

Hiroya Umeda

PHD STUDENT

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Education

The University of Tokyo

7-3-1 Hongo, Bunkyo, Tokyo
113-0033, Japan
April 2023 - present

PHD PHYSICS

- Advisor: Prof. Masami Ouchi

The University of Tokyo

7-3-1 Hongo, Bunkyo, Tokyo
113-0033, Japan
April 2021 - March 2023

MS PHYSICS

- Advisor: Prof. Masami Ouchi
- Thesis Title: Cosmic Reionization History and Sources Probed by Optical Imaging and Spectroscopy with the Subaru Telescope

The University of Tokyo

7-3-1 Hongo, Bunkyo, Tokyo
113-0033, Japan
April 2017 - March 2021

BS PHYSICS

- No Thesis Requirement

Wayzata High School

4955 Peony Ln N, Plymouth, MN
55446, USA
September 2012 - June 2016

HIGH SCHOOL DIPLOMA

Publications

1ST AUTHOR

Summary: 3 Total (2 Published, 1 In-Review; Last Update on November 2024)

Umeda, H., Ouchi M., Kikuta, S., et al., SILVERRUSH. XIV. Ly α Luminosity Functions and Angular Correlation Functions from $\sim 20,000$ Ly α Emitters at $z \sim 2.2-7.3$ from upto 24 deg² HSC-SSP and CHORUS Surveys: Linking the Post-Reionization Epoch to the Heart of Reionization, [2024arXiv241115495U](https://arxiv.org/abs/2024arXiv241115495U), submitted to ApJS, 2024.

Umeda, H., Ouchi M., Nakajima, K., et al., JWST Measurements of Neutral Hydrogen Fractions and Ionized Bubble Sizes at $z = 7 - 12$ Obtained with Ly α Damping Wing Absorptions in 27 Bright Continuum Galaxies, [ApJ, 921, 124, 16, 2024](https://arxiv.org/abs/2024arXiv241115495U).

Umeda, H., Ouchi M., Nakajima, K., et al., EMPRESS. VII. Ionizing Spectrum Shapes of Extremely Metal-Poor Galaxies: Uncovering the Origins of Strong H δ and the Impact on Cosmic Reionization, [ApJ, 930, 37, 14, 2022](https://arxiv.org/abs/2024arXiv241115495U).

CO-AUTHOR

Summary: 28 Total (20 Published, 1 Accepted, 7 In-Review; Last Update on November 2024)

Kikuta, S., Ouchi M., Shibuya, T., et al., SILVERRUSH. XIII. A Catalog of 20,567 Ly α Emitters at $z = 2 - 7$ Identified in the Full-Depth Data of the Subaru/HSC-SSP and CHORUS Surveys, [2023arXiv230508921K](https://arxiv.org/abs/2023arXiv230508921K), submitted to ApJS, 2023.

Hatano, S., Ouchi M., Umeda, H., et al., EMPRESS. XIV. Strong High Ionization Lines of Young Galaxies at $z = 0 - 8$: Ionizing Spectra Consistent with the Intermediate Mass Black Holes with $M_{\text{BH}} \sim 10^3 - 10^6 M_{\odot}$, [2023arXiv230502189H](https://arxiv.org/abs/2023arXiv230502189H), submitted to ApJ, 2023.

Harikane, Y., Nakajima, K., Ouchi, M., et al., Pure Spectroscopic Constraints on UV Luminosity Functions and Cosmic Star Formation History From 25 Galaxies at $z_{\text{spec}} = 8.61 - 13.20$ Confirmed with JWST/NIRSpec, [2023arXiv230406658H](https://arxiv.org/abs/2023arXiv230406658H), submitted to ApJ, 2023.

- Hatano, S., Ouchi, M., Nakajima, K., et al.**, *Active Massive Black Hole Found in the Young Star-Forming Dwarf Galaxy SBS 0335-052E*, [2023arXiv230403726H](#), submitted to Nature, 2023.
- Xu, Y., Ouchi, M., Isobe, Y., et al.**, *EMPRESS. XII. Statistics on the Dynamics and Gas Mass Fraction of Extremely-Metal Poor Galaxies*, [2023arXiv230312467X](#), submitted to ApJ, 2023.
- Harikane, Y., Zhang, Y., Nakajima, K., et al.**, *JWST/NIRSpec First Census of Broad-Line AGNs at $z = 4 - 7$: Detection of 10 Faint AGNs with $M_{BH} \sim 10^6 - 10^7 M_{\text{sun}}$ and Their Host Galaxy Properties*, [2023arXiv230311946H](#), submitted to ApJ, 2023.
- Nakajima, K., Ouchi, M., Isobe, Y., et al.**, *JWST Census for the Mass-Metallicity Star-Formation Relations at $z = 4 - 10$ with the Self-Consistent Flux Calibration and the Proper Metallicity Calibrators*, [2023arXiv230311946H](#), accepted to ApJS, 2023.
- Isobe, Y., Ouchi, M., Nakajima, K., et al.**, *Redshift Evolution of the Electron Density in the ISM at $z \sim 0 - 9$ Uncovered with JWST/NIRSpec Spectra and Line-Spread Function Determinations*, [2023arXiv230106811I](#), submitted to ApJ, 2023.
- Mastumoto, A., Ouchi, M., Nakajima, K., et al.**, *EMPRESS. VIII. A New Determination of Primordial He Abundance with Extremely Metal-poor Galaxies: A Suggestion of the Lepton Asymmetry and Implications for the Hubble Tension*, [ApJ, 941, 167, 14, 2022](#).
- Ono, Y., Harikane, Y., Ouchi, M., et al.**, *Morphologies of Galaxies at $z \gtrsim 9$ Uncovered by JWST/NIRCam Imaging: Cosmic Size Evolution and an Identification of an Extremely Compact Bright Galaxy at $z \sim 12$* , [2022arXiv220813582O](#), accepted to ApJ, 2022.
- Isobe, Y., Ouchi, M., Nakajima, K., et al.**, *EMPRESS. IX. Extremely Metal-Poor Galaxies are Very Gas-Rich Dispersion-Dominated Systems: Will JWST Witness Gaseous Turbulent High- z Primordial Galaxies?*, [2022arXiv220604709I](#), accepted to ApJ, 2022.

