

Mathias S. Scheurer

Curriculum Vitae

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Personal details

Date of birth June 18, 1988
Place of birth Heilbronn, Germany
Present citizenship Germany

Research positions

09/2020–today **Assistant Professor** at the Institute for Theoretical Physics at the University of Innsbruck
03/2017–08/2020 **Post-doctoral Fellow** in the Department of Physics at Harvard University
Faculty Advisor Subir Sachdev
05/2016–02/2017 **Post-doctoral Fellow** in the Department of Physics at Karlsruhe Institute of Technology
Faculty Advisor Jörg Schmalian
02/2013 – 05/2013 **Graduate research assistant** with Peter P. Orth at Karlsruhe Institute of Technology

Education

06/2013–04/2016 **PhD in Physics**, Karlsruhe Institute of Technology
Thesis Mechanism, symmetry and topology of ordered phases in correlated systems
Advisor Jörg Schmalian
Final grade summa cum laude (with highest honor)
12/2012 **Diploma in Physics**, Karlsruhe Institute of Technology
Thesis Non-adiabatic processes in Majorana qubit systems
Advisor Alexander Shnirman
Final grade 1.0 (with distinction)
10/2007–12/2012 **Undergraduate studies in physics**, Karlsruhe Institute of Technology
02/2011–07/2011 Exchange student at University of Technology Sydney
06/2007 **Abitur** (High-school diploma) at Elly-Heuss-Knapp-Gymnasium, Heilbronn, Germany
Final grade 1.0

Awards & Grants

- 2022–2027 **ERC Starting Grant**, see [here](#), for project “SuperCorr: Understanding, Engineering, and Probing Correlated Many-Body Physics in Superlattices of Graphene and Beyond”
- 04/2017 **Otto Haxel PhD award**, awarded by “Freundeskreis des Forschungszentrums Karlsruhe e.V.” and DPG for outstanding PhD thesis in 2016 at the universities of Göttingen, Heidelberg, and Karlsruhe
- 03/2017–02/2019 **Post-doctoral fellowship of the National Academy of Sciences Leopoldina**, grant number LPDS 2016-12
- 03/2011–06/2011 **Scholarship of the German Academic Exchange Service (DAAD)** for studying 4 months at University of Technology Sydney
- 10/2007 – 12/2012 **Scholarship of the German National Academic Foundation** (“Studienstiftung des deutschen Volkes”) during undergraduate studies
- 07/2007 – 07/2016 **Scholarship of e-fellows.net** during undergraduate and graduate studies
- 07/2007 **Robert Mayer award** of the city of Heilbronn, awarded to the best high-school students in natural sciences of 2006/2007

Teaching experience

Lecturer at University of Innsbruck for:

- Winter 22/23 Theory of Condensed Matter (3 h/week),
Research Seminar: Solid State Physics 2022 (2 h/week), and
1 lecture in joint class Modern Physics (3 h)
- Summer 22 Advanced Theory of Condensed Matter (3 h/week),
Applications of Condensed Matter Theory (1 h/week), and
Seminar with Bachelor’s Thesis (3 students)
- Winter 21/22 Theory of Condensed Matter (3 h/week) and
Research Seminar: Solid State Physics 2022 (2 h/week)
- Summer 21 Advanced Theory of Condensed Matter (3 h/week) and
Seminar with Bachelor’s Thesis (3 students)
- Winter 20/21 Theory of Condensed Matter (3 h/week),
the associated exercises “Proseminar” (2 h/week), and
1 lecture in joint class Modern Physics (3 h)

Head teaching assistant for Condensed Matter Theory II (Introduction to many-body field theory) at Karlsruhe Institute of Technology, Summer 2016

Responsibilities: Designing weekly exercise sheets complementing the lecture, presentation of solutions and Q&A with students (2 hours per week)

Teaching assistant at Karlsruhe Institute of Technology for **five** different classes:

- Summer 15 Theoretical Physics D (Quantum mechanics)
- Winter 14/15 Experimental Physics V (Solid state physics)
- Summer 14 Theoretical Physics F (Statistical mechanics)
- Winter 13/14 Theoretical Physics A (Classical mechanics)
- Summer 13 Theoretical Optics (Classical and quantum optics)

Responsibilities: Presentation of solutions to exercise sheets and Q&A with students (2 hours per week), grading of homework and exams

