

# SAMI HAKANI

Ph.D. Candidate, School of Physics, Georgia Institute of Technology

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## Research Interests

Low-dimensional quantum systems, spin dynamics of strongly correlated electronic systems, topological and entangled phases of matter in model systems (frustrated quantum magnets, ultracold atoms and molecules, topological semimetals, etc.)

## Education

2025 (expected)	Ph.D. in Physics Advisor: Itamar Kimchi	Georgia Institute of Technology
2018	B.S. in Physics, Electrical Engineering Advisor: Nir Navon	Yale University

## Positions

2019-present	Graduate Student Researcher	Georgia Tech
2019-present	Graduate Teaching Assistant	Georgia Tech
2018-2019	Postgraduate Research Associate	Yale University

## Fellowships and Awards

2023	<sup>1</sup> Amelio Travel Grant (\$500)	Georgia Tech
2022	Amelio Travel Grant (\$1000)	Georgia Tech
2022	<sup>2</sup> Rice Fellowship (\$2500)	Georgia Tech
2022	Amelio Travel Grant (\$500)	Georgia Tech
2018	Distinction in the Major	Yale University
2017	<sup>3</sup> PFCU Academic Scholarship (\$2500)	
2015	PFCU Academic Scholarship (\$2500)	
2014-2018	<sup>4</sup> H. G. Bessent Scholarship	Yale University
2014-2018	QuestBridge Scholar	Yale University

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<sup>1</sup> Amelio Endowment and the Weatherly Fund Graduate Student Travel Grant

<sup>2</sup> Bonnie B. and Charles K. Rice Jr. Fellowship

<sup>3</sup> External scholarship awarded by Platinum Federal Credit Union

<sup>4</sup> Funded by Mr. Scott K. H. Bessent and the Bessent Foundation

## Publications

1. Sokolik, A., Hakani, S., Roy, S., Pellatz, N., Zhao, H., Cao, G., Kimchi, I., & Reznik, D. (2022). Spinons and damped phonons in the spin-1/2 quantum liquid  $\text{Ba}_4\text{Ir}_3\text{O}_{10}$  observed by Raman scattering. *Physical Review B*, 106(7), 075108.  
<https://doi.org/10.1103/PhysRevB.106.075108>
2. Zhang, Y., Ni, Y., Zhao, H., Hakani, S., Ye, F., DeLong, L., Kimchi, I., & Cao, G. (2022). Control of chiral orbital currents in a colossal magnetoresistance material. *Nature*, 1–6.  
<https://doi.org/10.1038/s41586-022-05262-3>
3. Hakani, S. and Kimchi, I. (2023). Topological Defects in a response theory. (in preparation)

## Press and Media Coverage

[“New Quantum State Discovered in Trimer-Honeycomb Material”](#) *GaTech News Center*. Feb. 23, 2023.

## Presentations

### Poster Presentations

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|-----------|---|
| Aug 2023  | Dynamical Response and Transport in Quantum Magnets<br>Kavli Institute for Theoretical Physics (KITP), UC Santa Barbara<br>“Topological Defects in a Response Theory”   |
| June 2023 | Dynamics and Quantum Information in Many-body Systems<br>University of Minnesota, Minneapolis, MN<br>“Topological Defects in a Response Theory”   |
| May 2023  | Topology and Fractionalization in Magnetic Materials (TopoMag23)<br>The Ohio State University, Columbus, OH<br>“Topological Defects in a Response Theory”   |
| Jan 2022  | MagLab Winter Theory School<br>National High Magnetic Field Laboratory, Tallahassee, FL (Virtual)<br>“Spinons and damped phonons in spin-1/2 quantum-liquid $\text{Ba}_4\text{Ir}_3\text{O}_{10}$ observed by Raman scattering” |

### Oral Presentations

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|-----------|--|
| Dec 2022  | A Quantum Many-Body Handshake<br>Weizmann Institute of Science, Rehovot, Israel<br>“Raman Responses with and without Topological Defects”  |
| July 2022 | Yale Young Global Scholars Research Showcase, New Haven CT (Virtual)   |
| May 2022  | Georgia Tech Quantum Alliance Workshop<br>Georgia Institute of Technology, Atlanta, GA<br>“Optical Signatures for Fractional Excitations in Quantum Liquid Candidate $\text{Ba}_4\text{Ir}_3\text{O}_{10}$ ” |
| Mar 2022  | APS March Meeting, Chicago, IL   |

