature, 639, 897.
- 39. Helton, J. M., Rieke, G. H., Alberts, S., Wu, Z., Eisenstein, D. J., Hainline, K. N., Carniani, S., Ji, Z., Baker, W. M., Bhatawdekar, R., Bunker, A. J., Cargile, P. A., Charlot, S., Chevallard, J., D'Eugenio, F., Egami, E., Johnson, B. D., Jones, G. C., Lyu, J., Maiolino, R., Pérez-González, P. G., Rieke, M. J., Robertson, B., Saxena, A., Scholtz, J., Shivaei, I., Sun, F., Tacchella, S., Whitler, L., Williams, C. C., Willmer, C. N. A., Willott, C., Witstok, J., and Zhu, Y., 2025. Photometric detection at 7.7 μm of a galaxy beyond redshift 14 with JWST/MIRI, Nature Astronomy.
- 38. Fudamoto, Y., Sun, F., Diego, J. M., Dai, L., Oguri, M., Zitrin, A., Zackrisson, E., Jauzac, M., Lagattuta, D. J., Egami, E., Iani, E., Windhorst, R. A., Abe, K. T., Bauer, F. E., Bian, F., Bhatawdekar, R., Broadhurst, T. J., Cai, Z., Chen, C.-C., Chen, W., Cohen, S. H., Conselice, C. J., Espada, D., Foo, N., Frye, B. L., Fujimoto, S., Furtak, L. J., Golubchik, M., Hsiao, T. Y.-Y., Jolly, J.-B., Kawai, H., Kelly, P. L., Koekemoer, A. M., Kohno, K., Kokorev, V., Li, M., Li, Z., Lin, X., Magdis, G. E., Meena, A. K., Niemiec, A., Nabizadeh, A., Richard, J., Steinhardt, C. L., Wu, Y., Zhu, Y., and Zou, S., 2025. *Identification of more than 40 gravitationally magnified stars in a galaxy at redshift 0.725*, Nature Astronomy, 9, 428.

- 37. D'Eugenio, F., Cameron, A. J., Scholtz, J., Carniani, S., Willott, C. J., Curtis-Lake, E., Bunker, A. J., Parlanti, E., Maiolino, R., Willmer, C. N. A., Jakobsen, P., Robertson, B. E., Johnson, B. D., Tacchella, S., Cargile, P. A., Rawle, T., Arribas, S., Chevallard, J., Curti, M., Egami, E., Eisenstein, D. J., Kumari, N., Looser, T. J., Rieke, M. J., Rodríguez Del Pino, B., Saxena, A., Übler, H., Venturi, G., Witstok, J., Baker, W. M., Bhatawdekar, R., Bonaventura, N., Boyett, K., Charlot, S., Danhaive, A. L., Hainline, K. N., Hausen, R., Helton, J. M., Ji, X., Ji, Z., Jones, G. C., Juodžbalis, I., Maseda, M. V., Pérez-González, P. G., Perna, M., Puskás, D., Shivaei, I., Silcock, M. S., Simmonds, C., Smit, R., Sun, F., Villanueva, N. C., Williams, C. C., and Zhu, Y., 2025. JADES Data Release 3: NIRSpec/Microshutter Assembly Spectroscopy for 4000 Galaxies in the GOODS Fields, The Astrophysical Journal Supplement Series, 277, 4.
- 36. Kaur, B., Kanekar, N., Neeleman, M., Zhu, Y., Prochaska, J. X., Rafelski, M., and Becker, G., 2025. A Massive H I-absorption-selected Galaxy at z ≈ 2.356, The Astrophysical Journal, 982, L26.
- 35. Lyu, J., Rieke, G. H., Stone, M., Morrison, J., Alberts, S., Jin, X., **Zhu, Y.**, Liu, W., and Yang, J., **2025**. Fading Light, Fierce Winds: JWST Snapshot of a Sub-Eddington Quasar at Cosmic Dawn, The Astrophysical Journal, 981, L20.
