Yoshihide Yamato

RIKEN Special Postdoctoral Researcher (SPDR Fellow)

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PROFESSIONAL APPOINTMENTS

Special Postdoctoral Researcher (SPDR Fellow) — Apr. 2025 – present
RIKEN (Saitama, Japan)

Japan Society for the Promotion of Science (JSPS) Research Fellowship — Apr. 2023 – Mar. 2025
The University of Tokyo (Tokyo, Japan)

Research Assistant of the WINGS Program — Oct. 2020 – Mar. 2023
The University of Tokyo (Tokyo, Japan)

EDUCATION

Ph.D., Astronomy (The University of Tokyo); Thesis — Mar. 2025
Supervisor: Prof. Yuri Aikawa

M.Sc., Astronomy (The University of Tokyo) — Mar. 2022
Supervisor: Prof. Yuri Aikawa

B.Sc., Astronomy (The University of Tokyo) — Mar. 2020

AWARDS AND FELLOWSHIPS

RIKEN Special Postdoctoral Researchers Program — Apr. 2025

JSPS Overseas Research Fellowship (offered) — Apr. 2025

JSPS Research Fellowship for Young Scientists (offered) — Apr. 2025

WINGS Program Excellence Award (The University of Tokyo) — Sep. 2024

JSPS Research Fellowships for Young Scientists — Apr. 2023

The Research Award for Masters Thesis (The University of Tokyo) — Mar. 2022

WINGS Program Excellence Award (The University of Tokyo) — Sep. 2022

GRANTS

Grant for RIKEN Special Postdoctoral Researchers (3M JPY) — Apr. 2025 – Mar. 2028
Physical and Chemical Structure of Protoplanetary Disks Probed by high-sensitivity Observations: Clarifying the Early Environment of Planet Formation

Grants-in-Aid for JSPS Overseas Research Fellow (16M JPY, offered) — Apr. 2025 – Mar. 2027
Exploring the Evolution of Planet-forming Material with High-sensitivity ALMA Observations

Grants-in-Aid for JSPS Fellows (offered) Apr. 2025 – Mar. 2028
Exploring the Evolution of Planet-forming Material with High-sensitivity ALMA Observations

Grants-in-Aid for JSPS Fellows (23KJ0636; 1.8M JPY) Apr. 2023 – Mar. 2025
Physical and chemical structure of young planet-forming disks revealed by ALMA high-resolution observations

PUBLICATIONS

A total of **28** refereed publications, including **4** as first author, 3 as second/third author, and 21 other co-authored (see also ADS Library or Google Scholar)

Refereed Publications with Significant Contributions (Including as a Lead Author)

[7] *A Multi-line Analysis of the Distribution and Excitation of CS and H_2CS in the HD 163296 Disk*, Law, C. J., Le Gal, R., **Yamato, Y.**, et al. 2025, arXiv e-prints, arXiv:2503.16605, doi: 10.48550/arXiv.2503.16605

[6] *Chemistry of Complex Organic Molecules in the V883 Ori Disk Revealed by ALMA Band 3 Observations*, **Yamato, Y.**, Notsu, S., Aikawa, Y., et al. 2024, AJ, 167, 66, doi: 10.3847/1538-3881/ad11d9

[5] *Detection of Dimethyl Ether in the Central Region of the MWC 480 Protoplanetary Disk*, **Yamato, Y.**, Aikawa, Y., Guzmán, V. V., et al. 2024, ApJ, 974, 83, doi: 10.3847/1538-4357/ad6981

[4] *Early Planet Formation in Embedded Disks (eDisk). IV. The Ringed and Warped Structure of the Disk around the Class I Protostar L1489 IRS*, **Yamato, Y.**, Aikawa, Y., Ohashi, N., et al. 2023, ApJ, 951, 11, doi: 10.3847/1538-4357/accd71

