Jungjoon Leo Kim

PhD Candidate in Physics at Queen's University

Department of Physics, Engineering Physics & Astronomy
Queen's University
64 Bader Lane, Kingston, ON. K7L 3N6
leo.kim@queensu.ca
jlkim.github.io
0000-0001-8699-834X

Education

2021–Present **PhD, Physics**, *Queen's University*, Kingston, ON, Canada.
2019–2021 **MMath, Applied Mathematics**, *University of Waterloo*, Waterloo, ON, Canada.
2014–2019 **BMath, Mathematical Physics**, *University of Waterloo*, Waterloo, ON, Canada.

Honours & Awards

2022-2025	NSERC Canada Graduate Scholarship – Doctoral (CGS D)	*$105,000*
2023	Harold M. Cave Graduate Travel Scholarship	*$1,000*
2021	University of Waterloo Applied Math Outstanding Teaching Assistant Award	*$500*
2018	NSERC Undergraduate Student Research Award	*$4,500*
2016	NSERC Undergraduate Student Research Award [Declined]	*$4,500*
2014	Adel S. Sedra Entrance Scholarship	*$3,000*
2014	University of Waterloo President's Scholarship	*$1,500*

Research Experience

2021–Present **Graduate Research Assistant**, *Queen's University*, Kingston, ON, Canada.
Advisor: Joseph Bramante
Thesis: TBD

2019–2021 **Graduate Research Assistant**, *University of Waterloo*, Waterloo, ON, Canada.
Advisor: Ghazal Geshnizjani
Thesis: Spectrum of Cuscuton Bounce and Cosmological Parameter Inference Using Dark Sirens

2019 **Undergraduate Research Assistant**, *McGill University*, Montréal, QC, Canada.
Advisor: Gantumur Tsogtgerel
Project: Quadrilateral Regge Elements

2018 **Undergraduate Research Assistant**, *University of Waterloo*, Waterloo, ON, Canada.
Advisor: Ghazal Geshnizjani
Project: Power Spectrum for Cuscuton Bounce

2016 **Undergraduate Researcher**, *Institute for Quantum Computing*, Waterloo, ON, Canada.
Advisor: Kyung Soo Choi
Project: PID Controllers for ECDL Frequency Stabilization

Publications and Preprints

* indicates non-alphabetical ordering of authors

5. J. Bramante, M. Diamond, C. V. Cappiello, **J. L. Kim**, Q. Liu and A. C. Vincent, *Collapsed Dissipative Dark Matter Forming Compact Objects and Delayed Primordial Black Holes*, In preparation.

4. A. Dehghani, **J. L. Kim***, D. Sadat Hosseini, A. Krolewski, S. Mukherjee and G. Geshnizjani, *The Gravitational Wave Bias Parameter from Angular Power Spectra: Bridging Galaxy Properties with Binary Black Holes*, In preparation.

3. D. Sadat Hosseini, A. Dehghani, **J. L. Kim***, A. Krolewski, S. Mukherjee and G. Geshnizjani,

Connecting Galaxies and Black Holes with the Gravitational Wave Bias Parameter from 3D Power Spectra, In preparation.

2. J. Bramante, M. Diamond and **J. L. Kim**, *The effect of multiple cooling channels on the formation of dark compact objects*, *JCAP* **02** (2024) 002 [2309.13148].

1. **J. L. Kim*** and G. Geshnizjani, *Spectrum of Cuscuton Bounce*, *JCAP* **03** (2021) 104 [2010.06645].

Presentations

Feb 2024 **Contributed Talk**, *Dark Matter, First Light – Perimeter Institute for Theoretical Physics*, Waterloo, ON, Canada.
"The effect of multiple cooling channels on the formation of dark compact objects"

Feb 2024 **Talk**, *Astroparticle Group Meeting – Queen's University*, Kingston, ON, Canada.
"The effect of multiple cooling channels on the formation of dark compact objects"

May 2023 **Contributed Talk**, *PHENO 2023 – University of Pittsburgh*, Pittsburgh, PA, USA.
"More Ways to (Be) Cool: Compact Objects from Inelastic Dark Matter"

Aug 2022 **Contributed Talk**, *TeVPA 2022 – Queen's University*, Kingston, ON, Canada.
"A Poisson Log-Normal Framework for Cosmological Parameter Inference Using Dark Sirens"

Nov 2020 **Poster and Lightning Talk**, *The 9th KIAS Workshop on Cosmology and Structure Formation (online) – Korea Institute for Advanced Study*, Seoul, South Korea.
"Power spectrum for scalar and tensor perturbations in Cuscuton bounce"

Jun 2020 **Talk**, *Applied Mathematics Graduate Seminar (online) – University of Waterloo*, Waterloo, ON, Canada.
"Towards scale invariance in Cuscuton bounce"

Jun 2020 **Talk**, *Cosmology group meeting (online) – Perimeter Institute for Theoretical Physics*, Waterloo, ON, Canada.
"Towards scale invariance in Cuscuton bounce"