- 34. Ma, H.-X., Takeuchi, T. T., Cooray, S., and **Zhu, Y.**, **2025**. *sOPTICS:* a modified density-based algorithm for identifying galaxy groups/clusters and brightest cluster galaxies, Monthly Notices of the Royal Astronomical Society, 537, 1504.
- 33. Hainline, K. N., Maiolino, R., Juodžbalis, I., Scholtz, J., Übler, H., D'Eugenio, F., Helton, J. M., Sun, Y., Sun, F., Robertson, B., Tacchella, S., Bunker, A. J., Carniani, S., Charlot, S., Curtis-Lake, E., Egami, E., Johnson, B. D., Lin, X., Lyu, J., Pérez-González, P. G., Rinaldi, P., Silcock, M. S., Venturi, G., Williams, C. C., Willmer, C. N. A., Willott, C., Zhang, J., and **Zhu, Y.**, **2025**. An Investigation into the Selection and Colors of Little Red Dots and Active Galactic Nuclei, The Astrophysical Journal, 979, 138.
- 32. Baker, W. M., D'Eugenio, F., Maiolino, R., Bunker, A. J., Simmonds, C., Tacchella, S., Witstok, J., Arribas, S., Carniani, S., Charlot, S., Chevallard, J., Curti, M., Curtis-Lake, E., Jones, G. C., Kumari, N., Rinaldi, P., Robertson, B., Williams, C. C., Willott, C., and **Zhu, Y.**, **2025**. Zapped then Napped? A rapidly quenched remnant leaker candidate with a steep spectroscopic β_{UV} slope at z=8.5, arXiv e-prints, arXiv:2501.09070.
- 31. Jones, G. C., Bunker, A. J., Saxena, A., Arribas, S., Bhatawdekar, R., Boyett, K., Cameron, A. J., Carniani, S., Charlot, S., Curtis-Lake, E., Hainline, K., Johnson, B. D., Kumari, N., Maseda, M. V., Rix, H.-W., Robertson, B. E., Tacchella, S., Übler, H., Williams, C. C., Willott, C., Witstok, J., and Zhu, Y., 2025. JADES: measuring reionization properties using Lyman-alpha emission, Monthly Notices of the Royal Astronomical Society, 536, 2355.
- 30. Sun, Y., Lyu, J., Rieke, G. H., Ji, Z., Sun, F., **Zhu, Y.**, Bunker, A. J., Cargile, P. A., Circosta, C., D'Eugenio, F., Egami, E., Hainline, K., Helton, J. M., Rinaldi, P., Robertson, B. E., Scholtz, J., Shivaei, I., Stone, M. A., Tacchella, S., Williams, C. C., Willmer, C. N. A., and Willott, C., **2025**. No Evidence for a Significant Evolution of MBH-M* Relation in Massive Galaxies up to $z \sim 4$, The Astrophysical Journal, 978, 98.
- 29. Laseter, I. H., Maseda, M. V., Simmonds, C., Endsley, R., Stark, D., Bunker, A. J., Bhatawdekar, R., Boyett, K., Cameron, A. J., Carniani, S., Curti, M., Ji, Z., Rinaldi, P., Saxena, A., Tacchella, S., Willott, C., Witstok, J., and Zhu, Y., 2024. Efficient Ionizers with Low Hβ+[OIII] Equivalent Widths: JADES Spectroscopy of a Peculiar High-z Population, arXiv e-prints, arXiv:2412.04542.
- 28. Qin, Y., Mesinger, A., Prelogović, D., Becker, G., Bischetti, M., Bosman, S. E. I., Davies, F. B.,

- D'Odorico, V., Gaikwad, P., Haehnelt, M. G., Keating, L., Lai, S., Ryan-Weber, E., Satyavolu, S., Walter, F., and **Zhu, Y.**, **2024**. Percent-level timing of reionization: self-consistent, implicit-likelihood inference from XQR-30+ Lyα forest data, arXiv e-prints, arXiv:2412.00799.
