

Mehdi Kargarian

Personal Information

Name: Mehdi **Last Name:** Kargarian **Date of birth:** 11/22/1981 **Nationality:** Iranian

Institute: Department of physics, Sharif University of Technology, Tehran, Iran.

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E-Mail: kargarian@sharif.edu, mehdi.kargarian@gamil.com **Web:** <http://sharif.edu/kargarian/>

Current Position

- **Associate Professor**

Department of physics, Sharif University of Technology, Tehran, Iran (Feb. 2022 - now).

- **Assistant Professor**

Department of physics, Sharif University of Technology, Tehran, Iran (Sept. 2017 - Feb. 2022)

Postdoc Positions

- **Postdoctoral Associate**

Department of Physics, Joint Quantum Institute and Condensed Matter Theory Center, University of Maryland, College Park, Maryland, USA (Sept. 2015 - Sept. 2017).

Research group of Prof. Victor. M. Galitski

- **Postdoctoral Fellow**

Center for Emerging Materials and Department of Physics, Ohio State University, Columbus, Ohio, USA (Sept. 2013 - Aug. 2015).

Research group of Prof. Mohit Randeria and Prof. Nandini Trivedi

- **Postdoctoral Fellow**

Department of Physics, University of Texas at Austin, Texas, USA (Jan. 2010 - Aug. 2013).

Research group of Prof. Gregory A. Fiete

Education

- **Ph.D**

Department of Physics, Sharif University of Technology, Tehran, Iran (Sept. 2006 - Sept. 2009).

Ph.D in Theoretical Condensed Matter Physics.

Thesis title: *Entanglement, quantum phase transition and topological order.*

Supervisor: Prof. A. Langari

- **Master of Science**

Department of Physics, Sharif University of Technology, Tehran, Iran (Sep.2004 - Aug.2006).

M.Sc. in Experimental Condensed Matter Physics.

Thesis title: *physical properties of NiSi layer.*

Supervisor: Prof. A. Z. Moshfegh - Advisor: Prof. O. Akhavan

- **Bachelor of Science**

in Physics, Physics Department, Faculty of Science, University of Tehran, Iran (2000-2004).

Thesis title: *1/N expansion in nonrelativistic quantum mechanics.*

Supervisor: Prof. S. Baygan

Research Interests

- **Strongly correlated electron systems**
- **Topological Phases of Matter**
- **Entanglement and Quantum Criticality**
- **Topological orders and Quantum Spin Liquids**

- **Transition Metal Oxides**
- **Topological Quantum Computation**

Honors and Awards

- **Outstanding Referee**, American Physical Society (APS) 2024.
- **ICTP 2020 Prize** (shared), International Center for Theoretical Physics, Trieste , Italy.
- **Distinguished Teacher**, Sharif University of Technology (2021).
- **Research Award and Grant**, Iran Science Elite Federation (2023).
- **Research Award and Grant**, Iran Science Elite Federation (2022).
- **Research Award and Grant**, Iran Science Elite Federation (2021).
- **Distinguished young researcher in Basic Sciences**, Sharif University of Technology (2020).
- **Research Award and Grant**, Iran Science Elite Federation (2020).
- **Abu-Reyhan Biruni Award**, National Academy of Science, Iran (2019).
- **Research Award and Grant**, Iran Science Elite Federation (2019).
- **Scientific Achievement Award** in International Conference on Superconductivity (2017).
- **Ranked 3** in Khwarizmi national youth festival, Iran (2009).
- **Fellowship** for talented students during PhD, Sharif university of Technology (2008).
- **Fellowship** for talented students during PhD, Sharif university of Technology (2007).
- **Ranked 2** in the National M.Sc. Physics Entrance Exam, Iran (2004).
- **Ranked 1** in the National M.Sc. Photonic Entrance Exam, Iran (2004).
- **Ranked 5** in National Student Physics Olympiad, Iran (2004).
- **Honor student** in Physics Department, University of Tehran, Tehran, Iran (2004).

