



TO MAGNIFICO RETTORE OF UNIVERSITA' DEGLI STUDI DI MILANO

ID CODE 6506

I the undersigned asks to participate in the public selection, for qualifications and examinations, for the awarding of a type B fellowship at **Dipartimento di Fisica Aldo Pntremoli, Università degli Studi di Milano**

Scientist- in - charge: Prof. Giovanni Rosotti

**Ryohei Nakatani**

## CURRICULUM VITAE

### PERSONAL INFORMATION

Surname	Nakatani
Name	Ryohei

### PRESENT OCCUPATION

Appointment	Structure
JSPS Oversea Fellow	NASA Jet Propulsion Laboratory, Pasadena, USA

### EDUCATION AND TRAINING

Degree	Course of studies	University	year of achievement of the degree
Degree	Physics	Osaka University	2014
PhD	Physics	The University of Tokyo	2019
Master	Physics	The University of Tokyo	2016

### REGISTRATION IN PROFESSIONAL ASSOCIATIONS

Date registration	of Association	City
Jun 9, 2015	The Astronomical Society of Japan	Mitaka, Tokyo

### FOREIGN LANGUAGES

Languages	level of knowledge
Japanese	Native



English	Proficient
German	Elementary proficiency

## AWARDS, ACKNOWLEDGEMENTS, SCHOLARSHIPS

Year	Description of award
2022	RIKEN Special Postdoctoral Researcher (SPDR) Presentation Award for Outstanding Research Activities (category: Physics II)
2022	Japan Society for Promotion of Science (JSPS) fellowship for overseas research
2022	JSPS postdoctoral fellowship for domestic research
2021	JSPS postdoctoral fellowship for domestic research
2019	Advanced Leading Graduate Course for Photon Science (ALPS) Program at the University of Tokyo (Completion)
2019	RIKEN SPDR fellowship
2016	JSPS fellowship for young scientists (category: DC1)
2014	ALPS fellowship

## TRAINING OR RESEARCH ACTIVITY

<p>Outreach</p> <ul style="list-style-type: none"><li>Aug 2023: “ロサンゼルスで暮らす人々：仲谷峻平（NASA 科学者）” (Interview), Publisher: LA LA LA USA, <a href="https://lalalauusa.com/archives/42067">https://lalalauusa.com/archives/42067</a></li><li>Aug 2022: 「惑星の形成現場に冷たい陰」 (Press release), Publisher: RIKEN, <a href="https://www.riken.jp/press/2022/20220819_2/index.html">https://www.riken.jp/press/2022/20220819_2/index.html</a></li><li>Nov 2021: クローズアップ科学道：「惑星形成シナリオに新展開」 (interview), Publisher: RIKEN, <a href="https://www.riken.jp/pr/closeup/2021/20211101_1/index.html">https://www.riken.jp/pr/closeup/2021/20211101_1/index.html</a></li><li>Jul 2021: 「惑星の母天体、実は長生き？」 (Press release), Publisher: RIKEN &amp; Nagoya University, <a href="https://www.riken.jp/press/2021/20210712_1/index.html">https://www.riken.jp/press/2021/20210712_1/index.html</a></li><li>Jan 2021: 「惑星は恒星と同時に作られていく？」 (Press release), Publisher: RIKEN &amp; Nagoya University &amp; ASIAA (Jan 22, 2021), <a href="https://www.riken.jp/press/2021/20210122_1/index.html">https://www.riken.jp/press/2021/20210122_1/index.html</a></li></ul> <p>Mentor &amp; Teaching Experiences</p> <ul style="list-style-type: none"><li>Dec 2023-Present: Mentoring a Master's student at Kyoto University</li><li>Apr 2019-Mar 2023: Mentoring a Ph.D. student at the University of Tokyo</li><li>Oct 2019-Present: Mentoring a Ph.D. student at the University of Tokyo</li><li>Oct 2015-Mar 2016: Teaching assistant for a lecture on analytic mechanics at the University of Tokyo</li><li>Apr 2016-Sep 2016: Teaching assistant for a lecture on fluid dynamics at the University of Tokyo</li></ul> <p>Conference SOC</p>
---



- Dec 2021: “Star and Planet Formation in Low-Metallicity Environments”, online meeting, Japan

## Reviewer experiences

- Monthly Notices of the Royal Astronomical Society
- The Astrophysical Journal
- Astronomy & Astrophysics

## Programming skills

- Programming languages: C, Python, LaTeX, Unix, Linux, Make, C++ (read-only), Fortran (read-only)
- Code developments: hydrodynamics, radiative transfer, chemistry, GUI python applications
- Often-used software: PLUTO (Mignone 2007, 2011), VisIt, Blender