Professional service

- Scientific journals** Peer-review for Nature, Science, Nature Communications, Scientific Reports, Physical Review X, Physical Review Letters, Physical Review B, Annals of Physics, IOP Machine Learning: Science and Technology, and EPJ Quantum Technology
- Grants** Review of proposals for “U.S. Department of Energy” (USA), “Israel Science Foundation” (Israel), “French National Research Agency” (France), and “National Research, Development and Innovation Office” (Hungary)
- Books** Review of book proposal for Taylor & Francis Group

Publications

In total **60 manuscripts**: 7 preprints online, 1 book chapter, 1 News & Views article (Nature), and 51 published in peer-reviewed journals: Science (1), Nature Materials (1), Nature Physics (5), Nature Communications (2), Physical Review X (2), Proceedings of the National Academy of Sciences (3), Physical Review Letters (2), 2D Materials (2), SciPost Physics (2), Nano Letters (1), npj Quantum Materials (1), Scientific Reports (1), Physical Review B Letter (2), Physical Review B (19), Physical Review Research (6), and Journal of Physical Chemistry C (1).

Complete list of publications available online:

- Submitted**
 1. *Classifying topological neural network quantum states via diffusion maps*, Y. Teng, S. Sachdev, M. S. Scheurer, [arXiv:2301.02683](https://arxiv.org/abs/2301.02683).
 2. *Vestigial singlet pairing in a fluctuating magnetic triplet superconductor: Applications to graphene moiré systems*, Prathyush P. Poduval, M. S. Scheurer, [arXiv:2301.01344](https://arxiv.org/abs/2301.01344).
 3. *Time-reversal symmetry breaking in superconducting low-carrier-density quasi-skutterudite $\text{Lu}_3\text{Os}_4\text{Ge}_{13}$* , A. Kataria, J. A. T. Verezhak, O. Prakash, R. K. Kushwaha, A. Thamizhavel, S. Ramakrishnan, M. S. Scheurer, A. D. Hillier, R. P. Singh, [arXiv:2211.03084](https://arxiv.org/abs/2211.03084).
 4. *Tunable superconductivity and Möbius Fermi surfaces in an inversion-symmetric twisted van der Waals heterostructure*, H. D. Scammell, M. S. Scheurer, [arXiv:2210.03125](https://arxiv.org/abs/2210.03125).

5. *Electron spin resonance and collective excitations in magic-angle twisted bilayer graphene*, E. Morissette, J.-X. Lin, S. Liu, D. Rhodes, K. Watanabe, T. Taniguchi, J. Hone, M. S. Scheurer, M. Lilly, A. Mounce, J.I.A. Li, [arXiv:2206.08354](https://arxiv.org/abs/2206.08354).
6. *Non-coplanar magnetism, topological density wave order and emergent symmetry at half-integer filling of moiré Chern bands*, P. Wilhelm, T. Lang, M. S. Scheurer, A. Läuchli, [arXiv:2204.05317](https://arxiv.org/abs/2204.05317).
7. *A new flavor of correlation and superconductivity in small twist-angle trilayer graphene*, P. Siriviboon, J.-X. Lin, H. D. Scammell, S. Liu, D. Rhodes, K. Watanabe, T. Taniguchi, J. Hone, M. S. Scheurer, J.I.A. Li, [arXiv:2112.07127](https://arxiv.org/abs/2112.07127).