Preprints

1. Xia-Ming Zheng, Mehdi Kargarian, *Spin liquid phase in the Hubbard model : Luttinger-Ward analysis of the slave-rotor formalism*, arXiv : 2505.01509 (2025) .
2. Md Shafayat Hossain, Zahir Muhammad, Rajibul Islam, Zi-Jia Cheng, Yu-Xiao Jiang, Maksim Litskevich, Tyler A. Cochran, Xian P. Yang, Byunghoon Kim, Fei Xue, Ilias E. Perakis, Weisheng Zhao, Mehdi Kargarian, Luis Balicas, Titus Neupert, M. Zahid Hasan, *Pomeranchuk instability of a topological crystal*, arXiv :2410.19636
3. Ruiqi Zhang, Cheng-Yi Huang, Mehdi Kargarian, Rahul Verma, Robert S. Markiewicz, Arun Bansil, Jianwei Sun, Bahadur Singh, *Exposing nontrivial flat bands and superconducting pairing in infinite-layer nickelates*, arXiv :2311.03302
4. Leyla Majidi, Abolhassan Vaezi, Mehdi Kargarian, *Stoner ferromagnetism and thermoelectricity in partially flat-band materials*, arXiv (2024)

Publications

1. Md Shafayat Hossain, Rajibul Islam, Zi-Jia Cheng, Zahir Muhammad, Qi Zhang, Zurab Guguchia, Jonas A. Krieger, Brian Casas, Yu-Xiao Jiang, Maksim Litskevich, Xian P. Yang, Byunghoon Kim, Tyler A. Cochran, Ilias E. Perakis, Fei Xue, Mehdi Kargarian, Weisheng Zhao, Luis Balicas, M. Zahid Hasan, *Superconductivity and a van Hove singularity confined to the surface of a topological semimetal*, **Nature Communication**, **16**, 3998 (2025).
<https://www.nature.com/articles/s41467-025-58024-w>
2. Fatemeh Mohammadi, Mojtaba Tabatabaei, Mehdi Kargarian, Abolhassan Vaezi, *Phase diagram of the Kitaev-Hubbard model : Z2 slave-spin and quantum Monte Carlo approaches*, **Phys. Rev. B** **110**, 214425 (2024).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.110.214425>
3. Xia-Ming Zheng, Mehdi Kargarian, *Spinon Kondo lattice in quantum spin liquids using the slave-rotor formalism*, **Phys. Rev. B** **110**, 115116 (2024).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.110.115116>

4. Sougata Mardanya, **Mehdi Kargarian**, Rahul Verma, Tay-Rong Chang, Sugata Chowdhury, Hsin Lin, Arun Bansil, Amit Agarwal, Bahadur Singh, *Unconventional superconducting pairing in a B20 Kramers Weyl semimetal*, **Phys. Rev. Materials** **8**, L091801 (2024) [Letter].
<https://journals.aps.org/prmaterials/abstract/10.1103/PhysRevMaterials.8.L091801>
5. Elahe Davari, S. Samaneh Ataei, **Mehdi Kargarian**, *Optical drive of amplitude and phase modes in excitonic insulators*, **Phys. Rev. B** **109**, 075146 (2024).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.109.075146>
6. Fatemeh Mohammadi, Amirhossein Saedpanah, Abolhassan Vaezi, **Mehdi Kargarian**, *Phase transition and fractionalization in the superconducting Kondo lattice model*, **Phys. Rev. B** **106**, 195145 (2022).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.106.195145>
7. Cooper Finnigan, **Mehdi Kargarian**, and Dmitry K. Efimkin, *Equatorial magnetoplasmons*, **Phys. Rev. B** **105**, 205426 (2022).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.105.205426>
8. Fatemeh Mohammadi, **Mehdi Kargarian**, *Desining $\mathbb{Z}_2$ and $\mathbb{Z}_2 \times \mathbb{Z}_2$ topological orders in networks of Majorana bound states*, **Phys. Rev. B** **105**, 165107 (2022).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.105.165107>
9. Dmitry K. Efimkin, **Mehdi Kargarian**, *Topological spin-plasma waves*, **Phys. Rev. B** **104**, 075413 (2021).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.104.075413>
10. Bahman Sheikhi, **Mehdi Kargarian**, Abdollah Langari, *Hybrid topological magnon-phonon modes in honeycomb and kagome lattices*, **Phys. Rev. B** **104**, 045139 (2021).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.104.045139>
11. Bahman Sheikhi, **Mehdi Kargarian**, Abdollah Langari, *Thermal Hall and Nernst responses in ultrathin magnetic films of pyrochlore lattice*, **J. Phys. : Condens. Matter** **33** 265601 (2021).
<https://iopscience.iop.org/article/10.1088/1361-648X/abf976/meta>
12. **Mehdi Kargarian**, *Review article: Principles of topology in understanding and development of topological states of matter*, **Iranian J. Phys. Res** (2020).
https://ijpr.iut.ac.ir/article_1606_en.html
13. M. Mehdi Jadidi, **Mehdi Kargarian**, Martin Mittendorf, Yigit Aytac, Bing Shen, Jacob C. Konig-Otto, Stephan Winnerl, Ni Ni, Alexander L. Gaeta, Thomas E. Murphy, and H. Dennis Drew, *Nonlinear optical control of chiral charge pumping in a topological Weyl semimetal*, **Phys. Rev. B** **102**, 245123 (2020).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.102.245123>
14. Zahra Khatibi, Roya Ahemeh, **Mehdi Kargarian**, *Excitonic insulator phase and dynamics of condensate in a topological one-dimensional model*, **Phys. Rev. B** **102**, 245121 (2020).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.102.245121>
15. Roya Radgohar, **Mehdi Kargarian**, *Effects of dynamical noises on Majorana bound states*, **Phys. Rev. B** **102**, 165111 (2020).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.102.165111>
16. Fatemeh Mirmojarabian, **Mehdi Kargarian**, Abdollah Langari, *Phase diagram and thermal Hall conductivity of spin-liquid Kekule-Kitaev model*, **Phys. Rev. B** **101**, 115116 (2020).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.101.115116>
17. Hossein Hosseinabadi and **Mehdi Kargarian**, *Vortex bound states of charge and magnetic fluctuations-induced topological superconductors in heterostructures*, **Phys. Rev. B** **100**, 144507 (2019).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.100.144507>
18. Rasoul Ghadimi, **Mehdi Kargarian**, S. Akbar Jafari, *Gap-filling states in the nodeless chiral superconducting Bi/Ni bilayer system*, **Phys. Rev. B** **100**, 024502 (2019).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.100.024502>