- 27. Simmonds, C., Tacchella, S., Hainline, K., Johnson, B. D., Puskás, D., Robertson, B., Baker, W. M., Bhatawdekar, R., Boyett, K., Bunker, A. J., Cargile, P. A., Carniani, S., Chevallard, J., Curti, M., Curtis-Lake, E., Ji, Z., Jones, G. C., Kumari, N., Laseter, I., Maiolino, R., Maseda, M. V., Rinaldi, P., Stoffers, A., Übler, H., Villanueva, N. C., Williams, C. C., Willott, C., Witstok, J., and Zhu, Y., 2024. Ionizing properties of galaxies in JADES for a stellar mass complete sample: resolving the cosmic ionizing photon budget crisis at the Epoch of Reionization, Monthly Notices of the Royal Astronomical Society, 535, 2998.
- 26. Alberts, S., Lyu, J., Shivaei, I., Rieke, G. H., Pérez-González, P. G., Bonaventura, N., **Zhu, Y.**, Helton, J. M., Ji, Z., Morrison, J., Robertson, B. E., Stone, M. A., Sun, Y., Williams, C. C., and Willmer, C. N. A., **2024**. *SMILES Initial Data Release: Unveiling the Obscured Universe with MIRI Multiband Imaging*, The Astrophysical Journal, 976, 224.
- 25. Saxena, A., Cameron, A. J., Katz, H., Bunker, A. J., Chevallard, J., D'Eugenio, F., Arribas, S., Bhatawdekar, R., Boyett, K., Cargile, P. A., Carniani, S., Charlot, S., Curti, M., Curtis-Lake, E., Hainline, K., Ji, Z., Johnson, B. D., Jones, G. C., Kumari, N., Laseter, I., Maseda, M. V., Robertson, B., Simmonds, C., Tacchella, S., Ubler, H., Williams, C. C., Willott, C., Witstok, J., and Zhu, Y., 2024. Hitting the slopes: A spectroscopic view of UV continuum slopes of galaxies reveals a reddening at z ¿ 9.5, arXiv e-prints, arXiv:2411.14532.
- 24. Rinaldi, P., Bonaventura, N., Rieke, G. H., Alberts, S., Caputi, K. I., Baker, W. M., Baum, S., Bhatawdekar, R., Bunker, A. J., Carniani, S., Curtis-Lake, E., D'Eugenio, F., Egami, E., Ji, Z., Hainline, K., Helton, J. M., Lin, X., Lyu, J., Johnson, B. D., Ma, Z., Maiolino, R., Pérez-González, P. G., Rieke, M., Robertson, B. E., Shivaei, I., Stone, M., Sun, Y., Tacchella, S., Übler, H., Williams, C. C., Willmer, C. N. A., Willott, C., Zhang, J., and Zhu, Y., 2024. Not Just a Dot: the complex UV morphology and underlying properties of Little Red Dots, arXiv e-prints, arXiv:2411.14383.
- 23. Jiang, D., Onoue, M., Jiang, L., Lai, S., Bañados, E., Becker, G. D., Bischetti, M., Bosman, S. E. I., Davies, R. L., D'Odorico, V., Farina, E. P., Haehnelt, M. G., Mazzucchelli, C., Schindler, J.-T., Walter, F., and **Zhu, Y.**, 2024. No Redshift Evolution in the Fe II/Mg II Flux Ratios of Quasars across Cosmic Time, The Astrophysical Journal, 975, 214.