*“Raman Response via 4-Spinon Continuum in Spin-1/2 Quantum Liquid  $Ba_4Ir_3O_{10}$ ”*

July 2021 Yale Young Global Scholars Research Showcase, New Haven CT (Virtual)  
 Jun 2019 Yale Young Global Scholars Research Showcase, New Haven, CT

**Conferences and Schools Attended**

Aug 2023 Dynamical Response and Transport in Quantum Magnets  
 Kavli Institute for Theoretical Physics (KITP), UC Santa Barbara  
 July 2023 Princeton Summer School on Condensed Matter Physics  
 Princeton University, Princeton, NJ (Virtual)  
 June 2023 Dynamics and Quantum Information in Many-body Systems  
 University of Minnesota, Minneapolis, MN  
 May 2023 Topology and Fractionalization in Magnetic Materials (TopoMag23)  
 The Ohio State University, Columbus, OH  
 Dec 2022 A Quantum Many-Body Handshake  
 Weizmann Institute of Science, Rehovot, Israel  
 Mar 2022 APS March Meeting, Chicago, IL  
 Jan 2022 MagLab Winter Theory School  
 National High Magnetic Field Laboratory, Tallahassee, FL (Virtual)  
 Aug 2021 International conference on theoretical physics  
 Landau Institute for Theoretical Physics (Virtual)  
*“From quasi-classics to Bose condensation and everything in between”*  
*dedicated to Valery Pokrovsky's 90th anniversary*  
 Aug 2021 Bad Honnef School on Ultracold Quantum Gases  
 German Physical Society, Bad Honnef, Germany (Virtual)  
 Mar 2021 APS March Meeting (Virtual)  
 June 2020 APS DAMOP (Virtual)

**Teaching Experience**

*Guest Lectures*

Spring 2023	PHYS 6106 Graduate Quantum Mechanics II	Georgia Tech
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*Graduate Teaching Assistantships*

Fall 2023	PHYS 6210 Graduate Condensed Matter I	Georgia Tech
Summer 2023	PHYS 2211 Intro Physics I	Georgia Tech
Spring 2023	PHYS 6106 Graduate Quantum Mechanics II	Georgia Tech
Summer 2021	PHYS 2211 Intro Physics I	Georgia Tech
Fall 2021	PHYS 6105 Graduate Quantum Mechanics I	Georgia Tech
Spring 2021	PHYS 6106 Graduate Quantum Mechanics II	Georgia Tech
Fall 2020	PHYS 6101 Graduate Classical Mechanics	Georgia Tech

Summer 2020	PHYS 2211 Intro Physics I	Georgia Tech
Fall 2019	PHYS 2211 Intro Physics I	Georgia Tech

#### *Undergraduate Teaching Assistantships*

Spring 2018	MATH 222 Linear Algebra with Applications	Yale University
Fall 2017	MATH 118 Intro to Functions of Several Variables	Yale University
Spring 2017	MATH 222 Linear Algebra with Applications	Yale University

#### *Other Teaching Positions*

Summer 2018	Yale Young Global Scholars	Yale University
Summer 2017	Yale Young Global Scholars	Yale University

#### **Leadership and Service**

2022-2023	President, Graduate Association of Physicists (GAP)	Georgia Tech
2022-2023	Member, School of Physics Graduate Committee	Georgia Tech
2022	Organizer, GAP Graduate Student Panel	Georgia Tech
2022-2023	College of Sciences Dean's Advisory Council	Georgia Tech
2022-2023	Equity in Graduate Education Consortium	Georgia Tech
2021-2023	Organizer, weekly Quantum Café	Georgia Tech
2021	Organizer, weekly Quantum Journal Club	Georgia Tech

#### **Students Supervised**

##### *High School Students*

2020-2021	Samad Hakani
	Won Regional and National Junior Science and Humanities Symposium
	Subsequently: Undergraduate Student, Yale University

#### **Professional Memberships**

2020-present	American Physical Society
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#### **Skills Summary**

##### *Languages*

English (native), Urdu (native), Spanish (conversational)

##### *Programming Languages*

Python (proficient), MATLAB, Mathematica, C++ (novice), LaTeX

##### *Python Frameworks*

TeNPy, Scikit-learn, Tensorflow, NumPy, Pandas, Matplotlib, Seaborn, BeautifulSoup

## *Platforms*

Linux, Windows, Arduino