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8. *Moiré phonons and impact of electronic symmetry breaking in twisted trilayer graphene*, R. Samajdar, Y. Teng, M. S. Scheurer, *Phys. Rev. B* **106**, L201403 (Letter) [[arXiv:2205.06816](https://arxiv.org/abs/2205.06816)].
9. *Zero-field superconducting diode effect in small-twist-angle trilayer graphene*, J.-X. Lin, P. Siriviboon, H. D. Scammell, S. Liu, D. Rhodes, K. Watanabe, T. Taniguchi, J. Hone, M. S. Scheurer, J.I.A. Li, *Nature Physics* **2022** [[arXiv:2112.07841](https://arxiv.org/abs/2112.07841)].
10. *Time-reversal-symmetry Breaking in the Superconducting State of ScS*, Arushi, R. K. Kushwaha, D. Singh, A. D. Hillier, M. S. Scheurer, R. P. Singh, *Phys. Rev. B* **106**, L020504 (Letter) [[arXiv:2203.16458](https://arxiv.org/abs/2203.16458)].
11. *Correlated insulators, semimetals, and superconductivity in twisted trilayer graphene*, M. Christos, S. Sachdev, and M. S. Scheurer, *Phys. Rev. X* **12**, 021018 (2022) [[arXiv:2106.02063](https://arxiv.org/abs/2106.02063)].
12. *Orderly disorder in magic-angle twisted trilayer graphene*, S. Turkel, J. Swann, Z. Zhu, M. Christos, K. Watanabe, T. Taniguchi, S. Sachdev, M. S. Scheurer, E. Kaxiras, C. R. Dean, A. N. Pasupathy, *Science* **376**, 193-199 (2022) [[arXiv:2109.12631](https://arxiv.org/abs/2109.12631)].
13. *Theory of zero-field diode effect in twisted trilayer graphene*, H. D. Scammell, J.I.A. Li, and M. S. Scheurer, *2D Materials* **9**, 025027 (2022) [[arXiv:2112.09115](https://arxiv.org/abs/2112.09115)].
14. *Unconventional pairing in $(Ca,Sr)_3(Ir,Rh)_4Sn_{13}$ superconductors revealed by controlling disorder*, E. H. Krenkel, M. A. Tanatar, M. Konczykowski, R. Grasset, E. I. Timmons, S. Ghimire, K. R. Joshi, Y. Lee, Liqin Ke, S. Chen, C. Petrovic, P. P. Orth, M. S. Scheurer, R. Prozorov, *Phys. Rev. B* **105**, 094521 (2022) [[arXiv:2110.02025](https://arxiv.org/abs/2110.02025)].
15. *Universal moiré nematic phase in twisted graphitic systems*, C. Rubio

- Verdu, S. Turkel, Y. Song, L. Klebel, R. Samajdar, M. S. Scheurer, J. Venderbos, H. Ochoa, X. Ledé, D. Kennes, R. Fernandes, A. Rubio, and A. Pasupathy, *Nature Physics* **18**, 196–202 (2022) [[arXiv:2009.11645](#)].
16. *Photocurrent-driven transient symmetry breaking in the Weyl semimetal TaAs*, N. Sirica, P. P. Orth, M. S. Scheurer, Y.M. Dai, M.-C. Lee, P. Padmanabhan, L.T. Mix, L.X. Zhao, G.F. Chen, B. Xu, R. Yang, B. Shen, C.-C. Lee, H. Lin, T.A. Cochran, S.A. Trugman, J.-X. Zhu, M.Z. Hasan, N. Ni, X.G. Qiu, A.J. Taylor, D.A. Yarotski, R.P. Prasankumar, *Nature Materials* **21**, 62–66 (2022) [[arXiv:2005.10308](#)].
 17. *Generative models for sampling and phase transition indication in spin systems*, J. Singh, V. Arora, V. Gupta, M. S. Scheurer, *SciPost Phys.* **11**, 043 (2021) [[arXiv:2006.11868](#)].
 18. *Learning crystal field parameters using convolutional neural networks*, N. Berthussen, Y. Sizyuk, M. S. Scheurer, and P. Orth, *SciPost Phys.* **11**, 011 (2021)[[arXiv:2011.12911](#)].
 19. *Phonon Hall viscosity from phonon-spinon interactions*, Y. Zhang*, Y. Teng*, R. Samajdar, S. Sachdev, and M. S. Scheurer, *Phys. Rev. B* **104**, 035103 (2021) [[arXiv:2103.05650](#)].
 20. *Electric-field-tunable electronic nematic order in twisted double-bilayer graphene*, R. Samajdar*, M. S. Scheurer*, S. Turkel, C. Rubio-Verdú, A. Pasupathy, J. Venderbos, and R. Fernandes, *2D Materials* **8**, 034005 (2021) [[arXiv:2102.08385](#)].
 21. *Time-reversal symmetry breaking and multigap superconductivity in the noncentrosymmetric superconductor La_7Ni_3* , Arushi, D. Singh, A. D. Hillier, M. S. Scheurer, R. P. Singh, *Phys. Rev. B* **103**, 174502 (2021) [[arXiv:2012.05654](#)].
 22. *Anomalous mirror symmetry breaking in a model insulating cuprate $Sr_2CuO_2Cl_2$* , A. de la Torre, K. L. Seyler, L. Zhao, S. Di Matteo, M. S. Scheurer, Y. Li, B. Yu, M. Greven, S. Sachdev, M. R. Norman, D. Hsieh, *Nature Physics* **17**, 777-781 (2021) [[arXiv:2008.06516](#)].
 23. *Superconductivity, correlated insulators, and Wess-Zumino-Witten terms in twisted bilayer graphene*, M. Christos, S. Sachdev, M. S. Scheurer, *PNAS* **117**, 29543 (2020) [[arXiv:2007.00007](#)].
 24. *Time-reversal-symmetry breaking and unconventional pairing in the noncentrosymmetric superconductor La_7Rh_3 probed by μ SR*, D. Singh, M. S. Scheurer, A. D. Hillier, R. P. Singh, *Phys. Rev. B* **102**, 134511 (2020) [[arXiv:1802.01533](#)].
 25. *Bilocal quantum criticality*, H. D. Scammell, M. S. Scheurer, S. Sachdev,

