

片岡 章雅

助教
国立天文台 科学研究部

連絡先

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職歴

国立天文台 科学研究部 助教 (*理論研究部より改組)	2019年-現在
総合研究大学院大学 物理科学研究科 天文科学専攻 助教	2017年-現在
国立天文台 理論研究部 助教	2017年-2019年
国立天文台フェロー	
国立天文台 理論研究部	2017年4月-2017年11月
Humboldt Research Fellow	
ハイデルベルク大学(ドイツ)	2016年12月-2017年4月
日本学術振興会海外特別研究員	
ハイデルベルク大学(ドイツ)	2015年4月-2016年11月
日本学術振興会特別研究員(PD)	
東京工業大学 地球惑星科学専攻 中本研究室	2014年10月-2015年3月
日本学術振興会特別研究員(DC1)	
国立天文台 理論研究部	2012年4月-2014年9月

学歴

総合研究大学院大学 物理科学研究科 天文科学専攻 博士課程 (理学博士)	2012年4月-2014年9月
京都大学大学院 理学研究科 宇宙物理学教室 修士課程	2010年4月-2012年3月
京都大学理学部	2006年4月-2010年3月

研究

Planet formation, protoplanetary disks, radio observations, mechanical and optical properties of dust aggregates

学会

国際天文学連合(IAU)	2022年-現在
宇宙電波懇談会 (宇電懇)	2020年-現在
Humboldtian	2017年-現在
理論天文学宇宙物理学懇談会(理論懇)	2013年-現在
日本惑星科学会	2013年-現在
日本天文学会	2010年-現在

競争的資金

科学研究費助成事業 基盤研究(C), 22K03680, 300万円(5年間)	2022年4月-2027年3月
科学研究費助成事業 新学術領域研究 研究領域提案型, 19H05088, 200万円(2年間)	2019年4月-2023年3月
科学研究費助成事業 若手研究, 18K13590, 330万円(3年間)	2018年4月-2021年3月
科学研究費助成事業 若手研究(B), 15K17606, 310万円(3年間)	2015年4月-2018年3月

受賞

日本天文学会 2020年度研究奨励賞	2021年
日本惑星科学会 2020年度最優秀研究者賞	2021年
Young Scientist Award at Sant Cugat Forum on Astrophysics	2016年
総合研究大学院大学 長倉研究奨励賞	2015年
総合研究大学院大学 総長賞	2014年
日本惑星科学会秋季講演会最優秀発表賞	2013年

REFEREES AND ACADEMIC SERVICES

Academic referee for

The Astrophysical Journal, Astronomy and Astrophysics, Monthly Notice of Royal Astronomical Society, and Publication of Astronomical Society of Japan

Science assessor / reviewer

MSCA4Ukraine reviewer through Humboldt foundation 2023

Subaru telescope science assessor

JCMT science assessor

Science assessor of ALMA Cycle 6-7, Category 4 2018-2019

コミュニティへの貢献

国立天文台 研究交流委員会 委員 2022年-現在

理論懇運営委員 Dec. 2018-Nov. 2020

国立天文台 談話会委員 2018-2021

博士論文・修士論文審査

Committee member for the master thesis by Shiori Koshisaka, SOKENDAI 2023

Committee member for the Ph.D. thesis by Jungha Kim, SOKENDAI 2020

授業等

神戸大学 集中講義 惑星形成 2022

総研大 講義 Basic seminar (大学院生向け、流体力学) 2018-2019

研究指導

学生

土井聖明 (5年一貫性博士課程) 2019年-現在

ポスドク

植田高啓(学振PD), mass estimate of protoplanetary disks 2019-2023

その他の関わりの深い学生・PD

辰馬未沙子 (博士課程実質指導、ダスト集合体のN体計算、2023年東京大学より博士号取得) 2017年-現在

森智宏 (博士課程実質指導、ALMA偏光観測、2019年東京大学より博士号取得) 2017-2018

大橋聡史 (ALMA偏光観測に関する共同研究) 2017年-現在

Adriana Pohl (collaborations on a project of dust coagulation and polarimetric observations at Heidelberg) 2015-2017

co-supervised students

竹村英晃 (総研大 天文科学専攻 所属。副指導助教) 2018-2023

吉田有宏 (総研大 天文科学専攻 所属。副指導助教) 2021-present

アカデミックアシスタント

松下祐子 Apr. 2021 - present

Seongjoong Kim Apr. 2020 - Mar. 2021

意見を述べられる人の連絡先

Professor Emeritus Kohji Tomisaka

National Astronomical Observatory of Japan (retired)