[3] *The First Interferometric Measurements of NH_2D/NH_3 Ratio in Hot Corinos*, **Yamato, Y.**, Furuya, K., Aikawa, Y., et al. 2022, ApJ, 941, 75, doi: 10.3847/1538-4357/ac9ea5

[2] *Molecules with ALMA at Planet-forming Scales (MAPS). X. Studying Deuteration at High Angular Resolution toward Protoplanetary Disks*, Cataldi, G., **Yamato, Y.**, Aikawa, Y., et al. 2021, ApJS, 257, 10, doi: 10.3847/1538-4365/ac143d

[1] *Molecules with ALMA at Planet-forming Scales (MAPS). XIII. HCO^+ and Disk Ionization Structure*, Aikawa, Y., Cataldi, G., **Yamato, Y.**, et al. 2021, ApJS, 257, 13, doi: 10.3847/1538-4365/ac143c

Co-authored Refereed Publications

[21] *Asymmetric Dust Accumulation of the PDS 70 Disk Revealed by ALMA Band 3 Observations*, Doi, K., Kataoka, A., Liu, H. B., et al. 2024, ApJ, 974, L25, doi: 10.3847/2041-8213/ad7f51

[20] *Early Planet Formation in Embedded Disks (eDisk) XIV: Flared Dust Distribution and Viscous Accretion Heating of the Disk around R CrA IRS 7B-a*, Takakuwa, S., Saigo, K., Kido, M., et al. 2024, arXiv e-prints, arXiv:2401.08722, doi: 10.48550/arXiv.2401.08722

[19] *Early Planet Formation in Embedded Disks (eDisk). I. Overview of the Program and First Results*, Ohashi, N., Tobin, J. J., Jørgensen, J. K., et al. 2023, ApJ, 951, 8, doi: 10.3847/1538-4357/acd384

[18] *Early Planet Formation in Embedded Disks (eDisk). II. Limited Dust Settling and Prominent Snow Surfaces in the Edge-on Class I Disk IRAS 04302+2247*, Lin, Z.-Y. D., Li, Z.-Y., Tobin, J. J., et al. 2023, ApJ, 951, 9, doi: 10.3847/1538-4357/acd5c9

[17] *Early Planet Formation in Embedded Disks (eDisk). VII. Keplerian Disk, Disk Substructure, and Accretion Streamers in the Class 0 Protostar IRAS 16544-1604 in CB 68*, Kido, M., Takakuwa, S., Saigo, K., et al. 2023, ApJ, 953, 190, doi: 10.3847/1538-4357/acdd7a

[16] *Early Planet Formation in Embedded Disks (eDisk). VIII. A Small Protostellar Disk around the Extremely Low Mass and Young Class 0 Protostar IRAS 15398-3359*, Thieme, T. J., Lai, S.-P., Ohashi, N., et al. 2023, ApJ, 958, 60, doi: 10.3847/1538-4357/ad003a

[15] *Early Planet Formation in Embedded Disks (eDisk). XII. Accretion Streamers, Protoplanetary Disk, and Outflow in the Class I Source Oph IRS 63*, Flores, C., Ohashi, N., Tobin, J. J., et al. 2023, ApJ, 958, 98, doi: 10.3847/1538-4357/acf7c1

[14] *Molecules with ALMA at Planet-forming Scales (MAPS). I. Program Overview and Highlights*, Öberg, K. I., Guzmán, V. V., Walsh, C., et al. 2021, ApJS, 257, 1, doi: 10.3847/1538-4365/ac1432

[13] *Molecules with ALMA at Planet-forming Scales (MAPS). II. CLEAN Strategies for Synthesizing Images of Molecular Line Emission in Protoplanetary Disks*, Czekala, I., Loomis, R. A., Teague, R., et al. 2021, ApJS, 257, 2, doi: 10.3847/1538-4365/ac1430