[Phys. Rev. Research 2, 033390 \(2020\) \[arXiv:2006.01834\]](#).

26. *Protection of parity-time symmetry in topological many-body systems: non-Hermitian toric code and fracton models*, H. Shackleton, [M. S. Scheurer](#), [Phys. Rev. Research 2, 033022 \(2020\) \[arXiv:2005.09668\]](#).
27. *Unquantized thermal Hall effect in quantum spin liquids with spinon Fermi surfaces*, Y. Teng, Y. Zhang, [M. S. Scheurer](#), S. Sachdev, [Phys. Rev. Research 2, 033283 \(2020\) \[arXiv:2005.02396\]](#).
28. *Microscopic theory of superconductivity in twisted double-bilayer graphene*, R. Samajdar and [M. S. Scheurer](#), [Phys. Rev. B 102, 064501 \(2020\) \[arXiv:2001.07716\]](#).
29. *Not all doped Mott insulators have a pseudogap: key role of van Hove singularities*, W. Wu, [M. S. Scheurer](#), M. Ferrero, A. Georges, [Phys. Rev. Research 2, 033067 \(2020\) \[arXiv:2001.00019\]](#).
30. *Pairing in twisted double-bilayer graphene and related moiré superlattice systems*, [M. S. Scheurer](#) and R. Samajdar, [Phys. Rev. Research 2, 033062 \(2020\) \[arXiv:1906.03258\]](#).
31. *Unsupervised machine learning and band topology*, [M. S. Scheurer](#), R.-J. Slager, [Phys. Rev. Lett. 124, 226401 \(2020\) \[arXiv:2001.01711\]](#).
32. *Phases of $SU(2)$ gauge theory with multiple adjoint Higgs fields in $2+1$ dimensions*, H. D. Scammell, K. Patekar, [M. S. Scheurer](#), S. Sachdev, [Phys. Rev. B 101, 205124 \(2020\) \[arXiv:1912.06108\]](#).
33. *Gauge Theories for the Thermal Hall Effect*, H. Guo, R. Samajdar, [M. S. Scheurer](#), S. Sachdev, [Phys. Rev. B 101, 195126, Editors' Suggestion \(2020\) \[arXiv:2002.01947\]](#).
34. *Electron irradiation effects on superconductivity in $PdTe_2$: an application of a generalized Anderson theorem*, E. I. Timmons, S. Teknowijoyo, M. Kończykowski, O. Cavani, M. A. Tanatar, S. Ghimire, K. Cho, Y. Lee, L. Ke, N. H. Jo, S. L. Bud'ko, P. C. Canfield, P. P. Orth, [M. S. Scheurer](#), R. Prozorov, [Phys. Rev. Research 2, 023140 \(2020\) \[arXiv:2001.04673\]](#).
35. *Enhanced thermal Hall effect in the square-lattice Néel state*, R. Samajdar, [M. S. Scheurer](#), S. Chatterjee, H. Guo, C. Xu, and S. Sachdev, [Nature Physics 15, 1290-1294 \(2019\) \[arXiv:1903.01992\]](#).
36. *Spectroscopy of graphene with a magic twist*, [M. S. Scheurer](#), [Nature 572, 40-41 \(2019\)](#).
37. *Identifying topological order through unsupervised machine learning*,

