

# Yuhiko Aoyama

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## EDUCATION

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### The University of Tokyo

Tokyo, Japan

#### Ph.D., Science

May 2019

Dissertation: "Constructing theoretical model of gas accretion for constraining planet formation theory by using observations of forming stars and planets: modeling non-equilibrium micro-physics in detail"

#### M.A., Science

May 2016

#### B.A., Science

May 2014

## POSITIONS

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Postdoc, Peking University

July 2022–

Postdoc, Tsinghua University

Sep. 2019–June 2022

Postdoc, The University of Tokyo

Apr. 2019–Aug. 2019

## RESEARCH INTERESTS

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Planet formation

Star formation

Astrophysics

Hydrodynamics

Radiative transfer

Astrochemistry

## GRANTS AND AWARDS

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Boya fellow

2022

Shui-Mu Tsinghua Scholar

2019

Leading Graduate Course for Frontiers of Mathematical Sciences and Physics

2016-2019

## SKILLS

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Proficient in numerical modeling with Fortran (advanced), C (advanced), and CUDA (beginning)

Advanced use of open-source software (Athena++)

Basic use of open-source software (FLASH and Cloudy)

Proposed observational targets and attended observations at Subaru observatory in Hawaii

## PUBLICATIONS (first authored)

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- [1] **Aoyama, Y.** and B. Xuening (2023), "Three-dimensional Global Simulation of Type-II Planet-disk interaction with a Magnetized Disk Wind: I. Magnetic Flux Concentration and Gap Properties," *The Astrophysical Journal*, 946:5
- [2] **Aoyama, Y.**, G.-D. Marleau, M. Ikoma, and C. Mordasini (2021), "Comparison of Planetary H $\alpha$ -emission Models: A New Correlation with Accretion Luminosity," *The Astrophysical Journal Letters*, 917:L30
- [3] **Aoyama, Y.** and M. Ikoma (2019), "Constraining Planetary Gas Accretion Rate from H $\alpha$  Line Width and Intensity: Case of PDS 70 b and c," *The Astrophysical Journal Letters*, 885:L29
- [4] **Aoyama, Y.**, M. Ikoma, and T. Tanigawa (2018), "Theoretical Model of Hydrogen Line Emission from Accreting Gas Giants", *The Astrophysical Journal*, 866:84

## PUBLICATIONS (co-authored)

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- [5] Fang, M., Wang, L., Herczeg, G.J., Hashimoto, J., Xu, Z., Nemer, A., Pascucci, I., Haffert, S.Y., **Yuhiko Aoyama** (2023) "High-resolution [O I] line spectral mapping of TW Hya supportive of a magnetothermal wind," *Nature Astronomy* 1–8.
- [6] Flores-Rivera, L., Flock, M., Kurtovic, N.T., Husemann, B., Banzatti, A., Ringqvist, S.C., Kamann, S., Müller, A., Fendt, C., García Lopez, R., Marleau, G.-D., Henning, T., Carrasco-González, C., Van Boekel, R., Keppler, M., Launhardt, R., **Yuhiko Aoyama** (2023), "Forbidden emission lines in protostellar outflows and jets with MUSE," *Astronomy & Astrophysics* 670:A126
- [7] Ringqvist, S.C., Viswanath, G., **Yuhiko Aoyama**, Janson, M., Marleau, G.-D., Brandeker, A. (2023), "Resolved near-UV hydrogen emission lines at 40-Myr super-Jovian protoplanet Delorme 1 (AB)b: Indications of magnetospheric accretion," *Astronomy & Astrophysics* 669:L12.
- [8] Betti, S.K., Follette, K.B., Ward-Duong, K., **Yuhiko Aoyama**, Marleau, G.-D., Bary, J., Robinson, C., Janson, M., Balmer, W., Chauvin, G., Palma-Bifani, P. (2022), "Near-infrared Accretion Signatures from the Circumbinary Planetary-mass Companion Delorme 1 (AB)b\*," *Astrophysical Journal Letter*, 935:L18.
- [9] Marleau, G.-D., **Yuhiko Aoyama**, R. Kuiper, K. Follette, N. J. Turner, G. Cugno, C. F. Manara, S. Y. Haffert, D. Kitzmann, S. C. Ringqvist, K. R. Wagner, R. van Boekel, S. Sallum, M. Janson, T. O. B. Schmidt, L. Venuti, Ch. Lovis, and C. Mordasini (2022), "Accreting protoplanets: Spectral signatures and magnitude of gas and dust extinction at H $\alpha$ ", *Astronomy & Astrophysics*, Volume 657:A38
- [10] Stolker, T., S. Y. Haffert, A. Y. Kesseli, R. G. van Holstein, **Yuhiko Aoyama**, J. Brinchmann, G. Cugno, J. H. Girard, G.-D. Marleau, M. R. Meyer, J. Milli, S. P. Quanz, I. A. G. Snellen, and K. O. Todorov (2021), "Characterizing the Portolunar Disk of the Accreting Companion GQ Lupi B", *The Astronomical Journal*, Volume 162, Issue 6, id.286, 19pp.
- [11] Takasao, S., **Yuhiko Aoyama**, and I. Masahiro (2021), "Hydrodynamic Model of H $\alpha$  Emission from Accretion Shocks of a Proto-giant Planet and Circumplanetary Disk", *The Astrophysical Journal*, Volume 921, Issue 1, id.10, 18 pp.
- [12] Uyama, T., C. Xie, **Yuhiko Aoyama**, C. A. Beichman, J. Hashimoto, R. Dong, Y. Hasegawa, M. Ikoma, D. Mawet, M. W. McElwain, J.-B. Ruffio, K. R. Wagner, J. J. Wang, and Y. Zhou (2021), "Keck/OSIRIS Pa $\beta$  High-contrast Imaging and Updated Constraints on PDS 70b", *The Astronomical Journal*, Volume 162, Issue 5, id.214, 6 pp.
- [13] Christiaens, V., M.-G. Ubeira-Gabellini, H. Cánovas, P. Delorme, B. Pairet, O. Absil, S. Casassus, J. H. Girard, A. Zurlo, **Yuhiko Aoyama**, G.-D. Marleau, L. Spina, N. van der Marel, L. Cieza, G. Lodato, S. Pérez, C. Pinte, D. J. Price, and M. Reggiani (2021), "A faint companion around CrA-9: protoplanet or obscured binary?", *Monthly Notices of the Royal Astronomical Society*, Volume 502, Issue 4, pp.6117-6139
- [14] Eriksson, S. C., R. A. Torres, M. Janson, **Yuhiko Aoyama**, G.-D. Marleau, M. Bonnefoy, and S. Petrus (2020), "Strong H $\alpha$  emission and signs of accretion in a circumbinary planetary mass companion from MUSE", *Astronomy & Astrophysics*, Volume 638, id.L6, 9 pp.
- [15] Hashimoto, J., **Yuhiko Aoyama**, M. Konishi, T. Uyama, S. Takasao, M. Ikoma, and T. Tanigawa (2020), "Accretion Properties of PDS 70b with MUSE", *The Astronomical Journal*, Volume 159, Issue 5, id.222, 10 pp.
- [16] Uyama, T., T. Tanigawa, J. Hashimoto, M. Tamura, **Yuhiko Aoyama**, T. D. Brandt, and M. Ishizuka (2017), "Constraining Accretion Signatures of Exoplanets in the TW Hya Transitional Disk", *The Astronomical Journal*, 154:90