## PROJECT ACTIVITY

Year	Project
N/A	N/A

## PATENTS

Patent
Non

## CONGRESSES AND SEMINARS

Date	Title	Place
Dec 2023	Gas-Rich Debris Disks’ Origins in Slow Photoevaporation Around Intermediate-Mass Stars	Nagoya University, Nagoya, Japan
Nov 2023	Gas-Rich Debris Disks’ Origins in Slow Photoevaporation Around Intermediate-Mass Stars	University of Arizona, Tucson, USA
Oct 2023	Molecular Photoevaporative Winds	Institut Pascal, Paris-Saclay, France
Aug 2023	Gas-Rich Debris Disks’ Origins in Slow Photoevaporation Around Intermediate-Mass Stars	Jet Propulsion Laboratory, Pasadena, USA
Jun 2023	Evolution from Protoplanetary Disk to Debris Disk: Effects of Photoevaporation	Sheraton Hotel, Pasadena, USA
Jan 2023	How Protoplanetary Disks Evolve to Planetary Systems: Disk-Dispersal Processes	National Observatory of Japan, Mitaka, Japan
Jul 2021	Photoevaporation of Protoplanetary Disks: Revisiting the Underlying Physics and a	Osaka University, Osaka, Japan



	Newly-Found Link to Formation of Gas-Rich Debris Disks	
Jun 2021	Revisiting the Underlying Physics for Photoevaporation of Protoplanetary Disks: Towards Generic Understanding	National Observatory of Japan, Mitaka, Tokyo, Japan
Jun 2021	Photoevaporation of Protoplanetary Disks: Revisiting the Underlying Physics and the Gravitational Radius	National Observatory of Japan, Mitaka, Tokyo, Japan
Nov 2020	Photoevaporation of Grain-Depleted Protoplanetary Disks around Intermediate-Mass Stars: Investigating Possibility of Gas-Rich Debris Disks as Protoplanetary Remnants	Online, Berlin & Tübingen, Germany
Oct 2020	Radiation Hydrodynamics Simulations of Photoevaporating Disks: Dependencies on Disk Properties	Online, München, Germany
May 2020	Radiation Hydrodynamics Simulations of Photoevaporating Protoplanetary Disks with Multi-Metallicity Chemistry	Potsdam, Germany
Jul 2018	Radiation Hydrodynamics Simulations of Photoevaporation of Protoplanetary Disks: Metallicity Dependence	National Observatory of Japan, Mitaka, Tokyo, Japan
Jan 2018	Radiation Hydrodynamics Simulations of Photoevaporation of Protoplanetary Disks: Metallicity Dependence	Osaka University, Osaka, Japan
Jun 2017	Radiation-Hydrodynamical Simulations of Photoevaporating Protoplanetary Disks with Various Metallicities	University of Tübingen, Tübingen, Germany
Mar 2015- Feb 2022	(Other 46 talks)	USA, Germany, Italy, Vietnam, Teiwan, Japan

## PUBLICATIONS

Books
Non

Articles in reviews
<b>(i) Lead-author papers</b>
<ol style="list-style-type: none"><li>1. <b>Riouhei Nakatani</b>, Neal J. Turner, Yasuhiro Hasegawa, Gianni Cataldi, Yuri Aikawa, Sebastián Marino, Hiroshi Kobayashi, “A Primordial Origin for the Gas-Rich Debris Disks Around Intermediate-Mass Stars,” <i>The Astrophysical Journal Letters</i>, 959, L28-39 (2023)</li><li>2. <b>Riouhei Nakatani</b> and Shinsuke Takasao, “Anatomy of Photoevaporation Base: Linking the Property of the Launched Wind to Irradiation Flux”, <i>The Astrophysical Journal</i>, 930, 124-137 (2022)</li><li>3. <b>Riouhei Nakatani</b>, Hiroshi Kobayashi, Rolf Kuiper, Hideko Nomura, and Yuri Aikawa, “Photoevaporation of Grain-Depleted Protoplanetary Disks around Intermediate-Mass Stars: Investigating the Possibility of Gas-Rich Debris Disks as Protoplanetary Remnants”, <i>The Astrophysical Journal</i>, 915, 90-111 (2021)</li></ol>



