Jason Kristiano

Ph.D. Student in Theoretical Physics.

Research Center for the Early Universe (RESCEU), Graduate School of Science,
The University of Tokyo, Hongo 7-3-1, Bunkyo-ku, Tokyo 113-0013, Japan.

jkristiano@resceu.s.u-tokyo.ac.jp

Research Interest

Quantum field theory of fluctuations generated during cosmic inflation.

Keywords: Cosmic Inflation, Cosmological Perturbations, Quantum Field Theory in Curved Spacetime, Cosmological Bootstrap, and Primordial Black Holes.

Personal

- Year of Birth: 1997.
- Place of Birth: Jakarta, Indonesia.
- Nationality: Indonesia.
- Pronoun: He/Him/His.
- Language: Indonesian (Native), English (CEFR C1), and Japanese (Passed N3).

Education

Doctor of Philosophy (Ph.D.) in Physics 2021/10–

- Institution: Department of Physics, The University of Tokyo.
- Supervisor: Prof. Jun'ichi Yokoyama.
- Support: JSPS DC1 Fellowship and GSGC Scholarship (Partial).

Master of Science (M.Sc.) in Physics 2019/09–2021/09

- Institution: Department of Physics, The University of Tokyo.
- Supervisor: Prof. Jun'ichi Yokoyama.
- Thesis: *Theoretical bound on primordial non-Gaussianity in single-field inflation.*
- Support: MEXT Scholarship and GSGC Scholarship (Inactive).

Bachelor of Science (S.Si.) in Physics 2015/08–2018/08

- Institution: Department of Physics, Universitas Indonesia.
- Supervisor: Prof. Terry Mart.
- Thesis: *Pure spin-3/2 representation for use in particle and nuclear physics.*
- Support: Indonesia International Science Olympiad Scholarship.

Career

JSPS DC1 Research Fellow 2022/04–

- Institution: Department of Physics, The University of Tokyo.

- Supervisor: Prof. Jun'ichi Yokoyama.
- Grant: 2,500,000 JPY for 3 years.
- Project: Cosmological correlators as a probe of fundamental physics.

Research Assistant (Internship) 2019/04–2019/06

- Institution: IBM T. J. Watson Research Center, New York, United States.
- Supervisor: Dr. Oki Gunawan.
- Project: Theoretical aspect of magnetic trap system.

Publication and Preprint

7. J. Kristiano and J. Yokoyama, *Ruling Out Primordial Black Hole Formation From Single-Field Inflation*, arXiv preprint [arXiv:2211.03395].
6. J. Kristiano and J. Yokoyama, *Perturbative region on non-Gaussian parameter space in single-field inflation*, Journal of Cosmology and Astroparticle Physics **07** (2022) 007 [arXiv:2204.05202].
5. J. Kristiano and J. Yokoyama, *Why Must Primordial Non-Gaussianity Be Very Small?*, Physical Review Letters **128**, 061301 (2022) [arXiv:2104.01953].
4. O. Gunawan, J. Kristiano, and H. Kwee, *Magnetic-tip trap system*, Physical Review Research **2**, 013359 (2020) [arXiv:1906.05680].
3. J. Kristiano, R.D. Lambaga, and H.S. Ramadhan, *Coleman-de Luccia tunneling wave function*, Physics Letters B **796**, 225-229 (2019) [arXiv:1808.10110].
2. T. Mart, J. Kristiano, and S. Clymton, *Pure spin-3/2 representation with consistent interactions*, Physical Review C **100**, 035207 (2019) [arXiv:1909.04282].
1. J. Kristiano, S. Clymton, and T. Mart, *Pure spin-3/2 propagator for use in particle and nuclear physics*, Physical Review C (Rapid Communication) **96**, 052201 (2017) [arXiv:1710.07930].

Press Release

1. J. Kristiano and J. Yokoyama, *Quantum nature makes spacetime fluctuations in the early Universe to be very symmetrical*, The University of Tokyo, March 2022 (English and Japanese).

Invited Talk

Conference

1. *Primordial black holes from single-field inflation?*, Cosmology and Particle Astrophysics (CosPA), Asia Pacific Center for Theoretical Physics (APCTP), South Korea, November 2022 (Online).

