

Jack Hollis Farrell

jack.farrell@colorado.edu University of Colorado Boulder
<https://jackfarrell.ca> Department of Physics
[GitHub](#)

EDUCATION

- Ph.D. Physics*, University of Colorado Boulder 2021–Present
- Advisor: Prof. Andrew Lucas
 - GPA 4.00/4.00
- Honours B.Sc. Physics*, University of Toronto 2017–2021
- Major in Physics, Minors in Mathematics and English.
 - GPA 3.96/4.00

TEACHING

- Instructor of Record*, University of Colorado Boulder
- PHYS 1400: Fundamentals of Scientific Inquiry ([student projects](#)) ([slides](#)) 2025
- Guest Lecturer*, University of Colorado Boulder
- PHYS 5210: Graduate Classical Mechanics 2024
 - PHYS 4410: Quantum Mechanics II 2023
- Teaching Assistant*, University of Colorado Boulder
- PHYS 1125 2023
 - PHYS 1110 2023
 - PHYS 1110 2022
 - PHYS 1110 2021
- Teaching Assistant*, University of Toronto 2020–2021
- Extra help for programming in `Python` for physics majors
- Physics Tutor*, Victoria College Physics Tutors 2019–2020
- Extra help for first- and second-year physics classes

INVITED TALKS

1. *Generalized Time-Reversal Symmetry and Effective Theories for Nonequilibrium Matter*, CTQM Seminar, Center for Theory of Quantum Matter (2024). [slides](#)

CONTRIBUTED PRESENTATIONS

1. *(title forthcoming)*, APS Global Physics Summit (2026) — Oral presentation. [slides](#)
2. *Endpoint of a Ballistic Dyakonov-Shur Instability*, APS March Meeting (2025) — Oral presentation. [slides](#)

3. *Generalized Time-Reversal Symmetry and Effective Theories for Nonequilibrium Matter*, UQM: Ultra Quantum Matter (2024) — Poster Presentation. [poster](#)
4. *Effective Theories for Nonequilibrium Matter*, APS March Meeting (2024) — Oral presentation. [slides](#)
5. *Hydrodynamics with Helical Symmetry*, APS March Meeting (2023) — Oral presentation. [slides](#)

HONOURS

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| <i>University of Toronto BMO National Scholarship</i> | 2017–2021 |
| <ul style="list-style-type: none"> • Full scholarship to U of T, covering tuition and living fees for four years. | |
| <i>NSERC Canada Graduate Scholarship (CGS-M), NSERC</i> | 2021 |
| <ul style="list-style-type: none"> • Declined: offered at U of T, UBC, University of Waterloo / Perimeter Institute. • Research grant for first-year Ph.D. students. | |
| <i>NSERC Undergraduate Summer Research Award</i> | 2020 |
| <ul style="list-style-type: none"> • Project: <i>Computational Electron Hydrodynamics</i> • Supervisors: Prof. Thomas Scaffidi & Prof. Nicolas Grisouard | |
| <i>Hymie and Roslyn Mida Award in Theoretical Physics</i> | 2020 |
| <ul style="list-style-type: none"> • Award for outstanding research potential in theoretical physics. | |
| <i>NSERC Undergraduate Summer Research Award</i> | 2019 |
| <ul style="list-style-type: none"> • Project: <i>Balloon-Borne Spectrometer Mission</i> • Supervisor: Prof. Kaley A. Walker | |
| <i>University of Toronto Scholar</i> | 2018–2019 |
| <ul style="list-style-type: none"> • The University of Toronto Scholars Program recognizes exceptional students in first, second, or third year. | |

PUBLICATIONS

1. Johannes Geurs, Tatiana A. Webb, Yinjie Guo, Itai Keren, **Jack H. Farrell**, Jikai Xu, Kenji Watanabe, Takashi Taniguchi, Dmitri N. Basov, James Hone, Andrew Lucas, Abhay Pasupathy, Cory R. Dean. *Supersonic flow and hydraulic jump in an electronic de Laval nozzle* (2023), arXiv: [2509.16321](#)
2. **Jack H. Farrell**, Xiaoyang Huang, Aaron J. Friedman, Isabella Zane, Paolo Glorioso, and Andrew Lucas. *Generalized time-reversal symmetry and effective theories for nonequilibrium matter* (2023), arXiv: [2310.12233](#)
3. **Jack H. Farrell**, Xiaoyang Huang, and Andrew Lucas. *Hydrodynamics with Helical Symmetry* (2022), arXiv: [2208.12269](#)
4. **Jack H. Farrell**, Nicolas Grisouard, and Thomas Scaffidi. *Terahertz Radiation from the Dyakonov-Shur Instability of Hydrodynamic Electrons in a Corbino Geometry* (2022), arXiv: [2112.07683](#)