J. F. Rodriguez-Nieva and M. S. Scheurer, *Nature Physics* **15**, 790-795 (2019) [arXiv:1805.05961].

38. *Thermal Hall effect in square-lattice spin liquids: a Schwinger boson mean-field study*, R. Samajdar, S. Chatterjee, S. Sachdev, M. S. Scheurer, *Phys. Rev. B* **99**, 165126 (2019) [arXiv:1812.08792].
39. *Gauge theory for the cuprates near optimal doping*, S. Sachdev, H. D. Scammell, M. S. Scheurer, and G. Tarnopolsky, *Phys. Rev. B* **99**, 054516, *Editors' Suggestion* (2019) [arXiv:1811.04930].
40. *Fermi surface reconstruction in electron-doped cuprates without antiferromagnetic long-range order*, J.-F. He, C. R. Rotundu, M. S. Scheurer, Y. He, M. Hashimoto, K. Xu, Y. Wang, E. W. Huang, T. Jia, S.-D. Chen, B. Moritz, D.-H. Lu, Y. S. Lee, T. P. Devereaux, and Z. X. Shen, *PNAS* **116** (9) 3449 (2019) [arXiv:1811.04992].
41. *Designing morphotropic phase composition in BiFeO₃*, A. Herklotz, S. F. Rus, N. B. Wisinger, C. Rouleau, E. J. Guo, A. Huon, S. KC, R. Roth, X. Yang, C. Vaswani, J. Wang, P. P. Orth, M. S. Scheurer, T. Z. Ward, *Nano Letters* **19**, 2, 1033 (2019).
42. *Orbital currents in insulating and doped antiferromagnets*, M. S. Scheurer and S. Sachdev, *Phys. Rev. B* **98**, 235126 (2018) [arXiv:1808.04826].
43. *Friedel oscillations and Majorana zero modes in inhomogeneous superconductors*, L. Lauke, M. S. Scheurer, A. Poenicke, J. Schmalian, *Phys. Rev. B* **98**, 134502 (2018) [arXiv:1803.11421].
44. *Triangular antiferromagnetism on the honeycomb lattice of twisted bilayer graphene*, A. Thomson, S. Chatterjee, S. Sachdev, M. S. Scheurer, *Phys. Rev. B* **98**, 075109 (2018) [arXiv:1806.02837].
45. *Nodeless superconductivity in type-II Dirac semimetal PdTe₂: low-temperature London penetration depth and symmetry analysis*, S. Teknowijoyo, N. H. Jo, M. S. Scheurer, M. A. Tanatar, K. Cho, S. L. Bud'ko, P. P. Orth, P. C. Canfield, R. Prozorov, *Phys. Rev. B* **98**, 024508 (2018) [arXiv:1804.00723].
46. *Hierarchy of Information Scrambling, Thermalization, and Hydrodynamic Flow in Graphene*, M. J. Klug, M. S. Scheurer, J. Schmalian, *Phys. Rev. B* **98**, 045102 (2018) [arXiv:1712.08813].
47. *Topological order in the pseudogap metal*, M. S. Scheurer, S. Chatterjee, W. Wu, M. Ferrero, A. Georges, S. Sachdev, *PNAS* **115**, E3665 (2018) [arXiv:1711.09925].
48. *Pseudogap and Fermi surface topology in the two-dimensional Hubbard*

model, W. Wu, M. S. Scheurer, S. Chatterjee, S. Sachdev, A. Georges, M. Ferrero, *Phys. Rev. X* **8**, 021048 (2018) [[arXiv:1707.06602](#)].