4. **Riouhei Nakatani**, Anastasia Fialkov, and Naoki Yoshida, “Photoevaporation of Minihalos During Cosmic Reionization: Primordial and Metal-enriched Halos”, *The Astrophysical Journal*, 905, 151-168 (2020)
5. **Riouhei Nakatani**, Haiyu Baobab Liu, Satoshi Ohashi, Yichen Zhang, Tomoyuki Hanawa, Claire Chandler, Yoko Oya, and Nami Sakai, “Substructure Formation in a Protostellar Disk of L1527 IRS”, *The Astrophysical Journal Letters*, 895, L2-15 (2020)
6. **Riouhei Nakatani** and Naoki Yoshida, “Photoevaporation of Molecular Gas Clumps Illuminated by External Massive Stars: Clump Lifetimes and Metallicity Dependence”, *The Astrophysical Journal*, 883, 127-142 (2019)
7. **Riouhei Nakatani**, Takashi Hosokawa, Naoki Yoshida, Hideko Nomura, and Rolf Kuiper, “Radiation Hydrodynamics Simulations of Photoevaporation of Protoplanetary Disks II: Metallicity Dependence of UV and X-Ray Photoevaporation”, *The Astrophysical Journal*, 865, 75-87 (2018)
8. **Riouhei Nakatani**, Takashi Hosokawa, Naoki Yoshida, Hideko Nomura, and Rolf Kuiper, “Radiation Hydrodynamics Simulations of Photoevaporation of Protoplanetary Disks by Ultraviolet Radiation: Metallicity Dependence”, *The Astrophysical Journal*, 857, 57-78, (2018)

## ii) Co-author papers

9. Takahiro Oyama, Yuki Ohno, Akemi Tamanai, Yoshimasa Watanabe, Satoshi Yamamoto, Takeshi Sakai, Shaoshan Zeng, **Riouhei Nakatani**, Nami Sakai, “Laboratory Measurement of CH<sub>2</sub>DOH Line Intensities in the Millimeter-wave Region”, *The Astrophysical Journal*, 957, 4-16 (2023)
10. Hiroto Mitani, **Riouhei Nakatani**, Naoki Yoshida, “Physics of the atmospheric escape driven by EUV photoionization heating: Classification of the hydrodynamic escape in close-in planets”, *Winds of Stars and Exoplanets. Proceedings of the International Astronomical Union*, 370, 155-160 (2023)
11. Ayano Komaki, **Riouhei Nakatani**, Naoki Yoshida, “Photoevaporation of Protoplanetary Disks”, *The Predictive Power of Computational Astrophysics as a Discovery Tool. Proceedings of the Virtual Meeting held 8-12 November 2021, originally planned for Chamonix, France. Edited by Dmitry Bisikalo, Dmitri Wiebe and Christian Boily. Proceedings of the International Astronomical Union*, 362, 294-299 (2023)
12. Hiroto Mitani, **Riouhei Nakatani**, Naoki Yoshida, “Stellar activity effects on the atmospheric escape of hot Jupiters”, *The Predictive Power of Computational Astrophysics as a Discovery Tool. Proceedings of the Virtual Meeting held 8-12 November 2021, originally planned for Chamonix, France. Edited by Dmitry Bisikalo, Dmitri Wiebe and Christian Boily. Proceedings of the International Astronomical Union*, 362, 158-163 (2023)
13. Satoshi Ohashi, **Riouhei Nakatani**, Haiyu Baobab Liu, Hiroshi Kobayashi, Yichen Zhang, Tomoyuki Hanawa, Nami Sakai “Formation of Dust Clumps with Sub-Jupiter Mass and Cold Shadowed Region in Gravitationally Unstable Disk around Class 0/I Protostar in L1527 IRS”, *The Astrophysical Journal*, 934, 163-179 (2022)
14. Vastel, C., et al. “FAUST. V. Hot methanol in the [BHB2007] 11 protobinary system; hot corino versus shock origin”, *Astronomy & Astrophysics*, 664, A171-187 (2022)
15. Muneaki Imai, et al. “Chemical and Physical Characterization of the Isolated Protostellar Source CB68: FAUST IV”, *The Astrophysical Journal*, 934, 70-77 (2022)
16. Yuki Ohno, Takahiro Oyama, Akemi Tamanai, Shaoshan Zeng, Yoshimasa Watanabe, **Riouhei Nakatani**, Takeshi Sakai, and Nami Sakai, “Laboratory Measurement of Millimeter-wave Transitions of <sup>13</sup>CH<sub>2</sub>DOH for Astronomical Use”, *The Astrophysical Journal*, 932, 101-108 (2022)
17. Hiroto Mitani, **Riouhei Nakatani**, and Naoki Yoshida, “Stellar wind effect on the atmospheric escape of hot Jupiters and their Ly  $\alpha$  and H  $\alpha$  transits”, *MNRAS*, 512, 855-860 (2022)
18. Kohei Inayoshi, **Riouhei Nakatani**, Daisuke Toyouchi, Takashi Hosokawa, Rolf Kuiper, and Masafusa Onoue, “Rapid Growth of Seed Black Holes during Early Bulge Formation”, *The Astrophysical Journal*, 927, 237-257 (2022)
19. Satoshi Ohashi, et al. “Misaligned Rotations of the Envelope, Outflow, and Disks in the Multiple Protostellar System of VLA 1623-2417: FAUST. III”, *The Astrophysical Journal*, 927, 54-75 (2022)
20. Akemi Tamanai, Yoshimasa Watanabe, Takeshi Sakai, **Riouhei Nakatani**, Shaoshan Zeng, Satoshi Yamamoto, Nami Sakai, “Experimental Molecular Emission Spectroscopy of Ethylene Oxide in ALMA Band 6”, *Workshop on Interstellar Matter 2021, Institute of Low Temperature Science, Hokkaido*