[12] *Molecules with ALMA at Planet-forming Scales (MAPS). III. Characteristics of Radial Chemical Substructures*, Law, C. J., Loomis, R. A., Teague, R., et al. 2021, ApJS, 257, 3, doi: 10.3847/1538-4365/ac1434

[11] *Molecules with ALMA at Planet-forming Scales (MAPS). IV. Emission Surfaces and Vertical Distribution of Molecules*, Law, C. J., Teague, R., Loomis, R. A., et al. 2021, ApJS, 257, 4, doi: 10.3847/1538-4365/ac1439

[10] *Molecules with ALMA at Planet-forming Scales (MAPS). IX. Distribution and Properties of the Large Organic Molecules HC_3N, CH_3CN, and c-C_3H_2*, Ilee, J. D., Walsh, C., Booth, A. S., et al. 2021, ApJS, 257, 9, doi: 10.3847/1538-4365/ac1441

[9] *Molecules with ALMA at Planet-forming Scales (MAPS). V. CO Gas Distributions*, Zhang, K., Booth, A. S., Law, C. J., et al. 2021, ApJS, 257, 5, doi: 10.3847/1538-4365/ac1580

[8] *Molecules with ALMA at Planet-forming Scales (MAPS). VII. Substellar O/H and C/H and Superstellar C/O in Planet-feeding Gas*, Bosman, A. D., Alarcón, F., Bergin, E. A., et al. 2021, ApJS, 257, 7, doi: 10.3847/1538-4365/ac1435

[7] *Molecules with ALMA at Planet-forming Scales (MAPS). XI. CN and HCN as Tracers of Photochemistry in Disks*, Bergner, J. B., Öberg, K. I., Guzmán, V. V., et al. 2021, ApJS, 257, 11, doi: 10.3847/1538-4365/ac143a

[6] *Molecules with ALMA at Planet-forming Scales (MAPS). XII. Inferring the C/O and S/H Ratios in Protoplanetary Disks with Sulfur Molecules*, Le Gal, R., Öberg, K. I., Teague, R., et al. 2021, ApJS, 257, 12, doi: 10.3847/1538-4365/ac2583

[5] *Molecules with ALMA at Planet-forming Scales (MAPS). XIV. Revealing Disk Substructures in Multiwavelength Continuum Emission*, Sierra, A., Pérez, L. M., Zhang, K., et al. 2021, ApJS, 257, 14, doi: 10.3847/1538-4365/ac1431

[4] *Molecules with ALMA at Planet-forming Scales (MAPS). XIX. Spiral Arms, a Tail, and Diffuse Structures Traced by CO around the GM Aur Disk*, Huang, J., Bergin, E. A., Öberg, K. I., et al. 2021, ApJS, 257, 19, doi: 10.3847/1538-4365/ac143e

[3] *Molecules with ALMA at Planet-forming Scales (MAPS). XV. Tracing Protoplanetary Disk Structure within 20 au*, Bosman, A. D., Bergin, E. A., Loomis, R. A., et al. 2021, ApJS, 257, 15, doi: 10.3847/1538-4365/ac1433

[2] *Molecules with ALMA at Planet-forming Scales (MAPS). XVII. Determining the 2D Thermal Structure of the HD 163296 Disk*, Calahan, J. K., Bergin, E. A., Zhang, K., et al. 2021, ApJS, 257, 17, doi: 10.3847/1538-4365/ac143f

[1] *Molecules with ALMA at Planet-forming Scales (MAPS). XVIII. Kinematic Substructures in the Disks of HD 163296 and MWC 480*, Teague, R., Bae, J., Aikawa, Y., et al. 2021, ApJS, 257, 18, doi: 10.3847/1538-4365/ac1438

TELESCOPE OBSERVING PROPOSALS AND EXPERIENCES

PI:

2024.1.00225.S **ALMA** Cycle 11, Grade B, 15.7 hours
Unlocking the Organic Chemistry in a Protoplanetary Disk