Aug 2018 **Contributed Talk**, *Mathematics and Statistics Undergraduate Research Conference – McGill University*, Montréal, QC, Canada.
"Quadrilateral Regge elements"

Aug 2018 **Contributed Talk**, *Applied Mathematics Undergraduate Research Mini-Conference – University of Waterloo*, Waterloo, ON, Canada.
"Power spectrum for Cuscuton bounce" (Awarded best presentation)

Conference & Workshop Participation

2024 Dark Matter, First Light – *Perimeter Institute for Theoretical Physics*

2023 TRISEP 2023 – *Perimeter Institute for Theoretical Physics*

2023 PHENO 2023 – *University of Pittsburgh*

2022 TeVPA 2022 – *Queen's University*

2022 New Horizons in Astro and Particle Theory Workshop – *Queen's University*

2022 Gravitational Waves Beyond the Boxes II – *Perimeter Institute for Theoretical Physics*

2021 IV Joint ICTP-Trieste/ICTP-SAIFR School on Cosmology (virtual) – *ICTP-SAIFR*

2021 Astrostatistics Summer School XVI (virtual) – *Penn State University*

2020 The 9th KIAS Workshop on Cosmology and Structure Formation (virtual) – *KIAS*

2020 Cosmology from Home 2020 (virtual) – *Cosmology from Home*

2020 Michigan Cosmology Summer School (virtual) – *University of Michigan*

2019 Mathematics and Statistics Undergraduate Research Conference – *McGill University*

2018 Applied Mathematics Undergraduate Research Mini-Conference – *University of Waterloo*

Mentoring & Teaching

Mentoring

2020 **Summer Undergraduate Research Project**, *University of Waterloo and Perimeter Institute for Theoretical Physics*, Waterloo, ON, Canada.
Project: Cross-correlation of the Astrophysical Gravitational Wave Background with Galaxy Surveys
Mentees: Kieana Fana (Waterloo), Jordan Krywonos (Perimeter), Madison Tindall (Perimeter)

Teaching

2021-Present **Graduate Teaching Assistant**, *Queen's University*, Kingston, ON, Canada.
- PHYS 345: Quantum Physics of Atoms, Nuclei and Particles (Winter 2022, 2023, 2024)
- Physics Help Desk (Winter 2024)
- APSC 112: Physics II (Winter 2023)
- PHYS 316: Methods in Mathematical Physics I (Fall 2021, Fall 2022)
- PHYS 344: Introduction to Quantum Mechanics (Fall 2021)

2019–2021 **Graduate Teaching Assistant**, *University of Waterloo*, Waterloo, ON, Canada.
- MATH 674: Special Relativity for Teachers (Spring 2021)
- AMATH 373: Quantum Theory 1 (Winter 2021)
- MATH 228: Differential Equations for Physics and Chemistry (Winter 2021)
- AMATH 456: Calculus of Variations (Fall 2020)
- MATH 636: Linear Algebra for Teachers (Spring 2020)
- AMATH 353: Partial Differential Equations 1 (Winter 2020)
- MATH 217: Calculus 3 for Chemical Engineering (Winter 2020)
- MATH 115: Linear Algebra for Engineering (Fall 2019)

2016–2020 **Private Tutor**, *Self-employed*, Waterloo, ON, Canada.
- MTE 203: Advanced Calculus (Mechatronics)
- MATH 124: Calculus for Kinesiology
- MATH 127: Calculus for Honours Science
- PHYS 112: Physics 2
- PHYS 115: Mechanics for Engineering
- PHYS 121: Mechanics for Honours Physics
- MCAT Physics

2016–2019 **Undergraduate Teaching Assistant**, *University of Waterloo*, Waterloo, ON, Canada.
- MATH 137: Calculus 1 for Honours Mathematics (Fall 2016, Fall 2018)
- MATH 138: Calculus 2 for Honours Mathematics (Winter 2017, Winter 2019)
- ECE 206: Advanced Calculus 2 for Electrical Engineers (Fall 2017)

Outreach

2023-Present **Co-Founder, Graduate Mentor, Executive Member**, *Queen's Physics upper-year Undergraduate Mentorship Program (Q-PUMP), Queen's University*, Kingston, ON, Canada.

2022-Present **Public Education Specialist**, *Arthur B. McDonald Canadian Astroparticle Physics Research Institute, Queen's University*, Kingston, ON, Canada.

2023 **Volunteer**, *Science Rendezvous Kingston*, Kingston, ON, Canada.

2023 **Summer Camp Counsellor**, *IDEAS Initiative, Queen's University*, Kingston, ON, Canada.

Institutional Service

2022-Present **Colloquium Committee Graduate Representative**, *Graduate Physics Society, Queen's University*, Kingston, ON, Canada.

2022 **Volunteer**, *TeVPA 2022, Queen's University*, Kingston, ON, Canada.