Seminar

4. *Ruling out primordial black hole formation from single-field inflation*, Department of Physics (C-Lab) Seminar, Nagoya University, Japan, January 2023.
3. *One-loop perturbativity bound as a constraint on single-field inflation and primordial black hole formation*, Department of Physics (High Energy Theory Group) Seminar, The University of Athens, Greece, December 2022 (Online).
2. *One-loop perturbativity bound in single-field inflation*, Department of Physics (Particle Theory Group) Seminar, The University of Tokyo, Japan, November 2022.

1. *What happened before the Big Bang?*, Department of Physics Seminar, Universitas Indonesia, Indonesia, March 2022 (Online).

Contributed Talk

Oral Presentation

12. *Ruling out primordial black hole formation from single-field inflation*, Early Universe Mini-Workshop, Kobe RIKEN, Japan, January 2023.

11. *One-loop perturbativity bound in single-field inflation*, The 31st Workshop on General Relativity and Gravitation in Japan (JGRG), The University of Tokyo, Japan, October 2022.

10. *One-loop perturbativity bound in single-field inflation*, The 26th International Summer Institute on Phenomenology of Elementary Particle Physics and Cosmology, Fuji-Yoshida, Japan, September 2022.

9. *Perturbative region on non-Gaussian parameter space in single-field inflation*, The 78th Physical Society of Japan (JPS) Meeting, Okayama University of Science, Japan, September 2022.

8. *Perturbative region on non-Gaussian parameter space in single-field inflation*, The 15th Asia-Pacific Physics Conference (APPC), South Korea, August 2022 (Online).

7. *Theoretical bound on primordial non-Gaussianity in single-field inflation*, The 77th Physical Society of Japan (JPS) Meeting, Japan, March 2022 (Online).

6. *Theoretical bound on primordial non-Gaussianity in single-field inflation*, The 30th Workshop on General Relativity and Gravitation in Japan (JGRG), Waseda University, Japan, December 2021 (Online).

5. *Theoretical bound on primordial non-Gaussianity in single-field inflation*, Recent Progress of Quantum Cosmology (YITP Workshop), Kyoto University, Japan, November 2021 (Online).

4. *Coleman-de Luccia tunneling wave function*, The 14th Asia-Pacific Physics Conference (APPC), Kuching, Malaysia, November 2019.

3. *Coleman-de Luccia tunneling wave function*, Conference on Theoretical Physics and Nonlinear Phenomena (CTPNP), Makasar, Indonesia, July 2018.

2. *Path integral quantization of an interacting pure spin-3/2 field*, The 4th International Symposium on Current Progress in Mathematics and Sciences (ISCPMS), Depok, Indonesia, July 2018.

1. *Massive particle spin-3/2 propagator*, The 3rd International Symposium on Current Progress in Mathematics and Sciences (ISCPMS), Bali, Indonesia, July 2017.

Poster Presentation

3. *One-loop perturbativity bound in single-field inflation*, 2nd International Symposium on Trans-Scale Quantum Science (TSQS), The University of Tokyo, Japan, November 2022.

2. *Theoretical bound on primordial non-Gaussianity in single-field inflation*, The 24th International Conference on Particle Physics and Cosmology (COSMO), University of Illinois, United States, August 2021 (Online).

1. *Pure spin-3/2 propagator for use in particle and nuclear physics*, The 8th International Conference on Quark and Nuclear Physics (QNP), Tsukuba, Japan, November 2018.

Award

- Poster award, 2nd International Symposium on Trans-Scale Quantum Science (TSQS), The University of Tokyo, Japan, November 2022.
- Graduated *cum laude* with GPA 3.96/4 (the highest over all bachelor graduates) from Universitas Indonesia, August 2018.
- Bronze medal, 46th International Physics Olympiad (IPhO), Mumbai, India, July 2015.
- Honorable mention, 16th Asian Physics Olympiad (APhO), Hangzhou, China, May 2015.

Teaching Experience

- Laboratory Assistant, Advanced Physics Laboratory, Universitas Indonesia (Second Half of 2017, First Half of 2018, and Second Half of 2018).
- Teaching Assistant, Mathematical Physics 1, Universitas Indonesia (First Half of 2017).