## CONFERENCE PRESENTATIONS

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1. **Aoyama, Y.** and X. Bai. Type II planet-disk interaction and circumplanetary disk formation in windy protoplanetary disk. Contribution talk delivered at Athena++ Workshop, New York, USA, May 2023.
2. **Aoyama, Y.** and X. Bai. Type II planet-disk interaction and circumplanetary disk formation in windy protoplanetary disk. Contribution talk delivered at 2023 International Conference of Deep Space Sciences, Hefei, China, April 2023
3. **Aoyama, Y.**, G.-D. Marleau, and J. Hashimoto. Hydrogen line emission from accreting planetary-mass objects. Poster delivered at Protostars and Protoplanets VII, Kyoto, Japan, April 2023
4. **Aoyama, Y.** and X. Bai. Type II planet-disk interaction and circumplanetary disk formation in windy protoplanetary disks. Poster delivered at Protostars and Protoplanets VII, Kyoto, Japan, April 2023
5. **Aoyama, Y.** and X. Bai. Type-II planet-disk interaction with a magnetized disk wind. Contribution talk delivered at Stars, planets, and Formosa, Taipei, Taiwan, August 2022
6. **Aoyama, Y.** and M. Ikoma. Modeling of Hydrogen line emission from the accreting gas giant PDS70b. Contribution talk delivered at 2021 National Planetary Science Conference, Suzhou, China June 2021
7. **Aoyama, Y.** and M. Ikoma. Theoretical modeling of spectral profile with 1D-radiation hydrodynamic simulation: constraining the accretion rate and mass of the protoplanets PDS70b and c. Spirit of Lyot 2019, Tokyo International Exchange Center, Plaza Heisei, Tokyo, Japan, October 2019
8. **Aoyama, Y.** and M. Ikoma. Theoretical Modeling of Spectral Profile from the Two Protoplanets PDS70b and c. Contribution talk delivered at Planet2/RESCEU Symposium 2019, Bankoku Sinryokan, Okinawa, Japan, October 2019
9. **Aoyama, Y.**, M. Ikoma, and T. Tanigawa. Theoretical Modeling of Hydrogen Line Emission from Accreting Star and Planet. Contribution talk delivered at Theoretical and Computational Challenges in Planet Formation Workshop, CCA, Flatiron Institute, NewYork, USA, May 2019.
10. **Aoyama, Y.**, M. Ikoma, and T. Tanigawa. Theoretical modeling of shock-heated gas around accreting gas giants: comparing with observed hydrogen lines. Invited speak delivered at Symposium on Planetary Sciences, Tohoku University, Miyagi, Japan, February 2019.
11. **Aoyama, Y.**, M. Ikoma, and T. Tanigawa. Theoretical Model of Hydrogen Line Emission from Accreting Gas Giants. Poster presentation delivered at The ninth Moscow solar system symposium, Space research institute, Moscow, Russia, November 2018.
12. **Aoyama, Y.**, M. Ikoma, and T. Tanigawa. Theoretical estimate of Hydrogen line intensity emitted from accreting gas giants. Oral presentation delivered at the Circumplanetary Disks and Satellite Formation, Nagoya, Japan, March 2018. [\\_](#)
13. **Aoyama, Y.**, M. Ikoma, and T. Tanigawa. Theoretical estimate of intensity of hydrogen line emission from accreting gas giants. Oral presentation delivered at the 10th RESCEU/Planet2 Symposium, Tokyo, November 2017. [\\_](#)
14. **Aoyama, Y.**, M. Ikoma, and T. Tanigawa. Hydrogen line emission from accreting gas giants. Oral presentation delivered at Planet 2 Symposium 2017: Origin and diversity of planetary systems from the microscope to the telescope, Villefranche, French, February 2017.

*Also 3 first-authored and 7 co-authored presentations at international conferences and 16 presentations in Japanese*