

Thomas Iadecola

Assistant Professor

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Employment

- **Iowa State University** Ames, IA
Assistant Professor, Department of Physics & Astronomy Aug. 2019–Present
- **University of Maryland** College Park, MD
JQI Theoretical Postdoctoral Fellow Sept. 2017–Aug. 2019
 - Postdoctoral Mentor: Sankar Das Sarma

Education

- **Boston University** Boston, MA
Ph.D. in Physics 2017
 - Thesis Advisor: Claudio Chamon
 - Thesis Title: Designing topological quantum matter in and out of equilibrium
- **Brown University** Providence, RI
Sc.B. with Honors in Mathematics-Physics (Magna Cum Laude) 2012
 - Thesis Advisor: Dmitri Feldman
 - Thesis Title: Anyonic Fabry-Pérot interferometry in quantum Hall systems

Research Interests

Theoretical condensed matter physics

- *Out-of-equilibrium quantum many-body systems*: Nonergodic quantum dynamics, quantum thermalization, many-body localization, periodically-driven quantum systems, excited-state phenomena. Quantum algorithms for the study thereof. Realizations in quantum simulators.
- *Topological states of matter*: Topological order in (3+1) dimensions, fracton topological phases, symmetry-protected topological phases. Realizations in nonequilibrium quantum systems and engineered structures, emulation in photonic and mechanical systems.

Honors and Awards

- JQI Theoretical Postdoctoral Fellowship 2017
- Alvaro Rocco Memorial Prize 2017
 - For “outstanding achievement overall in physics by a graduate student” at Boston University
- KITP Graduate Fellowship 2016
- APS FGSA Travel Award for Excellence in Graduate Research 2014
- National Science Foundation Graduate Research Fellowship 2014–2017

- Gertrude and Maurice Goldhaber Award 2013
– For “outstanding achievement by a first-year graduate student” at Boston University
- Boston University Dean’s Fellowship 2012–2013
- Elected to Sigma Xi 2012

Funding and Research Grants

- “EAGER-QAC-QSA: Variational Quantum Algorithms for Nonequilibrium Quantum Many-Body Systems,” **National Science Foundation** (DMR-2038010), 9/2020 – 8/2022 (\$299,988.00)
– Co-PI with P. P. Orth
- “SQMS: Superconducting Quantum Materials and Systems Center,” **Department of Energy**, 9/2020 – 8/2025 (\$115,000,000.00)
– Ames Laboratory Team Member, Quantum Science Thrust

Citation Metrics

Total citation number: 600

***h*-index:** 15

Top 5 most cited papers (excluding review articles):

- **T. Iadecola**, T. Neupert, and C. Chamon, “Occupation of topological Floquet bands in open systems,” *Phys. Rev. B* **91**, 235133 (2015). [78 citations]
- **T. Iadecola**, D. K. Campbell, C. Chamon, C.-Y. Hou, R. Jackiw, S.-Y. Pi, and S. Viola Kusminskiy, “Materials design from non-equilibrium steady states: driven graphene as a tunable semiconductor with topological properties,” *Phys. Rev. Lett.* **110**, 176603 (2013). [72 citations]
- M. Schecter and **T. Iadecola**, “Weak ergodicity breaking and quantum many-body scars in spin-1 XY magnets,” *Phys. Rev. Lett.* **123**, 147201 (2019). [50 citations]
- **T. Iadecola**, L.H. Santos, and C. Chamon, “Stroboscopic symmetry-protected topological phases,” *Phys. Rev. B* **92**, 125107 (2015). [44 citations]
- **T. Iadecola** and C. Chamon, “Floquet systems coupled to particle reservoirs,” *Phys. Rev. B* **91**, 184301 (2015). [37 citations]

(Source: Google Scholar, 9/7/20)