University, November 17-19, 2021, id. 1 (2021)

21. Ayano Komaki, **Riouhei Nakatani**, and Naoki Yoshida, “Radiation Hydrodynamics Simulations of Protoplanetary Disks: Stellar Mass Dependence of the Disk Photoevaporation Rate”, *The Astrophysical Journal*, 910, 51-62 (2021)
22. Yuki Okoda, Yoko Oya, et al., “FAUST. II. Discovery of a Secondary Outflow in IRAS 15398-3359: Variability in Outflow Direction during the Earliest Stage of Star Formation?”, *The Astrophysical Journal*, 910, 11-23 (2021)
23. Satoshi Ohashi, Hiroshi Kobayashi, **Riouhei Nakatani**, Satoshi Okuzumi, Hidekazu Tanaka, Koji Murakawa, Yichen Zhang, Haiyu Baobab Liu, and Nami Sakai, “Ring Formation by Coagulation of Dust Aggregates in the Early Phase of Disk Evolution around a Protostar,” *The Astrophysical Journal*, 907, 80-91 (2021)
24. Hiroto Mitani, **Riouhei Nakatani**, Naoki Yoshida, “Stellar wind effect on the atmospheric escape of hot Jupiters”, American Geophysical Union, Fall Meeting 2020, abstract #P011-05 (2020)
25. Lizzandra Flores-Rivera, Mario Flock, and **Riouhei Nakatani**, “Hydrodynamical simulations of protoplanetary disks including irradiation of stellar photons. I. Resolution study for vertical shear instability”, *Astronomy & Astrophysics*, 644, 50-57 (2020)
26. E. Bianchi, et al., “FAUST I. The hot corino at the heart of the prototypical Class I protostar L1551 IRS5”, *Monthly Notices of the Royal Astronomical Society: Letters*, 498, L86-92 (2020)

Daisuke Toyouchi, Takashi Hosokawa, Kazuyuki Sugimura, **Riouhei Nakatani**, and Rolf Kuiper, “Super-Eddington accretion of dusty gas onto seed black holes: metallicity-dependent efficiency of mass growth,” *Monthly Notices of the Royal Astronomical Society*, 483, 2031-2043 (2019)

### (iii) Co-author papers (non-refereed)

27. Ayano Komaki, **Riouhei Nakatani**, Rolf Kuiper, and Naoki Yoshida, “The effect of ultra-violet photon pumping of H<sub>2</sub> in dust-deficient protoplanetary disks”, arXiv:2202.02804
28. Hiroto Mitani, **Riouhei Nakatani**, and Naoki Yoshida, “Atmospheric Escape of Close-in Giants around Hot Stars: Far-Ultraviolet Radiation and Photoelectric Heating Effect,” arXiv-eprint, arXiv:2005.08676

Congress proceedings

Non

### OTHER INFORMATION

References

Dr. Neal J. Turner, NASA Jet Propulsion Laboratory, [neal.j.turner@jpl.nasa.gov](mailto:neal.j.turner@jpl.nasa.gov)

Prof. Takashi Hosokawa, Kyoto University, [hosokawa@tap.scphys.kyoto-u.ac.jp](mailto:hosokawa@tap.scphys.kyoto-u.ac.jp)

Dr. Nami Sakai, RIKEN, [nami.sakai@riken.jp](mailto:nami.sakai@riken.jp)

Declarations given in the present curriculum must be considered released according to art. 46 and 47 of DPR n. 445/2000.

The present curriculum does not contain confidential and legal information according to art. 4, paragraph 1, points d) and e) of D.Lgs. 30.06.2003 n. 196.

Please note that CV WILL BE PUBLISHED on the University website and It is recommended that personal and sensitive data should not be included. This template is realized to satisfy the need of publication without personal and sensitive data.



Please DO NOT SIGN this form.

Place and date: \_\_\_\_\_, \_\_\_\_\_