E-mail:kohji.tomisaka@nao.ac.jp

Prof. Hidekazu Tanaka

Tohoku University

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Prof. Dr. Cornelis P. Dullemond

Heidelberg University

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Prof. Hideko Nomura

CONFERENCE TALKS

Invited talks

1. "Millimeter-wave polarization in protoplanetary disks," Five years after HL Tau, online, Dec 7-11, 2020
2. "Polarized dust emission in protoplanetary disks," Workshop on Polarization in Protoplanetary Disks and Jets,, Sant Cugat, Spain, May 20-24, 2019
3. "ALMA polarization observations towards protoplanetary disks," Polarimetry in the ALMA era: a new crossroads of astrophysics, March 25-29th, 2019, NAOJ, Japan
4. "Measuring the grain size and finding the magnetic fields by ALMA polarization", Planet-Forming Disks, March 4-8th, 2019, Como, Italy
5. "Dust and polarization," SOKENDAI Asia Winter School 2019, February 27th - March 1st, 2019, NAOJ, Japan
6. "mm-wave polarization of protoplanetary disks: alignment of scattering?," Cosmic Dust and Magnetism 2018, October 30 - November 2nd, 2018, KASI, Korea
7. "millimeter-wave polarization as a tool of investigating the planet formation," East-Asia ALMA Science Workshop 2017 - Korea. Nov.27-29,2017, KASI, Daejeon, Korea
8. "millimeter-wave polarization of protoplanetary disks: alignment or scattering?," Submm/mm/cm QUESO Workshop 2017, Oct.25-25,2017, ESO, Garching, Germany
9. "millimeter-wave polarization as a tool of investigating the planet formation," JpGU-AGU Joint Meeting 2017, May.20-25,2017, Makuhari Messe, Chiba, Japan
10. "ALMA revolution on planet formation," Japan-German planet & disk workshop, Sep.25-30, 2016, Beach Hotel Sunshine, Ishigaki, Japan

PUBLICATION LIST

Refereed papers as first author or lead by supervised students or postdocs

1. Ueda, T., **Kataoka, A.**, & Tsukagoshi, T., 2022, "Massive Compact Dust Disk with a Gap around CW Tau Revealed by ALMA Multiband Observations," *The Astrophysical Journal*, 930, 56
2. Tatsuuma, M., & **Kataoka, A.**, 2021, "Rotational Disruption of Porous Dust Aggregates due to Gas Flow in Protoplanetary Disks," *The Astrophysical Journal*, 913, 132
3. Ueda, T., **Kataoka, A.**, Zhang, S., Zhu, Z., Carrasco-González, C., et al., 2021, "Impact of Differential Dust Settling on the SED and Polarization: Application to the Inner Region of the HL Tau Disk," *The Astrophysical Journal*, 913, 117
4. Doi, K., & **Kataoka, A.**, 2021, "Estimate on Dust Scale Height from the ALMA Dust Continuum Image of the HD 163296 Protoplanetary Disk," *The Astrophysical Journal*, 912, 164
5. Mori, T., & **Kataoka, A.**, 2021, "Modeling of the ALMA HL Tau Polarization by Mixture of Grain Alignment and Self-scattering," *The Astrophysical Journal*, 908, 153
6. Ohashi, S., **Kataoka, A.**, van der Marel, N., Hull, C. L. H., Dent, W. R. F., et al., 2020, "Solving Grain Size Inconsistency between ALMA Polarization and VLA Continuum in the Ophiuchus IRS 48 Protoplanetary Disk," *The Astrophysical Journal*, 900, 81
7. Ueda, T., **Kataoka, A.**, & Tsukagoshi, T., 2020, "Scattering-induced Intensity Reduction: Large Mass Content with Small Grains in the Inner Region of the TW Hya disk," *The Astrophysical Journal*, 893, 125
8. Ohashi, S., & **Kataoka, A.**, 2019, "Radial Variations in Grain Sizes and Dust Scale Heights in the Protoplanetary Disk around HD 163296 Revealed by ALMA Polarization Observations," *The Astrophysical Journal*, 886, 103
9. **Kataoka, A.**, Tsukagoshi, T., Pohl, A., Muto, T., Nagai, H., et al., 2017, "The Evidence of Radio Polarization Induced by the Radiative Grain Alignment and Self-scattering of Dust Grains in a Protoplanetary Disk," *The Astrophysical Journal*, 844, L5
10. Tatsuuma, M., **Kataoka, A.**, & Tanaka, H., 2019, "Tensile Strength of Porous Dust Aggregates," *The Astrophysical Journal*, 874, 159
11. **Kataoka, A.**, Okuzumi, S., & Tazaki, R., 2019, "Millimeter-wave Polarization Due to Grain Alignment by the Gas Flow in Protoplanetary Disks," *The Astrophysical Journal*, 874, L6
12. Mori, T., **Kataoka, A.**, Ohashi, S., Momose, M., Muto, T., et al., 2019, "An Observational Study for Grain Dynamics in the AS 209 Disk with Submillimeter Polarization," *The Astrophysical Journal*, 883,

