

Yuhiko Aoyama

yaoyama@tsinghua.edu.cn

Institute for Advanced Study, Tsinghua University

Science Building
Tsinghua University, Haidian-Qu
Beijing 100084, People's Republic of China
(+86)10-6278-9972

Apartment 6, 314
Tsinghua University, Haidian-Qu
Beijing, 100084, People's Republic of China
(+86)18500436138

EDUCATION

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

Postdoc, Tsinghua University

Sep. 2019-

Postdoc, The University of Tokyo

Apr. 2019–Aug. 2019

RESEARCH INTERESTS

Planet formation

Star formation

Astrophysics

Hydrodynamics

Radiative transfer

Astrochemistry

GRANTS AND AWARDS

Shui-Mu Tsinghua Scholar

2019

Leading Graduate Course for Frontiers of Mathematical Sciences and Physics

2016-2019

SKILLS

Proficient in numerical modeling with Fortran95 (advanced), C (basic), 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)

- [1] **Aoyama, Y.**, G.-D. Marleau, M. Ikoma, and C. Mordasini (2021), "Comparison of Planetary H α -emission Models: A New Correlation with Accretion Luminosity", *The Astrophysical Journal Letters*, 917:L30
- [2] **Aoyama, Y.** and M. Ikoma (2019), "Constraining Planetary Gas Accretion Rate from H α Line Width and Intensity: Case of PDS 70 b and c", *The Astrophysical Journal Letters*, 885:L29
- [3] **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)

- [4] 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 α ", *Astronomy & Astrophysics*, Volume 657, id.A38, 31 pp.
- [5] 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.
- [6] Takasao, S., **Yuhiko Aoyama**, and I. Masahiro (2021), "Hydrodynamic Model of H α Emission from Accretion Shocks of a Proto-giant Planet and Circumplanetary Disk", *The Astrophysical Journal*, Volume 921, Issue 1, id.10, 18 pp.
- [7] 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 β High-contrast Imaging and Updated Constraints on PDS 70b", *The Astronomical Journal*, Volume 162, Issue 5, id.214, 6 pp.
- [8] 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
- [9] Eriksson, S. C., R. A. Torres, M. Janson, **Yuhiko Aoyama**, G.-D. Marleau, M. Bonnefoy, and S. Petrus (2020), "Strong H α emission and signs of accretion in a circumbinary planetary mass companion from MUSE", *Astronomy & Astrophysics*, Volume 638, id.L6, 9 pp.
- [10] 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.
- [11] Uyama, T., T. Tanigawa, J. Hashimoto, M. Tamura, **Y. 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

1. **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
2. **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
3. **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
4. **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.
5. **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.
6. **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.
7. Uyama, T., B. Norris, T. Kotani, O. Guyon, **Y. Aoyama**, M. Tamura, and SCExAO+VAMPIRES members. Search for H α from Accreting Protoplanets with Subaru/SCExAO+VAMPIRES. Guildhall, Cambridge, United Kingdom, July 2018.
8. **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.
9. **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.
10. **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.
11. **Aoyama, Y.**, T. Tanigawa, and M. Ikoma. Theoretical estimate of intensity of hydrogen line emission from accreting gas giants. Oral presentation delivered at the Japan-Germany planet & disk workshop, Ishigaki, Japan, September 2016.
12. **Aoyama, Y.**, T. Tanigawa, and M. Ikoma. Theoretical Estimate of Intensity of Hydrogen Line Emission from Accreting Gas Giants: Interpretation of the observed H α intensity from LkCa15b. Poster presentation delivered at the Exoplanet and Disks: Their Formation and Diversity III, Ishigaki, Japan, February 2016.
13. **Aoyama, Y.**, T. Tanigawa, and M. Ikoma. Intensity of Hydrogen Line Emission from Accreting Gas-Giant Planets. Poster presentation delivered at the Extreme Solar Systems III Meeting, Hawaii, USA, February 2015.

Also 6 co-author presentations and 11 oral presentations and 5 poster presentations in Japanese