Publications and Preprints

25. **T. Iadecola** and S. Vijay, “Nonergodic quantum dynamics from deformations of classical cellular automata,” arXiv:2006.02440.
24. J. Noh, T. Schuster, **T. Iadecola**, S. Huang, M. Wang, K. P. Chen, C. Chamon, and M. C. Rechtsman, “Braiding photonic topological zero modes,” *Nat. Phys.* **16**, 989 (2020).
23. Z.-C. Yang, F. Liu, A. V. Gorshkov, and **T. Iadecola**, “Hilbert-space fragmentation from strict confinement,” *Phys. Rev. Lett.* **124**, 207602 (2020).
22. **T. Iadecola** and M. Schecter, “Quantum many-body scar states with emergent kinetic constraints and finite-entanglement revivals,” *Phys. Rev. B* **101**, 024306 (2020) [Editors’ Suggestion].

21. M. Schecter and **T. Iadecola**, “Weak ergodicity breaking and quantum many-body scars in spin-1 XY magnets,” *Phys. Rev. Lett.* **123**, 147201 (2019).
20. **T. Iadecola**, M. Schecter, and S. Xu, “Quantum many-body scars from magnon condensation,” *Phys. Rev. B* **100**, 184312 (2019) [Editors’ Suggestion].
19. **T. Iadecola** and M. Žnidarič, “Exact localized and ballistic eigenstates in disordered chaotic spin ladders and the Fermi-Hubbard model,” *Phys. Rev. Lett.* **123**, 036403 (2019).
18. **T. Iadecola**, T. Neupert, C. Chamon, and C. Mudry, “Ground-state degeneracy of non-Abelian topological phases from coupled wires,” *Phys. Rev. B* **99**, 245138 (2019).
17. Z.-C. Yang, **T. Iadecola**, C. Chamon, and C. Mudry, “Hierarchical Majoranas in a programmable nanowire network,” *Phys. Rev. B* **99**, 155138 (2019).
16. D. Bulmash and **T. Iadecola**, “Braiding and gapped boundaries in fracton topological phases,” *Phys. Rev. B* **99**, 125132 (2019).
15. M. Schecter, **T. Iadecola**, and S. Das Sarma, “Configuration-controlled many-body localization and the mobility emulsion,” *Phys. Rev. B* **98**, 174201 (2018) [Editors’ Suggestion].
14. **T. Iadecola** and M. Schecter, “Quantum inverse freezing and mirror-glass order,” *Phys. Rev. B* **98**, 144204 (2018).
13. M. Schecter and **T. Iadecola**, “Many-body spectral reflection symmetry and protected infinite-temperature degeneracy,” *Phys. Rev. B* **98**, 035139 (2018).
12. **T. Iadecola** and T.H. Hsieh, “Floquet supersymmetry,” *Phys. Rev. Lett.* **120**, 210603 (2018).
11. T. Schuster, **T. Iadecola**, C. Chamon, R. Jackiw, and S.-Y. Pi “Dissipationless conductance in a topological coaxial cable,” *Phys. Rev. B* **94**, 115110 (2016).
10. **T. Iadecola**, T. Neupert, C. Chamon, and C. Mudry, “Wire constructions of Abelian topological phases in three or more dimensions,” *Phys. Rev. B* **93**, 195136 (2016).
9. **T. Iadecola**, T. Schuster, and C. Chamon, “Non-Abelian braiding of light,” *Phys. Rev. Lett.* **117**, 073901 (2016). [Cover feature for Vol. 117, Issue 7.]
8. T. Neupert, C. Chamon, **T. Iadecola**, L.H. Santos, and Christopher Mudry, “Fractional (Chern and topological) insulators,” *Phys. Scr.* **T164**, 014005 (2015). [Invited overview for Proceedings of the Nobel Symposium on “New forms of matter: topological insulators and superconductors.”]
7. **T. Iadecola**, L.H. Santos, and C. Chamon, “Stroboscopic symmetry-protected topological phases,” *Phys. Rev. B* **92**, 125107 (2015).
6. **T. Iadecola**, T. Neupert, and C. Chamon, “Occupation of topological Floquet bands in open systems,” *Phys. Rev. B* **91**, 235133 (2015).
5. **T. Iadecola** and C. Chamon, “Floquet systems coupled to particle reservoirs,” *Phys. Rev. B* **91**, 184301 (2015).
4. **T. Iadecola**, T. Neupert, C. Chamon, and C. Mudry, “Accessing topological order in fractionalized liquids with gapped edges,” *Phys. Rev. B* **90**, 205115 (2014).
3. **T. Iadecola**, T. Neupert, and C. Chamon, “Topological gaps without masses in driven graphene-like systems,” *Phys. Rev. B* **89**, 115425 (2014).
2. **T. Iadecola**, C. Chamon, R. Jackiw, and S.-Y. Pi, “Generalized energy and time-translation invariance in a driven, dissipative system,” *Phys. Rev. B* **88**, 104302 (2013).