19. Rasoul Ghadimi, **Mehdi Kargarian**, S. Akbar Jafari, *Competing superconducting phases in interacting two-dimensional electron gas*, **Phys. Rev. B** **99**, 115122 (2019).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.99.115122>
20. **Mehdi Kargarian**, Yuan-Ming Lu, and Mohit Randeria, *Deformation and Stability of Surface States in Dirac semimetals*, **Phys. Rev. B** **97**, 165129 (2018).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.97.165129>
21. Morteza Kayyalha, **Mehdi Kargarian**, Aleksandr Kazakov, Ireneusz Miotkowski, Victor M. Galitski, Victor M. Yakovenko, Leonid P. Rokhinson, Yong P. Chen, *Anomalous low-temperature enhancement of supercurrent in topological-insulator nanoribbon Josephson junctions : evidence for low-energy Andreev bound states*, **Phys. Rev. Lett.** **122**, 047003 (2019).
<https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.122.047003>
22. Victor Galitski, **Mehdi Kargarian**, and Sergey Syzranov, *Dynamo Effect and Turbulence in Hydrodynamic Weyl Metals*, **Phys. Rev. Lett.** **121**, 176603 (2018). Editors' Suggestion.
<https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.121.176603>
— Featured in Physics ; See Synopsis : *Weyl Metals as Proxies for Astrophysical Dynamos*
<https://physics.aps.org/synopsis-for/10.1103/PhysRevLett.121.176603>
23. X. X. Gong, **M. Kargarian**, A. Stern, D. Yue, H. X. Zhou, X. F. Jin, V. Yakovenko, V. Galitski, and J. Xia, *Time-reversal-symmetry-breaking Superconductivity in Epitaxial Bi/Ni Bilayer Films*, **Science Advances** **3**, e1602579 (2017).
24. Cody Youmans, Areg Ghazaryan, **Mehdi Kargarian**, Pouyan Ghaemi, *Odd-frequency Pairing in the Edge States of Superconducting Pnictides*, **Phys. Rev. B** **98**, 144517 (2018).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.98.144517>
25. Saeed S. Jahromi, Roman Orus, **Mehdi Kargarian**, and Abdollah Langari, *Infinite projected entangled-pair state algorithm for ruby lattices*, **Phys. Rev. B** **97**, 115161 (2018).
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.97.115161>
26. **Mehdi Kargarian**, Dmitry K. Efimkin, and Victor Galitski, *Amperean pairing at the surface topological insulators*, **Phys. Rev. Lett.** **117**, 076806 (2016).
<http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.117.076806>
27. **Mehdi Kargarian**, Mohit Randeria and Yuan-Ming Lu, *Are the double Fermi arcs of Dirac semimetals topologically protected ?*, **PNAS vol. 113 no. 31, 8648** (2016).
<http://www.pnas.org/content/113/31/8648>
28. **Mehdi Kargarian**, Mohit Randeria and Nandini Trivedi, *Theory of Kerr and Faraday rotations in Topological Weyl Semimetals*, **Scientific Reports** **5**, 12683 (2015).
<http://www.nature.com/articles/srep12683>
29. Saeed S. Jahromi, **Mehdi Kargarian**, S. Farhad Masoudi, Abdollah Langari, *Topological spin liquids in the ruby lattice with anisotropic Kitaev interactions*, **Phys. Rev. B** **94**, 125145 (2016).
<http://journals.aps.org/prb/abstract/10.1103/PhysRevB.94.125145>
30. **Mehdi Kargarian** and Gregory A. Fiete, *Topological Crystalline Insulators in Transition Metal Oxides*, **Phys. Rev. Lett** **110**, 156403 (2013).
<http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.110.156403>
31. J. Liu, **M. Kargarian**, M. Kareev, B. Gray, P. Ryan, J. W. Freeland, J. M. Rondinelli, G. A. Fiete, and J. Chakhalian, *Heterointerface engineered electronic and magnetic phases of NdNiO₃ thin films*, **Nature Communications** **4**, 2714 (2013).
<http://www.nature.com/ncomms/2013/131106/ncomms3714/full/ncomms3714.html>
32. Alexander B. Khanikaev, S. Hossein Mousavi, Wang-Kong Tse, **Mehdi Kargarian**, Allan H. MacDonald, Gennady Shvets, *Photonic Topological Insulators*, **Nature Materials** **12**, 233 (2013).
<http://www.nature.com/nmat/journal/v12/n3/full/nmat3520.html>
See also news in sciencedaily: <http://www.sciencedaily.com/releases/2012/12/121221123508.htm>
*This paper has been selected by Nature in the collection of ten research papers to celebrate the award of the **2016 Nobel Prize** in Physics : <http://www.nature.com/collections/fwsytnlwg>