- 22. Shivaei, I., Alberts, S., Florian, M., Rieke, G., Wuyts, S., Bodansky, S., Bunker, A. J., Cameron, A. J., Curti, M., D'Eugenio, F., Dudzevičiūtė, U., Ji, Z., Johnson, B. D., Kramarenko, I., Lyu, J., Matthee, J., Morrison, J., Naidu, R., Pérez-González, P. G., Reddy, N., Robertson, B., Sun, Y., Tacchella, S., Whitaker, K., Williams, C. C., Willmer, C. N. A., Witstok, J., Xiao, M., and Zhu, Y., 2024. A new census of dust and polycyclic aromatic hydrocarbons at z = 0.7-2 with JWST MIRI, Astronomy and Astrophysics, 690, A89.
- 21. Ji, Z., Williams, C. C., Rieke, G. H., Lyu, J., Alberts, S., Sun, F., Helton, J. M., Rieke, M., Shivaei, I., D'Eugenio, F., Tacchella, S., Robertson, B., **Zhu, Y.**, Maiolino, R., Bunker, A. J., Sun, Y., and Willmer, C. N. A., **2024**. Extended hot dust emission around the earliest massive quiescent galaxy, arXiv e-prints, arXiv:2409.17233.
- 20. Becker, G. D., Bolton, J. S., **Zhu, Y.**, and Hashemi, S., **2024**. Damping wing absorption associated with a giant Ly α trough at z < 6: direct evidence for late-ending reionization, Monthly Notices of the Royal Astronomical Society, 533, 1525.
- 19. Stone, M. A., Alberts, S., Rieke, G. H., Bunker, A. J., Lyu, J., Pérez-González, P. G., Shivaei, I., and **Zhu, Y.**, **2024**. 5-25 μm Galaxy Number Counts from Deep JWST Data, The Astrophysical

- Journal, 972, 62.
- 18. Spina, B., Bosman, S. E. I., Davies, F. B., Gaikwad, P., and **Zhu, Y.**, **2024**. Damping wings in the Lyman- α forest: A model-independent measurement of the neutral fraction at 5.4 < z < 6.1, Astronomy and Astrophysics, 688, L26.
- 17. Wolfson, M., Hennawi, J. F., Bosman, S. E. I., Davies, F. B., Lukić, Z., Becker, G. D., Chen, H., Cupani, G., D'Odorico, V., Eilers, A.-C., Haehnelt, M. G., Keating, L. C., Kulkarni, G., Lai, S., Mesinger, A., Walter, F., and **Zhu**, **Y**., **2024**. *Measurements of the z ἐ 5 Lyman-α forest flux autocorrelation functions from the extended XQR-30 data set*, Monthly Notices of the Royal Astronomical Society, 531, 3069.
- 16. Bischetti, M., Choi, H., Fiore, F., Feruglio, C., Carniani, S., D'Odorico, V., Bañados, E., Chen, H., Decarli, R., Gallerani, S., Hlavacek-Larrondo, J., Lai, S., Leighly, K. M., Mazzucchelli, C., Perreault-Levasseur, L., Tripodi, R., Walter, F., Wang, F., Yang, J., Zanchettin, M. V., and **Zhu, Y.**, **2024**. *Multiphase Black Hole Feedback and a Bright [C II] Halo in a LoBAL Quasar at z* ~ 6.6, The Astrophysical Journal, 970, 9.
- 15. Roth, J. T., D'Aloisio, A., Cain, C., Wilson, B., **Zhu, Y.**, and Becker, G. D., **2024**. The effect of reionization on direct measurements of the mean free path, Monthly Notices of the Royal Astronomical Society, 530, 5209.
- 14. Greig, B., Mesinger, A., Bañados, E., Becker, G. D., Bosman, S. E. I., Chen, H., Davies, F. B., D'Odorico, V., Eilers, A.-C., Gallerani, S., Haehnelt, M. G., Keating, L., Lai, S., Qin, Y., Ryan-Weber, E., Satyavolu, S., Wang, F., Yang, J., and Zhu, Y., 2024. IGM damping wing constraints on the tail end of reionization from the enlarged XQR-30 sample, Monthly Notices of the Royal Astronomical Society, 530, 3208.