1. **T. Iadecola**, D. K. Campbell, C. Chamon, C.-Y. Hou, R. Jackiw, S.-Y. Pi, and S. Viola Kusminskiy, “Materials design from non-equilibrium steady states: driven graphene as a tunable semiconductor with topological properties,” *Phys. Rev. Lett.* **110**, 176603 (2013). [Featured in a Physics Synopsis.]

Seminars and Invited Talks

24. “Nonergodic quantum dynamics from deformations of classical cellular automata,” Caltech, Pasadena (US), 7/16/20. [Delivered virtually.]
23. “Weak ergodicity breaking and quantum many-body scars in spin-1 XY magnets,” APS March Meeting, Denver (US), 3/6/20. [Canceled due to COVID-19 pandemic.]
22. “Quantum many-body scars and space-time crystalline order from magnon condensation,” 2019 CMTC Symposium, University of Maryland, College Park (US), 5/21/19.
21. “Quantum many-body scars and space-time crystalline order from magnon condensation,” Perimeter Institute for Theoretical Physics, Waterloo (CA), 4/30/19.
20. “Non-Abelian braiding of light: Berry phases from topological defects in photonic lattices,” CECAM Workshop “Condensed Matter Analogies in Mechanics, Optics and Cold Atoms,” Tel Aviv (IL), 4/2/19.
19. “Quantum many-body physics beyond ground states,” Iowa State University, Ames (US), 2/25/19.
18. “Quantum many-body physics beyond ground states,” University of Pennsylvania, Philadelphia (US), 2/13/19.
17. “Quantum inverse freezing and mirror-glass order,” ICTP Trieste, Trieste (IT), 6/14/18.
16. “Many-body spectral reflection symmetries and protected infinite-temperature degeneracy,” ETH Zürich, Zürich (CH), 4/19/18.
15. “Many-body spectral reflection symmetries and protected infinite-temperature degeneracy,” Laboratoire Pierre Aigrain, École Normale Supérieure, Paris (FR), 4/16/18.
14. “Many-body spectral reflection symmetries and protected infinite-temperature degeneracy,” University of Geneva, Geneva (CH), 4/12/18
13. “Floquet supersymmetry,” APS March Meeting, Los Angeles (US), 3/8/18.
12. “Floquet supersymmetry,” JQI-QuICS-CMTC Seminar, University of Maryland, College Park (US), 2/23/18.
11. “Floquet supersymmetry,” 2017 CMTC Symposium, University of Maryland, College Park (US), 11/15/17.
10. “Wire constructions of topological phases in three or more dimensions,” Yale University, New Haven (US), 1/23/17.
9. “Wire constructions of topological phases in three or more dimensions,” Massachusetts Institute of Technology, Cambridge (US), 12/07/16.
8. “Wire constructions of topological phases in three or more dimensions,” Microsoft Station Q, Santa Barbara (US), 11/10/16.
7. “Wire constructions of Abelian topological phases in three or more dimensions,” Princeton Center for Theoretical Science (Princeton University), Princeton (US), 05/12/16.