33. **Mehdi Kargarian** and Gregory A. Fiete, *Multi-orbital Effects on Thermoelectric Properties of Strongly Correlated Materials*, **Phys. Rev. B** **88**, 205141 (2013).
<http://journals.aps.org/prb/abstract/10.1103/PhysRevB.88.205141>
34. **M. Kargarian**, A. Langari, Gregory A. Fiete. *Unusual magnetic phases in the strong interaction limit of two-dimensional topological band insulators in transition metal oxides*, **Phys.Rev. B** **86**, 205124 (2012).
<http://journals.aps.org/prb/abstract/10.1103/PhysRevB.86.205124>
35. **M. Kargarian**, *Implementation of single-qubit and CNOT gates by anyonic excitations of two-body topological color code*, **Phys. Lett. A** **376**, 3540 (2012).
<http://www.sciencedirect.com/science/article/pii/S0375960112010511>
36. Saeed S. Jahromi, **M. Kargarian**, S Farhad Masoudi, Kai Phillip Schmidt, *Robustness of a topological phase : Topological color code in parallel magnetic field*, **Phys. Rev. B** **87**, 094413 (2013).
<http://journals.aps.org/prb/abstract/10.1103/PhysRevB.87.094413>
37. Saeed S. Jahromi, S Farhad Masoudi, **M. Kargarian** and Kai Phillip Schmidt, *Quantum phase transitions out of a $z_2 \times z_2$ topological phase*, **Phys. Rev. B** **88**, 214411 (2013).
<http://journals.aps.org/prb/abstract/10.1103/PhysRevB.88.214411>
38. **M. Kargarian**, Jun Wen and Gregory A. Fiete. *Competing Exotic Topological Insulator Phases in Transition Metal Oxides on the Pyrochlore Lattice with Distortion*, **Phys.Rev. B** **83**, 165112 (2011).
<http://journals.aps.org/prb/abstract/10.1103/PhysRevB.83.165112>
39. **M. Kargarian** and Gregory A. Fiete. *Topological phases and phase transitions on the square-octagon lattice*, **Phys. Rev. B** **82**, 085106 (2010).
<http://journals.aps.org/prb/abstract/10.1103/PhysRevB.82.085106>
40. Xiang Hu, **M. Kargarian** and Gregory A. Fiete. *Topological insulators and fractional quantum Hall effect on the ruby lattice*, **Phys. Rev. B** **84**, 155116 (2011).
<http://journals.aps.org/prb/abstract/10.1103/PhysRevB.84.155116>
41. Jun Wen, **M. Kargarian**, Abolhassan Vaezi and Gregory A. Fiete. *Doping the Kane-Mele-Hubbard model : A Slave-Boson Approach*, **Phys. Rev. B** **84**, 235149 (2011).
<http://journals.aps.org/prb/abstract/10.1103/PhysRevB.84.235149>
42. Gregory A. Fiete, Victor Chua, **M. Kargarian**, Rex Lundgren, Andreas Ruegg, Jun Wen, Vladimir Zyuzin. *Topological Insulators and Quantum Spin Liquids*, **Physica E** **44**, 845 (2012).
<http://www.sciencedirect.com/science/article/pii/S1386947711004061>
43. **M. Kargarian**, H. Bombin, M.A. Martin-Delgado. *Topological Color Codes and Two-Body Quantum Lattice Hamiltonians*, **New Journal of Physics**, **12** (2010) 025018.
<http://iopscience.iop.org/1367-2630/12/2/025018>
44. H. Bombin, **M. Kargarian** and M. A. Martin-Delgado. *Interacting Anyonic Fermions in a Two-Body Color Code Model*, **Physical Review B** **80**, 075111 (2009).
<http://journals.aps.org/prb/abstract/10.1103/PhysRevB.80.075111>
45. H. Bombin, **M. Kargarian** and M. A. Martin-Delgado. *Quantum 2-Body Hamiltonian for Topological Color Codes*, **Fortsch.Phys.** **57** :1103-1110 (2010).
<http://onlinelibrary.wiley.com/doi/10.1002/prop.200900084/abstract>
46. **M. Kargarian**, *Finite temperature topological order in 2D topological color codes*, **Physical Review A** **80**, 012321 (2009).
<http://journals.aps.org/pra/abstract/10.1103/PhysRevA.80.012321>
— This paper has also been selected for the August 2009 issue of Virtual Journal of Quantum Information. <http://www.vjquantuminfo.org>
47. **M. Kargarian**, R. Jafari, A. Langari. *Dzyaloshinskii-Moriya Interaction and Anisotropy effects on the Entanglement of Heisenberg Model*, **Phys. Rev. A** **79**, 042319 (2009).
<http://journals.aps.org/pra/abstract/10.1103/PhysRevA.79.042319>

