

THOMAS G. KIELY

ADDRESS: 8 Country Club Rd, Apt 27
Ithaca, NY 14853
PHONE: (973) 508-9076
EMAIL: tgk37@cornell.edu
PUBLICATIONS: [Google Scholar](#), [ORCID](#)
PERSONAL WEBSITE: thomas-kiely.github.io

EDUCATION

Aug. 2018 – Present	PH.D. IN PHYSICS Cornell University Thesis Advisor: Erich Mueller
Aug. 2018 – Mar. 2021 A Exam	M.S. IN PHYSICS Cornell University Q1 , Q2 , Q3
Aug. 2014 – May 2018 Senior Thesis	B.S. IN PHYSICS, B.A. IN ITALIAN, MINOR IN PHILOSOPHY Georgetown University <i>Summa Cum Laude</i> GPA: 3.96 Overall; 4.0 Physics; 4.0 Italian Quantum Simulators with Trapped Ions: Two Examples Thesis Advisor: James Freericks
Aug. 2016 – Dec. 2016	SEMESTER AT University of Bologna Direct Matriculation GPA: 4.0 (equivalent)

HONORS AND AWARDS

May 2023	Douglas Fitch Memorial Award to enable international travel to study, pursue research, or partake in Physics-related events
April 2023	DAMOP Travel Award to attend the APS DAMOP 2023 meeting in Spokane, Washington
May 2018	Undergraduate Research Award for depth and impact of written and oral presentation of undergraduate senior thesis
May 2018	Kidwell Medal for excellence in undergraduate Physics coursework
May 2018	Dante Award for excellence in undergraduate Italian coursework
May 2018	Phi Beta Kappa
April 2013	National Merit Finalist

RESEARCH EXPERIENCE

Aug. 2018 – Present	Laboratory of Atomic and Solid State Physics, Cornell University Graduate Research Assistant with Erich Mueller <ul style="list-style-type: none">Studied a wide range of problems with applications to quantum simulation with ultracold atoms, including transport and superfluidity in low-dimensions, topology, frustration and long-range interactions. Utilized a combination of analytic and numerical techniques with a particular focus on infinite tensor network methods.Collaborated on problems relevant to strongly-correlated materials, namely Sr_2RuO_4 and van der Waals heterostructures.
Jan. 2015 – May 2018	Georgetown University Undergraduate Research Assistant with James Freericks <ul style="list-style-type: none">Studied two problems with direct relevance to quantum simulation with trapped ions.

PUBLICATIONS

5. *Role of conservation laws in the density matrix renormalization group*
TGW and Erich J. Mueller
[Phys. Rev. B **106**, 235126 \(2022\)](#)
[arXiv:2207.03465](#)
4. *Strong Increase in Ultrasound Attenuation Below T_c in Sr_2RuO_4 : Possible Evidence for Domains*
Sayak Ghosh, TGW, Arkady Shekhter, F. Jerzembeck, N. Kikugawa, Dmitry A. Sokolov, A. P. Mackenzie and B. J. Ramshaw
[Phys. Rev. B **106**, 024520 \(2022\)](#)
[arXiv:2109.00041](#)
3. *Superfluidity in the one-dimensional Bose-Hubbard model*
TGW and Erich J. Mueller
[Phys. Rev. B **105**, 134502 \(2022\)](#)
[arXiv:2202.0066](#)
2. *Transport in the 2D Fermi-Hubbard Model: Lessons from Weak Coupling*
TGW and Erich J. Mueller.
[Phys. Rev. B **104**, 165143 \(2021\) \[Editor's Suggestion\]](#)
[arXiv:2106.04479](#)
1. *Relationship between the transverse-field Ising model and the XY model via the rotating-wave approximation*
TGW and J. K. Freericks
[Phys. Rev. A **97**, 023611 \(2018\)](#)
[arXiv:1711.04386](#)

PRESS ON RESEARCH

Phys. Rev. B **104**, 165143 (2021) [Editor's Suggestion]

- "Weak coupling shows flaw in strange metal model" (Cornell Chronicle)
- "Weak coupling shows flaw in strange metal model" (Phys.org)

PREPRINTS

- *Bandwidth-tuned Wigner-Mott Transition at $\nu = 1/5$: an Infinite Matrix Product State Study*
TGW and Debanjan Chowdhury
[arXiv:2305.13355](#)