6. “Stroboscopic symmetry-protected topological phases,” Harvard University, Cambridge (US), 9/15/15.
5. “Out-of-equilibrium design of quantum systems: From tunable band insulators to SPT phases,” Perimeter Institute for Theoretical Physics, Waterloo (CA), 7/8/15.
4. “Accessing topological order in fractionalized liquids with gapped edges,” Massachusetts Institute of Technology, Cambridge (US), 12/16/14.
3. “Fun with phonons in graphene: exactly solvable models of periodically-driven quantum systems,” Princeton Center for Theoretical Science (Princeton University), Princeton (US), 5/13/14.
2. “Rotating Kekulé mass in graphene: a ‘hydrogen atom’ for non-equilibrium quantum systems,” Dahlem Center for Complex Quantum Systems (Freie Universität Berlin), Berlin (DE), 9/24/13.
1. “Rotating Kekulé mass in graphene: a ‘hydrogen atom’ for non-equilibrium quantum systems,” Boston University, Boston (US), 9/4/13.

Contributed Talks

7. “Quantum inverse freezing and mirror-glass order,” APS March Meeting, Boston (US), 3/5/19.
6. “Quantum inverse freezing and mirror-glass order,” ICTP Trieste workshop “Conference on Quantum Dynamics of Disordered Interacting Systems,” Trieste (IT), 6/14/18.
5. “Non-Abelian topological phases in three spatial dimensions from coupled wires,” APS March Meeting, New Orleans (US), 3/14/17.
4. “Non-Abelian braiding of light,” APS March Meeting, Baltimore (US), 3/17/16.
3. “Occupation of topological Floquet bands in open systems,” APS March Meeting, San Antonio (US), 3/6/15.
2. “Accessing topological order in fractionalized liquids with gapped edges,” APS March Meeting, San Antonio (US), 3/2/15. [My slides presented by T. Neupert; my flight was canceled due to a blizzard in Boston.]
1. “Topological gaps without masses in driven graphene-like systems,” APS March Meeting, Denver (US), 3/3/14.

Posters

6. “Weak ergodicity breaking and quantum many-body scars in spin-1 XY magnets,” Les Houches Workshop “New Developments in Topological Condensed Matter Physics,” Les Houches (FR), 9/2 – 9/13/19.
5. “Wire constructions of Abelian topological phases in three or more dimensions,” Correlated Electron Systems Gordon Research Conference, South Hadley (US), 6/26 – 7/1/16.
4. “Wire constructions of Abelian topological phases in three or more dimensions,” Aspen Center for Physics, Aspen (US), 2/15 – 2/21/16.
3. “Stroboscopic symmetry-protected topological phases,” Fine Theoretical Physics Institute (University of Minnesota), Minneapolis (US), 5/2/15.
2. “Accessing topological order in fractionalized liquids with gapped edges,” Les Houches Summer School Session CIII, Les Houches (FR), 8/4 – 8/29/14.

1. “Generalized energy and time-translation invariance in a driven, dissipative system,” Max Planck Institute for the Physics of Complex Systems, Dresden (DE), 9/16 – 9/20/14.