- 13. Davies, F. B., Bosman, S. E. I., Gaikwad, P., Nasir, F., Hennawi, J. F., Becker, G. D., Haehnelt, M. G., D'Odorico, V., Bischetti, M., Eilers, A.-C., Keating, L. C., Kulkarni, G., Lai, S., Mazzucchelli, C., Qin, Y., Satyavolu, S., Wang, F., Yang, J., and Zhu, Y., 2024. Constraints on the Evolution of the Ionizing Background and Ionizing Photon Mean Free Path at the End of Reionization, The Astrophysical Journal, 965, 134.
- 12. Gaikwad, P., Haehnelt, M. G., Davies, F. B., Bosman, S. E. I., Molaro, M., Kulkarni, G., D'Odorico, V., Becker, G. D., Davies, R. L., Nasir, F., Bolton, J. S., Keating, L. C., Iršič, V., Puchwein, E., Zhu, Y., Asthana, S., Yang, J., Lai, S., and Eilers, A.-C., 2023. Measuring the photoionization rate, neutral fraction, and mean free path of H I ionizing photons at 4.9 leq z ≤ 6.0 from a large sample of XShooter and ESI spectra, Monthly Notices of the Royal Astronomical Society, 525, 4093.
- Christenson, H. M., Becker, G. D., D'Aloisio, A., Davies, F. B., Zhu, Y., Boera, E., Nasir, F., Furlanetto, S. R., and Malkan, M. A., 2023. The Relationship between IGM Lyα Opacity and Galaxy Density near the End of Reionization, The Astrophysical Journal, 955, 138.
- Mazzucchelli, C., Bischetti, M., D'Odorico, V., Feruglio, C., Schindler, J.-T., Onoue, M., Bañados, E., Becker, G. D., Bian, F., Carniani, S., Decarli, R., Eilers, A.-C., Farina, E. P., Gallerani, S., Lai, S., Meyer, R. A., Rojas-Ruiz, S., Satyavolu, S., Venemans, B. P., Wang, F., Yang, J., and Zhu, Y., 2023. XQR-30: Black hole masses and accretion rates of 42 z gtrsim 6 quasars, Astronomy and Astrophysics, 676, A71.
- D'Odorico, V., Bañados, E., Becker, G. D., Bischetti, M., Bosman, S. E. I., Cupani, G., Davies, R., Farina, E. P., Ferrara, A., Feruglio, C., Mazzucchelli, C., Ryan-Weber, E., Schindler, J.-T., Sodini, A., Venemans, B. P., Walter, F., Chen, H., Lai, S., Zhu, Y., Bian, F., Campo, S., Carniani, S., Cristiani, S., Davies, F., Decarli, R., Drake, A., Eilers, A.-C., Fan, X., Gaikwad, P., Gallerani, S., Greig, B., Haehnelt, M. G., Hennawi, J., Keating, L., Kulkarni, G., Mesinger, A., Meyer, R. A.,

- Neeleman, M., Onoue, M., Pallottini, A., Qin, Y., Rojas-Ruiz, S., Satyavolu, S., Sebastian, A., Tripodi, R., Wang, F., Wolfson, M., Yang, J., and Zanchettin, M. V., **2023**. *XQR-30*: The ultimate *XSHOOTER quasar sample at the reionization epoch*, Monthly Notices of the Royal Astronomical Society, 523, 1399.
- 8. Bischetti, M., Fiore, F., Feruglio, C., D'Odorico, V., Arav, N., Costa, T., Zubovas, K., Becker, G., Bosman, S. E. I., Cupani, G., Davies, R., Eilers, A.-C., Farina, E. P., Ferrara, A., Gaspari, M., Mazzucchelli, C., Onoue, M., Piconcelli, E., Zanchettin, M. V., and **Zhu, Y.**, **2023**. *The Fraction and Kinematics of Broad Absorption Line Quasars across Cosmic Time*, The Astrophysical Journal, 952, 44.