13. Ohashi, S., **Kataoka, A.**, Nagai, H., Momose, M., Muto, T., et al., 2018, "Two Different Grain Size Distributions within the Protoplanetary Disk around HD 142527 Revealed by ALMA Polarization Observation," *The Astrophysical Journal*, 864, 81
14. **Kataoka, A.**, 2017, "Dust Coagulation with Porosity Evolution," *Formation, Evolution, and Dynamics of Young Solar Systems*, 445, 143
15. **Kataoka, A.**, Tsukagoshi, T., Momose, M., Nagai, H., Muto, T., et al., 2016, "Submillimeter Polarization Observation of the Protoplanetary Disk around HD 142527," *The Astrophysical Journal*, 831, L12
16. Pohl, A., **Kataoka, A.**, Pinilla, P., Dullemond, C. P., Henning, T., et al., 2016, "Investigating dust trapping in transition disks with millimeter-wave polarization," *Astronomy and Astrophysics*, 593, A12
17. **Kataoka, A.**, Muto, T., Momose, M., Tsukagoshi, T., & Dullemond, C. P., 2016, "Grain Size Constraints on HL Tau with Polarization Signature," *The Astrophysical Journal*, 820, 54
18. **Kataoka, A.**, Muto, T., Momose, M., Tsukagoshi, T., Fukagawa, M., et al., 2015, "Millimeter-wave Polarization of Protoplanetary Disks due to Dust Scattering," *The Astrophysical Journal*, 809, 78
19. **Kataoka, A.**, Okuzumi, S., Tanaka, H., & Nomura, H., 2014, "Opacity of fluffy dust aggregates," *Astronomy and Astrophysics*, 568, A42
20. **Kataoka, A.**, Tanaka, H., Okuzumi, S., & Wada, K., 2013, "Fluffy dust forms icy planetesimals by static compression," *Astronomy and Astrophysics*, 557, L4
21. **Kataoka, A.**, Tanaka, H., Okuzumi, S., & Wada, K., 2013, "Static compression of porous dust aggregates," *Astronomy and Astrophysics*, 554, A4
22. **Kataoka, A.**, Machida, M. N., & Tomisaka, K., 2012, "Exploring Magnetic Field Structure in Star-forming Cores with Polarization of Thermal Dust Emission," *The Astrophysical Journal*, 761, 40