- This paper has been selected for the April 27, 2009 issue of *Virtual Journal of Nanoscale Science and Technology*. <http://www.vjnano.org>
- This paper has also been selected for the April 2009 issue of *Virtual Journal of Quantum Information*. <http://www.vjquantuminfo.org>
- 48. **M. Kargarian**, *Entanglement properties of topological color codes*, **Phys. Rev. A** **78**, 062312 (2008).
<http://journals.aps.org/prabstract/10.1103/PhysRevA.78.062312>
- 49. **M. Kargarian**, R. Jafari, A. Langari. *The renormalization of entanglement in the anisotropic Heisenberg (XXZ) model*, **Physical Review A** **77**, 032346 (2008).
<http://journals.aps.org/prabstract/10.1103/PhysRevA.77.032346>
— This paper has been selected for the April 7, 2008 issue of *Virtual Journal of Nanoscale Science and Technology*.
— This paper has also been selected for the April 2008 issue of *Virtual Journal of Quantum Information*.
- 50. R. Jafari, **M. Kargarian**, A. Langari, M.Siahatgar *Phase Diagram and Entanglement of Ising Model With Dzyaloshinskii-Moriya Interaction*, **Phys. Rev. B** **78**, 214414 (2008).
<http://journals.aps.org/prb/abstract/10.1103/PhysRevB.78.214414>
— This paper has also been selected for the December 22, 2008 issue of *Virtual Journal of Nanoscale Science and Technology*. <http://www.vjnano.org>
- 51. S. Hemmatiyani, M. Rahimi Movassagh, N. Ghassemi, **M. Kargarian**, A. T. Rezakhani, A. Langari, *Quantum phase transitions in the Kondo-necklace model : perturbative continuous unitary transformation approach*, **J. Phys. : Condens. Matter** **27** (2015) 155601.
<http://iopscience.iop.org/article/10.1088/0953-8984/27/15/155601/meta>
- 52. **M. Kargarian**, R. Jafari, A. Langari. *Renormalization of concurrence : The application of the quantum renormalization group to quantum-information systems*, **Physical Review A** **76**, 060304(R) (2007).
<http://journals.aps.org/prabstract/10.1103/PhysRevA.76.060304>
- 53. M. Heidari Saani, **M. Kargarian** and A. Ranjbar, *Comparison between stability, electronic, and structural properties of cage-like and spherical nanodiamond clusters*, **Physical Review B** **76**, 035417 (2007).
<http://journals.aps.org/prb/abstract/10.1103/PhysRevB.76.035417>
— This paper has also been selected for the July 30, 2007 issue of *Virtual Journal of Nanoscale Science and Technology*. <http://www.vjnano.org>
- 54. **M. Kargarian**, O. Akhavan and A.Z. Moshfegh, *The effect of Si addition and Ta diffusion barrier on growth and thermal stability of NiSi nanolayer*, **Microelectron. Eng.** **85** (2008) 548 .
<http://www.sciencedirect.com/science/article/pii/S0167931707006910>