- 7. Davies, R. L., Ryan-Weber, E., D'Odorico, V., Bosman, S. E. I., Meyer, R. A., Becker, G. D., Cupani, G., Keating, L. C., Bischetti, M., Davies, F. B., Eilers, A.-C., Farina, E. P., Haehnelt, M. G., Pallottini, A., and Zhu, Y., 2023. Examining the decline in the C IV content of the Universe over 4.3≤ z ≤ 6.3 using the E-XQR-30 sample, Monthly Notices of the Royal Astronomical Society, 521, 314.
- 6. Davies, R. L., Ryan-Weber, E., D'Odorico, V., Bosman, S. E. I., Meyer, R. A., Becker, G. D., Cupani, G., Bischetti, M., Sebastian, A. M., Eilers, A.-C., Farina, E. P., Wang, F., Yang, J., and **Zhu, Y.**, **2023**. The XQR-30 metal absorber catalogue: 778 absorption systems spanning $2 \lesssim z \lesssim 6.5$, Monthly Notices of the Royal Astronomical Society, 521, 289.
- 5. Bosman, S. E. I., Davies, F. B., Becker, G. D., Keating, L. C., Davies, R. L., Zhu, Y., Eilers, A.-C., D'Odorico, V., Bian, F., Bischetti, M., Cristiani, S. V., Fan, X., Farina, E. P., Haehnelt, M. G., Hennawi, J. F., Kulkarni, G., Mesinger, A., Meyer, R. A., Onoue, M., Pallottini, A., Qin, Y., Ryan-Weber, E., Schindler, J.-T., Walter, F., Wang, F., and Yang, J., 2022. Hydrogen reionization ends by z = 5.3: Lyman-α optical depth measured by the XQR-30 sample, Monthly Notices of the Royal Astronomical Society, 514, 55.
- 4. Lai, S., Bian, F., Onken, C. A., Wolf, C., Mazzucchelli, C., Bañados, E., Bischetti, M., Bosman, S. E. I., Becker, G., Cupani, G., D'Odorico, V., Eilers, A.-C., Fan, X., Farina, E. P., Onoue, M., Schindler, J.-T., Walter, F., Wang, F., Yang, J., and Zhu, Y., 2022. Chemical abundance of z ~ 6 quasar broad-line regions in the XQR-30 sample, Monthly Notices of the Royal Astronomical Society, 513, 1801.
- 3. Bischetti, M., Feruglio, C., D'Odorico, V., Arav, N., Bañados, E., Becker, G., Bosman, S. E. I., Carniani, S., Cristiani, S., Cupani, G., Davies, R., Eilers, A. C., Farina, E. P., Ferrara, A., Maiolino, R., Mazzucchelli, C., Mesinger, A., Meyer, R. A., Onoue, M., Piconcelli, E., Ryan-Weber, E., Schindler, J.-T., Wang, F., Yang, J., Zhu, Y., and Fiore, F., 2022. Suppression of black-hole growth by strong outflows at redshifts 5.8-6.6, Nature, 605, 244.
- 2. Becker, G. D., D'Aloisio, A., Christenson, H. M., **Zhu, Y.**, Worseck, G., and Bolton, J. S., **2021**. The mean free path of ionizing photons at 5 < z < 6: evidence for rapid evolution near reionization, Monthly Notices of the Royal Astronomical Society, 508, 1853.
- 1. Christenson, H. M., Becker, G. D., Furlanetto, S. R., Davies, F. B., Malkan, M. A., **Zhu, Y.**, Boera, E., and Trapp, A., **2021**. Constraints on the End of Reionization from the Density Fields Surrounding Two Highly Opaque Quasar Sightlines, The Astrophysical Journal, 923, 87.

Prepared by Yongda Zhu with LATEX. Updated on May 1, 2025.