Other refereed papers

1. Ching, T.-C., Qiu, K., Li, D., Ren, Z., Lai, S.-P., et al., 2022, "The JCMT BISTRO-2 Survey: Magnetic Fields of the Massive DR21 Filament," *The Astrophysical Journal*, 941, 122
2. Hwang, J., Kim, J., Pattle, K., Lee, C. W., Koch, P. M., et al., 2022, "The JCMT BISTRO Survey: A Spiral Magnetic Field in a Hub-filament Structure, Monoceros R2," *The Astrophysical Journal*, 941, 51
3. Kwon, W., Pattle, K., Sadavoy, S., Hull, C. L. H., Johnstone, D., et al., 2022, "B-fields in Star-forming Region Observations (BISTRO): Magnetic Fields in the Filamentary Structures of Serpens Main," *The Astrophysical Journal*, 926, 163
4. Lyo, A.-R., Kim, J., Sadavoy, S., Johnstone, D., Berry, D., et al., 2021, "The JCMT BISTRO Survey: An 850/450 μm Polarization Study of NGC 2071IR in Orion B," *The Astrophysical Journal*, 918, 85
5. Takemura, H., Nakamura, F., Ishii, S., Shimajiri, Y., Sanhueza, P., et al., 2021, "The C^{18}O core mass function toward Orion A: Single-dish observations," *Publications of the Astronomical Society of Japan*, 73, 487
6. Eswaraiah, C., Li, D., Furuya, R. S., Hasegawa, T., Ward-Thompson, D., et al., 2021, "The JCMT BISTRO Survey: Revealing the Diverse Magnetic Field Morphologies in Taurus Dense Cores with Sensitive Submillimeter Polarimetry," *The Astrophysical Journal*, 912, L27
7. Kanagawa, K. D., Hashimoto, J., Muto, T., Tsukagoshi, T., Takahashi, S. Z., et al., 2021, "ALMA Observation of the Protoplanetary Disk around WW Cha: Faint Double-peaked Ring and Asymmetric Structure," *The Astrophysical Journal*, 909, 212
8. Arzoumanian, D., Furuya, R. S., Hasegawa, T., Tahani, M., Sadavoy, S., et al., 2021, "Dust polarized emission observations of NGC 6334. BISTRO reveals the details of the complex but organized magnetic field structure of the high-mass star-forming hub-filament network," *Astronomy and Astrophysics*, 647, A78
9. Ngoc, N. B., Diep, P. N., Parsons, H., Pattle, K., Hoang, T., et al., 2021, "Observations of Magnetic Fields Surrounding LkH α 101 Taken by the BISTRO Survey with JCMT-POL-2," *The Astrophysical Journal*, 908, 10
10. Doi, Y., Hasegawa, T., Furuya, R. S., Coudé, S., Hull, C. L. H., et al., 2020, "The JCMT BISTRO Survey: Magnetic Fields Associated with a Network of Filaments in NGC 1333," *The Astrophysical Journal*, 899, 28
11. Yamaguchi, M., Akiyama, K., Tsukagoshi, T., Muto, T., **Kataoka, A.**, et al., 2020, "Super-resolution Imaging of the Protoplanetary Disk HD 142527 Using Sparse Modeling," *The Astrophysical Journal*, 895, 84
12. Bi, J., van der Marel, N., Dong (董若冰), R., Muto, T., Martin, R. G., et al., 2020, "GW Ori: Interactions between a Triple-star System and Its Circumtriple Disk in Action," *The Astrophysical Journal*, 895, L18

