

SARAH R. GELLER

🏠 MIT Center for Theoretical Physics (6-415), ✉ sgeller@mit.edu, ☎ (617) 548-1579, 🌐 sgellerphysics.com

EDUCATION AND EMPLOYMENT

Ph.D. Physics , Center for Theoretical Physics, Massachusetts Institute of Technology, Cambridge, MA	June 2023
Master of Science Physics , Department of Physics, Massachusetts Institute of Technology, Cambridge, MA	2017
Bachelor of Science Physics, Minor in Mathematics , Massachusetts Institute of Technology, Cambridge, MA	2013

FELLOWSHIPS AND AWARDS

Henry W. Kendall Graduate Fellow , MIT Department of Physics	2015–2016
Goulder Fellow MIT Department of Physics	2014
Praecis Presidential Fellow , MIT	2013
MIT 100K Competition, Semi-Finalist	2012

RESEARCH PAPERS

Conventional ordering of authors in my field is variably alphabetical or by contribution.

Peer-Reviewed

1) **Sarah R. Geller**, Wenzer Qin, David Kaiser, Evan McDonough
Primordial Black Holes from Multifield Inflation with Non-minimal Couplings
Phys. Rev. D. **106** no.6, 6063535, p1-23/ [ARXIV:2205.04471](https://arxiv.org/abs/2205.04471)

Preprints

2) Wenzer Qin, **Sarah R. Geller**, Shyam Balaji, Evan McDonough, and David Kaiser
Planck Constraints and Gravitational Wave Forecasts for Primordial Black Hole Dark Matter Seeded by Multifield Inflation
[ARXIV:2302.xxxxx](https://arxiv.org/abs/2302.xxxxx) *Expect to post within a 1-2 weeks and submit to Phys. Rev. D by end of February, 2023*

1) **Sarah R. Geller**, Jolyon Bloomfield, Alan H. Guth
Mass of a Patch of an FRW Universe
[ARXIV:1801.02249](https://arxiv.org/abs/1801.02249)

In Preparation

3) **Sarah R. Geller**, David Kaiser, Thomas Steingasser
Extended Higgs Criticality and Primordial Black Holes from Higgs Inflation

2) Malte Buschmann, Joshua Foster, **Sarah R. Geller**, Toby Opferkuch
Gravitation Waves from First Order Phase Transitions with Adaptive Mesh Refinement

Tung Tran, **Sarah R. Geller**, Alan H. Guth

1) *A Formalism to Describe a Mixture of Collisionless and Thermal Equilibrium Particles after Neutrino Decoupling*

INVITED SEMINAR TALKS

9) Primordial Black Holes and the Stochastic Gravitation Wave Background from Non-minimally Coupled Multifield Inflation <i>UC Santa Cruz Institute for Particle Physics</i>	November 2022
8) Primordial Black Holes and the Stochastic Gravitation Wave Background from Non-minimally Coupled Multi-field Inflation and Extended Higgs Criticality <i>Max Planck Institute for Astrophysics, Garching</i>	November 2022
7) Primordial Black Holes and the Stochastic Gravitation Wave Background from Non-minimally Coupled Multi-field Inflation <i>4-D Seminar, University of California, Berkeley</i>	November 2022
6) Primordial Black Holes from Multifield Inflation with Non-minimal Couplings <i>Cosmology Seminar, K.N. Toosi University of Technology, Tehran</i>	June 2022
5) Primordial Black Holes from Multifield Inflation with Non-minimal Couplings <i>Joint Phenomenology Seminar, Hebrew University, Jerusalem</i>	May 2022
4) Primordial Black Holes from Multifield Inflation with Non-minimal Couplings <i>Beyond Standard Model Seminar, CERN</i>	May 2022
3) Primordial Black Holes from Multifield Inflation with Non-minimal Couplings <i>Ludwig-Maximilians Universität, Munich</i>	May 2022
2) Primordial Black Holes from Multifield Inflation with Non-minimal Couplings <i>Joint Cosmology Seminar, MIT and Tufts University, Cambridge</i>	May 2022
1) Total Mass of a Patch of a Friedman-Robertson-Walker Universe <i>Cosmology and Gravity Seminar, Brown University, Providence</i>	February 2018

GROUP AND CLUB TALKS

7) Primordial Black Holes Constituting Dark Matter Can Form from Multifield Inflation <i>MIT Graduate Lunch Talks</i>	April 2022
6) Self-Organized Localization <i>Dark Matter Journal Club</i>	July 2021
5) The Three-Qutrit Holographic Code <i>Quantum Gravity Reading Group</i>	March 2020
4) Entropy In Quantum Information Theory <i>Quantum Gravity Reading Group</i>	March 2020
3) The Laws of Black Hole Thermodynamics <i>Quantum Gravity and String Group Meeting</i>	October 2019
2) Total Mass of a Patch of a Friedmann-Robertson-Walker Universe <i>MIT Graduate Lunch Talks</i>	May 2017
1) Total Mass of a Patch of a Friedmann-Robertson-Walker Universe <i>Density Perturbation Group and Hybrid Inflation Group Joint Summer Seminar, MIT</i>	May 2017