CONFERENCE TALKS AND POSTERS

APS DAMOP Meeting, Jun. 5-9, 2023, Spokane, WA

- TGW and Erich J. Mueller. "Transport in the 2D Fermi-Hubbard Model: Lessons from Weak Coupling." (Contributed Talk)
- TGW and Erich J. Mueller. "Transport in the mass-imbalanced 1D Fermi-Hubbard model." (Poster)

International Conference on Atomic Physics, Jul. 18-22, 2022, Toronto, ON

- TGW and Erich J. Mueller. "Transport in the 2D Fermi-Hubbard Model: Lessons from Weak Coupling." (Poster)

APS March Meeting, Mar. 14-18, 2022, Chicago, IL

- TGW and Erich J. Mueller. "Superfluidity in the 1D Bose-Hubbard model." (Poster and Contributed Talk)

Boulder School for Condensed Matter and Materials Physics: Ultracold Matter, Jul. 5-30, 2021, Boulder, CO

- TGW and Erich J. Mueller. "Superfluidity in the 1D Bose-Hubbard model." (Poster)

ARO/AFOSR MURI Quantum Matter Grant Review, Oct. 15, 2019, Amherst, MA

- TGW and Erich J. Mueller. "Umklapp Scattering gives rise to T-Linear Resistivity in the Hubbard Model." (Poster)

TEACHING EXPERIENCE

Spring 2023

PHYS-2214: PHYSICS III: OSCILLATIONS, WAVES, AND QUANTUM PHYSICS
Course Instructor: Glenn Case (Cornell)

Lead two discussion sections and a lab section, created weekly quizzes, graded homework, proctored and graded exams

Fall 2023	PHYS-7653: STATISTICAL PHYSICS II Course Instructor: Chao-Ming Jian (Cornell) Graded and wrote solutions to problem sets
Spring 2022	PHYS-2213: PHYSICS II: ELECTROMAGNETISM Course Instructor: Alan Giambattista (Cornell) Lead three discussion sections and twice weekly office hours, graded homework, proctored and graded exams
Fall 2020	PHYS-2213: PHYSICS II: ELECTROMAGNETISM Course Instructor: Ivan Bazarov (Cornell) Course held entirely online; lead three discussion sections and twice weekly office hours, graded homework, proctored and graded exams
Spring 2020	PHYS-1102: GENERAL PHYSICS II Course Instructor: Nick Taylor (Cornell) Staffed a flipped, self-taught classroom for 15hrs per week, set up student-run labs, graded lab notebooks, proctored and graded exams. Taught extensively over Zoom due to COVID
Spring 2019	PHYS-2208: FUNDAMENTALS OF PHYSICS II Course Instructor: Glenn Case (Cornell) Lead two discussion sections and a lab section, created weekly quizzes, graded homework, proctored and graded exams
Fall 2018	PHYS-1101: GENERAL PHYSICS I Course Instructor: Nick Taylor (Cornell) Staffed a flipped, self-taught classroom for 15hrs per week, set up student-run labs, graded lab notebooks, proctored and graded exams
Fall 2017	PHYS-251: INTERMEDIATE MECHANICS Course Instructor: Peter Olmsted (Georgetown) Held office hours, lead a weekly tutorial, graded problem sets, proctored exams
Fall 2015	PHYS-153: RELATIVITY AND QUANTUM PHYSICS Course Instructor: Joseph Serene (Georgetown) Held office hours, graded problem sets

EXTRACURRICULAR ACTIVITIES

April 2020	CORNELL EXPANDING YOUR HORIZONS CONFERENCE Workshop Co-Leader: "Physics of Bubbles"
Jun. 2019 – May 2020	CORNELL GRADUATE PEER MENTOR
Aug. 2014 – May 2018	GEORGETOWN MEN'S VARSITY LIGHTWEIGHT ROWING
Aug. 2014 – May 2018	GEORGETOWN CIRCOLO ITALIANO Treasurer (2017-2018)
June 2015 – Dec. 2015	GEORGETOWN PHYSICS PEER ADVISOR

TECHNICAL SKILLS

Programming Languages	Python, C++, Julia, Java, Mathematica
CAD	SolidWorks

LANGUAGES

English:	Native
Italian:	Fluent (non-Native)