13. Kim, S., Takahashi, S., Nomura, H., Tsukagoshi, T., Lee, S., et al., 2020, "The Detection of Dust Gapping Structure in the Outer Region of the CR Cha Protoplanetary Disk," *The Astrophysical Journal*, 888, 72
14. Soon, K.-L., Momose, M., Muto, T., Tsukagoshi, T., **Kataoka, A.**, et al., 2019, "Investigating the gas-to-dust ratio in the protoplanetary disk of HD 142527," *Publications of the Astronomical Society of Japan*, 71, 124
15. Matsumoto, M., Tsuchiyama, A., Nakato, A., Matsuno, J., Miyake, A., et al., 2019, "Discovery of fossil asteroidal ice in primitive meteorite Acfer 094," *Science Advances*, 5, eaax5078
16. Tazaki, R., Tanaka, H., **Kataoka, A.**, Okuzumi, S., & Muto, T., 2019, "Unveiling Dust Aggregate Structure in Protoplanetary Disks by Millimeter-wave Scattering Polarization," *The Astrophysical Journal*, 885, 52
17. Tazaki, R., Tanaka, H., Muto, T., **Kataoka, A.**, & Okuzumi, S., 2019, "Effect of dust size and structure on scattered-light images of protoplanetary discs," *Monthly Notices of the Royal Astronomical Society*, 485, 4951
18. Zhu, Z., Zhang, S., Jiang, Y.-F., **Kataoka, A.**, Birnstiel, T., et al., 2019, "One Solution to the Mass Budget Problem for Planet Formation: Optically Thick Disks with Dust Scattering," *The Astrophysical Journal*, 877, L18
19. Coudé, S., Bastien, P., Houde, M., Sadavoy, S., Friesen, R., et al., 2019, "The JCMT BISTRO Survey: The Magnetic Field of the Barnard 1 Star-forming Region," *The Astrophysical Journal*, 877, 88
20. Harrison, R. E., Looney, L. W., Stephens, I. W., Li, Z.-Y., Yang, H., et al., 2019, "Dust Polarization in Four Protoplanetary Disks at 3 mm: Further Evidence of Multiple Origins," *The Astrophysical Journal*, 877, L2
21. Liu, J., Qiu, K., Berry, D., Di Francesco, J., Bastien, P., et al., 2019, "The JCMT BISTRO Survey: The Magnetic Field in the Starless Core ρ Ophiuchus C," *The Astrophysical Journal*, 877, 43
22. Wang, J.-W., Lai, S.-P., Eswaraiah, C., Pattle, K., Di Francesco, J., et al., 2019, "JCMT BISTRO Survey: Magnetic Fields within the Hub-filament Structure in IC 5146," *The Astrophysical Journal*, 876, 42
23. Yang, H., Li, Z.-Y., Stephens, I. W., **Kataoka, A.**, & Looney, L., 2019, "Does HL Tau disc polarization in ALMA band 3 come from radiatively aligned grains?," *Monthly Notices of the Royal Astronomical Society*, 483, 2371
24. Soam, A., Pattle, K., Ward-Thompson, D., Lee, C. W., Sadavoy, S., et al., 2018, "Magnetic Fields toward Ophiuchus-B Derived from SCUBA-2 Polarization Measurements," *The Astrophysical Journal*, 861, 65
25. Hull, C. L. H., Yang, H., Li, Z.-Y., **Kataoka, A.**, Stephens, I. W., et al., 2018, "ALMA Observations of Polarization from Dust Scattering in the IM Lup Protoplanetary Disk," *The Astrophysical Journal*, 860, 82
26. Kwon, J., Doi, Y., Tamura, M., Matsumura, M., Pattle, K., et al., 2018, "A First Look at BISTRO Observations of the ρ Oph-A core," *The Astrophysical Journal*, 859, 4
27. Stephens, I. W., Yang, H., Li, Z.-Y., Looney, L. W., **Kataoka, A.**, et al., 2017, "ALMA Reveals Transition of Polarization Pattern with Wavelength in HL Tau's Disk," *The Astrophysical Journal*, 851, 55
28. Arakawa, S., Tanaka, H., **Kataoka, A.**, & Nakamoto, T., 2017, "Thermal conductivity of porous aggregates," *Astronomy and Astrophysics*, 608, L7
29. Tsukamoto, Y., Okuzumi, S., & **Kataoka, A.**, 2017, "Apparent Disk-mass Reduction and Planetesimal Formation in Gravitationally Unstable Disks in Class 0/I Young Stellar Objects," *The Astrophysical Journal*, 838, 151
30. Gunkelmann, N., **Kataoka, A.**, Dullemond, C. P., & Urbassek, H. M., 2017, "Low-velocity collisions of chondrules: How a thin dust cover helps enhance the sticking probability," *Astronomy and Astrophysics*, 599, L4
31. Tazaki, R., Tanaka, H., Okuzumi, S., **Kataoka, A.**, & Nomura, H., 2016, "Light Scattering by Fractal Dust Aggregates. I. Angular Dependence of Scattering," *The Astrophysical Journal*, 823, 70
32. Muto, T., Tsukagoshi, T., Momose, M., Hanawa, T., Nomura, H., et al., 2015, "Significant gas-to-dust ratio asymmetry and variation in the disk of HD 142527 and the indication of gas depletion," *Publications of the Astronomical Society of Japan*, 67, 122
33. Akiyama, E., Muto, T., Kusakabe, N., **Kataoka, A.**, Hashimoto, J., et al., 2015, "Discovery of a Disk Gap Candidate at 20 AU in TW Hydrae," *The Astrophysical Journal*, 802, L17
34. Fukagawa, M., Tsukagoshi, T., Momose, M., Saigo, K., Ohashi, N., et al., 2013, "Local Enhancement of the Surface Density in the Protoplanetary Ring Surrounding HD 142527," *Publications of the Astronomical Society of Japan*, 65, L14
35. Shinnaga, H., Novak, G., Vaillancourt, J. E., Machida, M. N., **Kataoka, A.**, et al., 2012, "Magnetic Field in the Isolated Massive Dense Clump IRAS 20126+4104," *The Astrophysical Journal*, 750, L29