My Research Group

- Postdocs
 - Dr. Samaneh Ataei (PhD, University of Tehran, Iran), Jul. 2022 - Sept 2024
 - Dr. Fatemeh Mohammadi (PhD, Sahrf University of Technology, Iran), Feb. 2023 - Feb. 2024
 - Dr. Roham Baghran (PhD, Shahid Beheshti University, Iran), 2021 - 2022
 - Dr. Zahra Khatibi (PhD, University of Science and Technology, Iran), 2019-2020
 - Dr. Roya Radgozar (PhD, Shiraz University, Iran), 2019 - 2021
- PhD students
 - Xiaming Zheng (started 2021)
 - Elahe Davari (graduated Feb. 2025)
 - Fatemeh Mohammadi (graduated Jan. 2023)
 - Bahman Sheikhi (co-supervisor, graduated 2021)
 - Fatemeh Mirmojarabian (co-supervisor, graduated 2021)
 - Rasoul Ghadimi (co-supervisor), graduated in 2019

- 8 MSc students
 - 4 students graduated in 2019, 2 graduated in 2020, 2 graduated in 2022
- 3 BSc students
 - 2 students graduated in 2019, 1 graduated in 2022

Teaching

- **Spring 2025** : Quantum Mechanics I
- **Fall 2024** : Quantum Mechanics II, General Lab 2
- **Spring 2024** : Quantum Mechanics I, General Lab 2
- **Fall 2023** : General Physics I
- **Spring 2023** : Statistical Mechanics 3, General Lab 2
- **Fall 2022** : Many-body Physics, Special topics in Topology and Matter
- **Spring 2022** : Electromagnetism 3
- **Fall 2021** : Many-body Physics
- **Spring 2021** : Many-body Physics, Electromagnetism 3
- **Fall 2020** : Statistical Mechanics 3
- **Spring 2020** : Electromagnetism 3, General Lab 1
- **Fall 2019** : Many-body Physics, Special topics in Topology and Matter
- **Spring 2019** : Introductory Condensed Matter, Theory of Superconductivity,
- **Fall 2018** : Many-body Physics
- **Spring 2018** : Introductory Condensed Matter, Theory of Superconductivity,
- **Fall 2017** : Special topics in Topology and Matter
- **2 Lectures on Many-body Theory**, University of Maryland, Spring 2016.
- **4 Lectures on Group Theory**, The Ohio State University, Summer 2014.
- **TA to many courses**, 2001-2009.