49. *Intertwining topological order and broken symmetry in a theory of fluctuating spin density waves*, S. Chatterjee, S. Sachdev, and M. S. Scheurer, *Phys. Rev. Lett.* **119**, 227002 (2017) [[arXiv:1705.06289](#)].
50. *Limits on dynamically generated spin-orbit coupling: Absence of $l = 1$ Pomeranchuk instabilities in metals*, E. I. Kiselev, M. S. Scheurer, P. Wölfle, J. Schmalian, *Phys. Rev. B* **95**, 125122 (2017) [[arXiv:1611.01442](#)].
51. *Selection rules for Cooper pairing in two-dimensional interfaces and sheets*, M. S. Scheurer, D. F. Agterberg, and J. Schmalian, *npj Quantum Materials* **2**, 9 (2017) [[arXiv:1503.03646](#)].
52. *Mechanism, time-reversal symmetry, and topology of superconductivity in noncentrosymmetric systems*, M. S. Scheurer, *Phys. Rev. B* **93**, 174509 (2016) [[arXiv:1601.05459](#)].
53. *Pair breaking in multiorbital superconductors: An application to oxide interfaces*, M. S. Scheurer, M. Hoyer, and J. Schmalian, *Phys. Rev. B* **92**, 014518 (2015) [[arXiv:1505.04919](#)].
54. *Anomalous quantum criticality in an itinerant ferromagnet*, C. L. Huang, D. Fuchs, M. Wissinger, R. Schneider, M. C. Ling, M. S. Scheurer, J. Schmalian, and H. v. Löhneysen, *Nat. Commun.* **6**, 8188 (2015).
55. *Pair breaking due to orbital magnetism in iron-based superconductors*, M. Hoyer, M. S. Scheurer, S. V. Syzranov, and J. Schmalian, *Phys. Rev. B* **91**, 054501 (2015) [[arXiv:1410.2555](#)].
56. *Dimensional crossover and cold-atom realization of topological Mott insulators*, M. S. Scheurer, S. Rachel, and P. P. Orth, *Sci. Rep.* **5**, 8386 (2015) [[arXiv:1406.7396](#)].
57. *Topological superconductivity and unconventional pairing in oxide interfaces*, M. S. Scheurer and J. Schmalian, *Nat. Commun.* **6**, 6005 (2015) [[arXiv:1404.4039](#)].
58. *Nonadiabatic processes in Majorana qubit systems*, M. S. Scheurer and A. Shnirman, *Phys. Rev. B* **88**, 064515 (2013) [[arXiv:1305.4923](#)].
59. *Damping of Plasmons of Closely Coupled Sphere Chains Due to Disordered Gaps*, M. S. Scheurer, M. D. Arnold, J. Setiadi, and M. J. Ford, *J. Phys. Chem. C* **116**, 1335-1343 (2012).

- Book chapters**
60. *Surface and Interface Superconductivity*, S. Gariglio, M. S. Scheurer, J. Schmalian, A. M. R. V. L. Monteiro, S. Goswami, and A. D. Caviglia in *The Oxford Handbook of Small Superconductors* (Oxford University Press, Oxford, 2017).

authors indicated with * contributed equally

Presentations

Talks

1. *Exotic superconductivity and magnetism in van der Waals moiré systems*, Seminar at Max-Planck Institute for Solid-State Research, Stuttgart, September 22, 2022.
2. *Zero-field superconducting diode effect in twisted trilayer graphene*, invited talk at IBS-APCTP conference on Advances in the Physics of Topological & Correlated Matter, Daejeon, Korea, September 20, 2022 (virtual).
3. *Theory of zero-field superconducting diode effect in trilayer graphene*, Invited talk at Virtual Science Forum conference on Superconducting diode effects, Mai 19, 2022, [Material Online](#).
4. *Quantum many-body physics in moiré superlattices*, Invited talk at 3rd PhD symposium on Correlated Magnetism, Dresden, April 5, 2022.
5. *Many-body physics in several twisted graphene systems*, Seminar, Wrocław University of Science & Technology, November 17, 2021, virtually.
6. *Correlated many-body physics in twisted trilayer graphene*, joint annual meeting of ÖPG and SPS, Innsbruck, September 1, 2021.
7. *More moiré is better: many-body physics in several twisted graphene systems*, Condensed Matter Seminar, Niels Bohr Institute, October 29, 2021, virtually.
8. *More moiré is better: many-body physics in several twisted graphene systems*, Condensed Matter Seminar, TU Munich, June 30, 2021, virtually.
9. *Many-body physics in 'other' twisted graphene systems*, at conference Correlations in Novel Quantum Materials, June 10, 2021, [Material Online](#).
10. *Form and field-tunability of nematic order in twisted double-bilayer graphene*, March Meeting 2021, March 16, 2021, virtually.
11. *Superconductivity, its relation to the correlated insulators, and field-*

controlled nematicity in moiré graphene, Seminar, Bar-Ilan University, January 7, 2021, virtually.