2022.1.00554.S **ALMA** Cycle 9, Grade A, 15.7 hours
Determining the primary nitrogen reservoir by ammonia ice deuteration

2022.1.00438.S **ALMA** Cycle 9, Grade A, 11.4 hours
Resolving the CO_2 snowline in the protostellar envelope of L483

22B-219 **VLA** 2022B, Grade B, 6 hours
Constraining the main nitrogen reservoir with ammonia ice deuteration

2021.1.00535.S **ALMA** Cycle 8, Grade B, 25.2 hours
High resolution observations of deuterated hydrocarbons in protoplanetary disks

Co-I: 18 ALMA programs including 1 Large Program

Other observing experiences: Nobeyama 45 m

MAJOR COLLABORATIONS

Co-I: DiskStrat 2024 – present
ALMA Cycle 11 Large Program, PI: Romane Le Gal

Co-I: Early Planet Formation in Embedded Disks (eDisk) 2021 – present
ALMA Cycle 7 Large Program, PI: Nagayoshi Ohashi

Co-I: Molecules with ALMA at Planet-forming Scales (MAPS) 2019 – present
ALMA Cycle 6 Large Program, PI: Karin Öberg

PROFESSIONAL SERVICES

Journal Referee for Astronomy & Astrophysics

Session Chair, Mini Workshop on Star Formation (Kagoshima University) Jun. 2024

LOC, Astrochemistry Get-together Workshop (The University of Tokyo) Apr. 2024

Student Stuff, Protostars & Planets VII (Kyoto, Japan) Apr. 2023

TEACHING

Teaching Assistant, Experimental Astronomy (The University of Tokyo) 2020

PRESS AND OUTREACH

ngVLA Science Showcase (NRAO eNews article) Mar. 2024
Complex Organic Molecules in Protoplanetary Disks

eDisk ALMA Large Program (NAOJ and many others) Jun. 2023
ALMA Digs Deeper into the Mystery of Planet Formation

MAPS ALMA Large Program (NAOJ and many others) Sep. 2021
Untangling the Formation of Planetary Systems with Deuterium

Student Staff of NAOJ Mitaka Stargazing Party 2018 – present

TALKS AND PRESENTATIONS

A total of **31** presentations, including **3** invited talks and 1 poster

Symposium on Next Generation Astrochemistry (Tokyo) Nov. 2024
Observations of Sulfur-bearing Molecules in the Inner Disk of HD 163296

ASJ Autumn Annual Meeting 2024 (Kwansai Gakuin University) Sep. 2024
Observations of Deuterated C_2H in Protoplanetary Disks

Astromaterial Science in the ngVLA Era (Tokyo Institute of Technology) Aug. 2024
VLA Observations of Ammonia in Low-mass Protostars

East Asian ALMA Science Workshop 2024 (Soul National University, Korea) Jul. 2024
Dimethyl Ether Emission Tracing Icy Organic Sublimates in the MWC 480 Protoplanetary Disk

Mini Workshop on Star Formation (Kagoshima University) Jun. 2024
ALMA Observations of Complex Organic Molecules in the Disk around the Outbursting Protostar V883 Ori

Astrochemistry Mini-workshop (NAOJ) May. 2024
ALMA Observations of Complex Organic Molecules in the V883 Ori Disk

Astrochemistry Get-together Workshop (The University of Tokyo) Apr. 2024
Dimethyl Ether Emission Tracing Icy Sublimates in the MWC 480 Protoplanetary Disk

Japan Radio Astronomy Forum 2023 (NAOJ, **invited**) Mar. 2024
ALMA Observations of Complex Organic Molecules in the Disk around the Outbursting Star V883 Ori

Planetary Science Workshop for Youngers (Virtual) Mar. 2024
Observations of Large Organic Molecules in the Disk of V883 Ori

Workshop on Interstellar Matter 2023 (Hokkaido University) Nov. 2023
ALMA Observations of the Young Bursting Star V883 Ori: Chemistry of Complex Organic Molecules in the Protoplanetary Disk