CONFERENCE TALKS, CONFERENCES, AND SUMMER SCHOOLS

Conference Talks and Presentations

3) Planck Constraints and Gravitational Wave Forecasts for Primordial Black Hole Dark Matter Seeded by Multifield Inflation <i>Accepted for presentation at String Theory, Cosmology, and Particle Astrophysics Gordon Research Conference, Lucca, Italy</i>	July 2023
2) Primordial Black Holes from Multifield Inflation with Non-minimal Couplings <i>Parallel Session COSMO-22: 25th International Conference on Particle Physics and Cosmology, Rio de Janeiro, Brazil</i>	August 2022
1) PBHs from Multifield Inflation with Non-minimal Couplings: Near Critical Potentials with Ultra Slow-Roll <i>Cambridge High Energy Workshop, Harvard Black Hole Initiative, Cambridge</i>	August 2022

Conferences and Summer Schools

Theoretical Advanced Summer Institute (TASI) <i>University of Colorado, Boulder</i>	June 2022
It from Qubit Workshop on Qubits and Spacetime <i>Institute for Advanced Studies, Princeton</i>	December 2019
It from Qubit Summer School <i>Yukawa Institute for Theoretical Physics, Kyoto</i>	June 2019
New England Theoretical Cosmology and Gravity Workshop <i>MIT, Brown University</i>	September 2017, 2016
New England Theoretical Cosmology and Gravity Workshop <i>Brown University, Providence</i>	September 2016

TEACHING AND MENTORSHIP

Research Students Supervised

Tung Tran, MIT Undergraduate Research Opportunities Program	2021–present
Jared Machtinger, MIT Undergraduate Research Opportunities Program	December 2022-present
Lana Xu, MIT Undergraduate Research Opportunities Program	January 2023 - present

Teaching Assistant-ships

Recitation Instructor, General Relativity G, <i>Instructor: Netta Engelhardt</i>	Spring 2023
TA Quantum Physics I U, <i>Instructor: Aram Harrow</i>	Fall 2021
Recitation Instructor, General Relativity G, <i>Instructor: Netta Engelhardt</i>	Spring 2021
TA Quantum Physics I U, <i>Instructor: Vladan Vuletic</i>	Spring 2020
TA Classical Mechanics U, <i>Instructor: Peter Dourmashkin</i>	Fall 2019
TA Quantum Physics II U, <i>Instructor: William Detmold</i>	Spring 2019
TA Quantum Computation G, <i>Instructor: Seth Lloyd</i>	Fall 2018
TA Quantum Physics I U, <i>Instructor: Raymond Ashoori</i>	Spring 2017
TA Quantum Physics I U, <i>Instructor: Barton Zwiebach</i>	Spring 2016
TA Waves and Vibrations U, <i>Instructor: Yen-Ji Lie</i>	Fall 2014

Tutoring

Senior tutor at Cambridge Coaching Company: have tutored ten students in mathematics and physics ranging from the middle-school to post-graduate levels	2017–present
Volunteer tutor for local community middle and high-school students, Brookline MA	2004-2008

Mentorship

Graduate Mentor: Physics Directed Reading Program	
Mentee: April Cheng, <i>Simulated gravitational waves from in-spiralling black holes</i>	January 2023- present
AGL Mentor Training Workshop: APS and CIMER “24 women and gender minority graduate students and postdocs are selected through an application process for a highly interactive workshop on research mentorship.”	December 2022

LEADERSHIP AND SERVICE

Co-instructor for Spring 2023: Leadership and Professional Strategies (LEAPS) <i>Leadership and professional skills for graduate students and postdoctoral scholars.</i>	Spring 2023
Creator and Instructor: <i>Filling the GAPS workshop series</i> <i>Graduate applications and professional strategies for physics seniors, with emphasis on mentorship of women, underrepresented minority students, and students with disabilities.</i>	Oct 2022–Jan 2023
Seminar Organizer , Joint MIT-Tufts Cosmology Seminar	2022–present
Treasurer , Graduate Women in Physics	2022–present
Representative, Physics Department Colloquium Committee	2020–present
Organizer , Center for Theoretical Physics Anti-Racism Group	2020–2021
Committee Member , Committee to compose a Code of Conduct, Center for Theoretical Physics, MIT	2021
Organizer , Joint Center for Theoretical Physics and Condensed Matter Theory Weekly Tea	2017–2018
Organizer , Graduate Lunch Talks in Theoretical Physics	2017–2018
Participant, Next Step Program for Youth with HIV, Sickle Cell, Cancer, and Rare Disorders	Summer 2013, 2014

SCIENCE COMMUNICATION

Invited Speaker Women in Physics and Astrophysics, University of California, Santa Cruz	February 2023
Torah from Tech MIT Hillel Newsletter https://hillel.mit.edu/content/enewsletter-archive	March 2022
Guest speaker <i>Created original class on the physics of rainbows, Maimonides High School</i>	2014
Tutor , MIT Reach Out Program, Cambridge Community Center	2011–2012
Instructor , MIT Educational Studies Program, SPLASH and SPARK <i>Created and taught three original courses in advanced science subjects to Middle and High-school students</i>	2009, 2011

SKILLS AND ALLOCATIONS

Numerical/Computational: Python, Mathematica, ROOT, CosmoLattice, PyTransport, Emcee, COMSOL
Cluster Allocations: Allocation through MIT Laboratory for Nuclear Science, SubMIT Cluster