Conferences, Schools, and Workshops Attended

26. 2020 Quantum Computing User Forum, Oak Ridge National Laboratory Leadership Computing Facility, Oak Ridge (US), 4/21 – 4/24/20. [Virtual seminar.]
25. APS March Meeting, Denver (US), 3/2 – 3/6/20. [Canceled due to COVID-19 pandemic.]
24. “Marching Towards Quantum Supremacy,” Princeton Center for Theoretical Science (Princeton University), Princeton (US), 11/13 – 11/15/19.
23. Les Houches Workshop “New Developments in Topological Condensed Matter Physics,” Les Houches (FR), 9/2 – 9/13/19.
22. CECAM Workshop “Condensed Matter Analogies in Mechanics, Optics and Cold Atoms,” Tel Aviv University, Tel Aviv (IL), 4/1–4/4/19.
21. “Fracton Phases of Matter and Topological Crystalline Order,” Princeton Center for Theoretical Science (Princeton University), Princeton (US), 12/3 – 12/5/18.
20. KITP Program “The Dynamics of Quantum Information,” Kavli Institute for Theoretical Physics, Santa Barbara (US), 8/6 – 11/2/18 (participated 9/4 – 9/21/18).
19. “Conference on Quantum Dynamics of Disordered Interacting Systems,” ICTP Trieste, Trieste (IT), 6/11 – 6/15/18.
18. APS March Meeting, Los Angeles (US), 3/5 – 3/9/2018.
17. “4th International Conference on Quantum Error Correction,” University of Maryland, College Park (US), 9/11 – 9/15/17.
16. “Order, Fluctuations, and Strong Correlations: New Platforms and Developments,” Kavli Institute for Theoretical Physics, Santa Barbara (US), 7/31 – 8/4/17.
15. APS March Meeting, New Orleans (US), 3/13 – 3/17/17.
14. KITP Program “Symmetry, Topology, and Quantum Phases of Matter: From Tensor Networks to Physical Realizations,” Kavli Institute for Theoretical Physics, Santa Barbara (US), 9/26 – 12/16/16.
13. KITP Program “Synthetic Quantum Matter,” Kavli Institute for Theoretical Physics, Santa Barbara (US), 9/12 – 12/9/16.
12. “New Kinds of Electronic Order in Quantum Materials,” Correlated Electron Systems Gordon Research Conference, South Hadley (US), 6/26 – 7/1/16.
11. APS March Meeting, Baltimore (US), 3/14 – 3/18/16.
10. “Topological Quantum Matter: Progress and Applications,” Aspen Center for Physics, Aspen (US), 2/15 – 2/21/16.
9. “The Non-Equilibrium Quantum Frontier,” Princeton Center for Theoretical Science (Princeton University), Princeton (US), 9/24 – 9/26/15.
8. “Symmetries and Interactions in Topological Matter,” Fine Theoretical Physics Institute (University of Minnesota), Minneapolis (US), 5/1 – 5/3/15.

7. “Topological and Strongly Correlated Phases in Cold Atoms,” Princeton Center for Theoretical Science (Princeton University), Princeton (US), 4/29 – 5/1/15.
6. APS March Meeting, San Antonio (US), 3/2 – 3/6/15.
5. “Topological Insulators and Mathematical Science,” Harvard University, Cambridge (US), 9/15 – 9/17/14.
4. “Topological Aspects of Condensed Matter Physics,” Les Houches Summer School Session CIII, Les Houches (FR), 8/4 – 8/29/2014.
3. APS March Meeting, Denver (US), 3/3 – 3/7/14.
2. “Topology and Nonequilibrium in Low-Dimensional Electronic Systems,” Max Planck Institute for the Physics of Complex systems, Dresden (DE), 9/16 – 9/20/13.
1. APS March Meeting, Boston (US), 2/27 – 3/2/12.

Synergistic Activities

- Co-organizer of KITP virtual conference “Frontiers of quantum computing and quantum dynamics” (10/19 – 10/20/20)
- Developing a new course on quantum computing for undergraduate and graduate students at ISU (offered beginning Spring 2021)
- Contributor at DOE’s Ames Laboratory 2019 –
- Referee for Physical Review Letters, Physical Review B, Physical Review X, and Communications Physics 2015 –
- Co-organizer of UMD’s Condensed Matter Theory Seminar Series 2018 – 2019
- Member of BU Physics department’s Graduate Student Council from 2012 – 2017
- Co-organizer of BU’s Condensed Matter Theory Seminar Series from 2015 – 2016
- Math tutor at Beacon Academy (academic program for middle schoolers from disadvantaged Boston-area public school districts) from 2013 – 2016