ALMA-J Seminar (NAOJ, **invited**) Oct. 2023
ALMA Observations of the Disk around the Young Bursting Star V883 Ori: Spatial Distributions and Chemistry of Complex Organic Molecules

ASJ Autumn Annual Meeting 2023 (Nagoya University) Sep. 2023
Detection of Dimethyl Ether in the MWC 480 Protoplanetary Disk

Astrochemistry Get-together Workshop (The University of Tokyo, **invited**) Jul. 2023
ALMA Observations of Complex Organic Molecules in Protoplanetary Disks

Protostars & Planets VII (Kyoto, *poster*) Apr. 2023
Early Planet Formation in Embedded Disks (eDisk): The Ringed and Warped Structure of the Disk around the Class I Protostar L1489 IRS

ASJ Spring Annual Meeting 2023 (Rikkyo University) Mar. 2023
Observations of Complex Organic Molecules in the Disk of FU Ori-type Star V883 Ori

Next Generation Astrochemistry Plenary Meeting (Rikkyo University) Mar. 2023
ALMA Observations of Complex Organic Molecules in the Disk around the Outbursting Star V883 Ori

Symposium on Next Generation Astrochemistry (The University of Tokyo) Nov. 2022
Constraining the primary nitrogen reservoir by ammonia ice deuteration

Molecules in Extreme Environments: Near and Far (NAOJ) Nov. 2022
Early Planet Formation in Embedded Disks (eDisk): Dust and molecular substructures in the disk around Class I source L1489 IRS

ASJ Autumn Annual Meeting 2022 (Niigata University) Sep. 2022
Early Planet Formation in Embedded Disks (eDisk): First-look results of L1489 IRS

Japan Geoscience Union Meeting 2022 (Makuhari Messe, Chiba) May. 2022
Constraining the primary nitrogen reservoir and formation history of ammonia ices in star-forming regions through VLA observations of ammonia deuteration

ASJ Spring Annual Meeting 2022 (Virtual) Mar. 2022
High NH_2D/NH_3 ratios around the low-mass protobinary NGC1333 IRAS4A

Astrochemical Frontiers 2021 Quarantine Edition 2 (Virtual) Jul. 2021
Deuterium chemistry and ionization rate in protoplanetary disks

From cores to codes: planning for the next steps in planet formation (Virtual) Mar. 2021
Deuterium fractionation and ionization rate in proto-planetary disks by MAPS project

ASJ Spring Annual Meeting 2021 (Virtual) Mar. 2021
VLA observations of ammonia lines towards the Class 0 protostar NGC1333 IRAS4A

East Asia ALMA Science Workshop 2021 (Virtual) Feb. 2021
Deuterium fractionation and ionization in protoplanetary disks probed by N_2H^+ and N_2D^+

Planetary System Formation Workshop (Virtual) Feb. 2021
Deuterium Fractionation and Ionization State of Protoplanetary Disks Probed by ALMA high-reoslution Observations

Five Years After HL Tau: A new era on planet formation (Virtual) Dec. 2020
ALMA Observations of N_2H^+ and N_2D^+ in Protoplanetary Disks

Tracking from Molecular Clouds to the Birth of Protostars – Toward Star Formation Model in the New Era (Virtual) Dec. 2020
Observations of NH_3 in Class 0 Sources

Japanese Society for Planetary Sciences Autumn Meeting 2020 (Virtual) Nov. 2020
Analysis of N_2H^+ and N_2D^+ Data in Protoplanetary Disks

Nobeyama Science Workshop 2020 (Virtual) Sep. 2020
Analysis of N_2H^+ and N_2D^+ Data in Protoplanetary Disks

ASJ Autumn Annual Meeting 2020 (Virtual) Sep. 2020
Analysis of N_2H^+ and N_2D^+ Data in Protoplanetary Disks