And more...

Awards, Fellowships, & Grants

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|------|---|------------|
| 2024 | The Award of Best Excellence , Summer Galaxy Workshop 2024
Award of Best Excellence , Galaxy-IGM Workshop 2024 | |
| 2023 | JSPS Research Fellowship Grant , Japan Society for the Promotion of Science
FoPM Qualification Exam Award of Excellence , The Forefront Physics and Mathematics Program to Drive Transformation, the University of Tokyo | USD 21,500 |
| 2021 | Award of Best Excellence , Galaxy-IGM Workshop 2021
Research Assistant for FoPM , The Forefront Physics and Mathematics Program to Drive Transformation, the University of Tokyo | |

Presentations

Summary for Talks/Posters: 18 Total (4 Peer-Reviewed Oral, 1 Peer-Reviewed Poster, 13 Others)

CONTRIBUTED ORAL PRESENTATIONS

- Kochel CLAW**, *Kochel*, Germany, 2024. [Peer-Reviewed](#).
- ASJ Autumn Annual Meeting 2023**, *Hyogo*, Japan, 2024.
- Summer Galaxy Workshop 2024**, *Nagano*, Japan, 2024.
- Galaxy-IGM Workshop 2024**, *Aomori*, Japan, 2024.
- First Stars VII**, *New York*, U.S., 2024. [Peer-Reviewed](#).
- Satellite Workshop: Formation and Evolution of galaxies with PFS 2024**, *Tokyo*, Japan, 2024.
- ELT SCIENCE IN LIGHT OF JWST**, *Los Angeles*, U.S., 2023. [Peer-Reviewed](#).
- First Star First Galaxy Workshop**, *Sapporo*, Japan, 2023.

Resolving the Extragalactic Universe with ALMA & JWST, Tokyo, Japan, 2023. [Peer-Reviewed](#).

ASJ Autumn Annual Meeting 2023, Nagoya, Japan, 2023.

21cm Line Mini-Workshop, Nagoya, Japan, 2023.

Summer Galaxy Workshop 2024, Kanagawa, Japan, 2023.

Galaxy-IGM Workshop 2023, Hamamatsu, Japan, 2023.

Understanding the Epoch of Cosmic Reionization, Sesto, Italy, 2023.

France-Japan Workshop, Tokyo, Japan, 2022.

ASJ Autumn Annual Meeting 2022, Niigata, Japan, 2022.

Galaxy-IGM Workshop 2022, Kushiro, Japan, 2022.

SAZERAC-SIPS “Early Galaxy Formation Near and Far”, Online, 2021, [Peer-Reviewed](#).

Metal-Poor Universe, Online, 2021.

ASJ Autumn Annual Meeting 2021, Online, 2021.

Galaxy-IGM Workshop 2021, Online, 2021.

CONTRIBUTED POSTER PRESENTATIONS

The 52nd Saas-Fee Advanced Course, Les Diablerets, Switzerland, 2023.

FoPM International Symposium, Tokyo, Japan, 2023.

SEMINARS

Galaxies Group Discussion presentation, Kavli Institute of Cosmology, Cambridge, October, 2024.

Coffee Talk, University of Edinburgh, October, 2024.

Seminar Talk, University of Heidelberg, September, 2024.

Seminar Talk, University of California, Santa Cruz, May, 2024.

Seminar Talk at the Journal Club, Carnegie Observatory, Pasadena, May, 2024.

Seminar Talk, IPAC, Pasadena, May, 2024.

Special Astro Seminar, University of California, Riverside, December, 2023.

Seminar Talk for Galaxy Group, University of Arizona in Tucson, December, 2023.

Seminar Talk, the University of Texas at Austin, December, 2023.

Cafe Club, Laboratoire d'Astrophysique de Marseille, March, 2023.

Skills

English Fluency: 109/120 on TOEFL ibt,

English Fluency: Spent Middle & High School in the U.S.,

Programming Languages: Python, C, Shell-Script, SQL, awk,,

Astrophysics Softwares: Cloudy, Prospector, CIGALE, IRAF, astropy, DS9, emcee, 21cmFAST, JWST pipelines, Pandeia,

Outreach & Professional Development

SERVICE AND OUTREACH

2024	Summer Galaxy Workshop 2024 , LOC	<i>Karuizawa Hojo-en, Kashiko-jima the University of Tokyo the University of Tokyo the University of Tokyo the University of Tokyo the University of Tokyo</i>
2024	54th Summer School on Astronomy and Astrophysics , Proceedings Committee (Chair)	
2024	ICRR Spring School , Tutor	
2023	53th Summer School on Astronomy and Astrophysics , Galaxy/Galaxy Cluster Branch (Chair)	
2022	ICRR Spring School , Tutor	
2021-2023	ICRR Open Campus , Staff	
2021-2023	Norikura Summer School (Outreach Club) , Principal	

PEER REVIEW

Refereed a journal paper for A&A once

Refereed a journal paper for ApJ once

Refereed a journal paper for MNRAS once