Conferences, Workshops and Seminars

- **Gordon Research Conference on Superconductivity, Les Diableretes, Switzerland, May 2025.**
- **Gordon Research Conference on Superconductivity, Les Diableretes, Switzerland, May 2023.**
- **ICTP Prize Talk, September 2021**, Talk on “ Topological Materials : Correlations and Symmetry”.
- **Invited talk at Washington University in Saint Louis, US; hosted by Prof. Zohar Nussinov**, April 2022, Talk on “Fractionalized superconductors and topological orders”.
- **Invited talk at APS March Meeting**, March 2021, Talk on “Nonlinear Optical Control of Chiral Charge Pumping in a Topological Weyl Semimetal”.
- **APS March Meeting, Chicago, IL, US**, March 2022. Talk on “Fractionalized superconductors and topological orders”.
- **Invited talk at IPM, Iran**, November 2021
- **Invited talk at Shahid Beheshti University, Iran** , December 2021
- **Invited talk, Iran Physics Conference**, August 2021, Talk on “Nonlinear Optical Control of Chiral Charge Pumping in a Topological Weyl Semimetal”.
- **Invited talk, 14th National Condensed Matter Conference**, Feb. 2021, Talk on “Nonlinear Optical Control of Chiral Charge Pumping in a Topological Weyl Semimetal”.
- **Invited talk at Physics Society of Iran**, October 2020, Talk on “Interacting topological phases of matter”.
- **Gordon Research Conference on Topological Phases, Hong-Kong, China**, June 2019.
- **Invited talk at the University of Pennsylvania, US, hosted by Prof. Gene Mele**, Fall 2016. Talk on “Exotic superconducting states in spin-orbit coupled systems”.
- **Invited talk at Shahid Beheshti University, Iran** , October 2018
- **Invited talk at IPM, Iran**, July 2018
- **Gordon Research Conference and Seminar on Superconductivity, NH, US**, June 2017.
- **JQI Friday seminar**, Spring 2016. Talk on “Amperean Pairings”

- **Summer School on strongly correlated systems, Minnesota, US, June 2016.**
- **Gordon Research Conference and Seminar, Boston US, June 2016.**
- **APS March Meeting, Baltimore, Maryland, US, March 2016.** Talk on “Amperean pairing at the surface of TI”.
- **Princeton Summer School, NJ, US, June 2015.**
- **Workshop on Spin-orbit Coupling and Magnetism in Correlated Transition Metal Oxides, Columbus, Ohio, US May 2015**
- **APS March Meeting, San Antonio, TX, US, March 2015.** Talk on “Topological Kerr and Faraday rotations in TWS”.
- **Gordon Research Conference and Seminar, Boston US, June 2014.**
- **Princeton Summer School, NJ, US, June 2013.**
- **APS March Meeting, Baltimore, Maryland, US, March 22, 2013.** Talk on “Unusual magnetic phases of topological band insulators in transition metal oxides”.
- **APS March Meeting, Boston, US, March 2012.** Talk on “Mean field phase diagram of $(\text{Li,Na})_2\text{IrO}_3$: possible realization of spin liquid phases”.
- **APS March Meeting, Dallas, US, March 2011.** Talk on “Topological insulator in a non-Abelian lattice model”.
- **Gordon Research Conference, Boston US June 2010.**
- **Nordita program on Quantum Hall physics - Novel systems and applications, September 2009, Stockholm, Sweden.** Talk on “Topological quantum computation models and 2-body quantum lattice Hamiltonians”.
- **International Iran Summer School on Quantum Information, September, 2008, Kish Island, Iran.** Poster on “Entanglement in Kondo-Necklace model”.
- **Workshop on quantum computation and topological orders, July 16-20, 2007. El Scorial, Madrid, Spain.**
- **International Iran Conference on Quantum Information, September, 2007, Kish Island, Iran.** Talk on “Renormalization of entanglement in quantum spin models”.
- **Summer school on strongly correlated electronic systems, July 2008, IPM, Tehran, Iran.**
- **Workshop on strongly correlated electron systems, Jun 2007, Isfahan University of Technology, Isfahan, Iran.**
- **School of Advanced Physics for Top Students, Institute for Advanced Studies in Basic Sciences, December, 2003, Zanzan, Iran.**

Referee to Journals

- Nature Physics, Science Advances, Nature Communication, Physical Review Letters, Physical Review B, ...