12. *Superconductivity, its relation to the correlated insulators, and field-controlled nematicity in twisted graphene*, at KITP Program: Correlated Systems with Multicomponent Local Hilbert Spaces, Dec 14, 2020, virtually [Material Online](#).
13. *Correlated many-body physics in moiré superlattices of graphene*, BLABS Seminar, Los Alamos National Laboratory, October 12, 2020, virtually.
14. *Superconductivity and its relation to the correlated insulators in moiré graphene*, Seminar, Weizmann Institute of Science, September 23, 2020, virtually.
15. *Moiré superlattices of graphene as a platform for many-body physics*, Colloquium, University of Innsbruck, June 16, 2020, virtually.
16. *Gauge theories for the thermal Hall effect*, virtual March Meeting 2020, March 13, 2020, [Material Online](#).
17. *Unsupervised machine learning of topological phase transitions*, virtual March Meeting 2020, March 11, 2020, [Material Online](#).
18. *Topology and correlations in two-dimensional systems*, Condensed Matter Seminar, UC Irvine, February 10, 2020, Irvine (USA).
19. *Topology and correlations in two-dimensional systems*, CAMP Seminar, Penn State University, January 29, 2020, State College (USA).
20. *Topology and correlations in two-dimensional systems*, Colloquium, Carnegie Mellon University, January 13, 2020, Pittsburgh (USA).
21. *Effective theories for the strongly coupled Hubbard model*, CCQ Seminar, Flatiron Institute, December 12, 2019, New York City (USA).
22. *Effective theories for the strongly interacting Hubbard model*, CQP Colloquium, New York University, December 11, 2019, New York City (USA).
23. *Gauge theories for the cuprates: thermal Hall effect and pseudogap*, CMSA Condensed Matter/Math seminar, Harvard University, November 7, 2019, Cambridge (USA).
24. *Gauge theories for the cuprates: thermal Hall effect and optimal doping*, Condensed Matter/Biophysics seminar, University of Florida, November 4, 2019, Gainesville (USA).

25. *Gauge theories for the strongly coupled Hubbard model*, Seminar at University of Innsbruck, October 22, 2019, Innsbruck (Austria).
26. *Gauge theories for the cuprates: thermal Hall effect and optimal doping*, Boston College, October 10, 2019, Newton (USA).
27. *Enhanced thermal Hall effect in the square-lattice Néel state*, Symposium on Theory of Novel Materials at Max Planck Institute of Solid State Research, September 26, 2019, Stuttgart (Germany).
28. *Gauge theories for the cuprates: thermal Hall effect*, at conference Quantum criticality and topology in correlated electron systems at Max Planck Institute for the Physics of Complex Systems, August 5, 2019, Dresden (Germany).
29. *Gauge theories for the cuprates near optimal doping*, at APS March Meeting 2019, March 4, 2019, Boston (USA).
30. *Gauge theories for the cuprates*, Condensed Matter Theory Seminar, University of Cologne, February 14, 2019, Cologne (Germany).
31. *Topology in correlated condensed matter systems*, LASSP and AEP seminar, Cornell University, February 05, 2019, Ithaca (USA).
32. *Gauge theories of fluctuating antiferromagnetism for the cuprate superconductors*, Seminar of the Institute for Theoretical Condensed Matter Physics, Karlsruhe Institute of Technology, December 06, 2018, Karlsruhe (Germany).
33. *Gauge theories of fluctuating antiferromagnetism for the cuprate superconductors*, CMT Seminar at TU Dresden, December 04, 2018, Dresden (Germany).
34. *Gauge theories of fluctuating antiferromagnetism for the cuprate superconductors*, Seminar at University of Würzburg, November 29, 2018, Würzburg (Germany).
35. *Gauge theories of fluctuating antiferromagnetism for the cuprate superconductors*, Condensed Matter Seminar at University of Minnesota, November 14, 2018, Minneapolis (USA).
36. *$SU(2)$ gauge theory of fluctuating magnetism: Fermi-surface reconstruction without translational-symmetry breaking*, at conference *Topology and Quantum Phases of Matter*, August 28, 2018, Cambridge (USA).
37. *Evidence for topological order in the pseudogap metal*, at APS March Meeting 2018, March 6, 2018, Los Angeles (USA).

38. *Topological order in the pseudogap metal*, Condensed Matter Physics Seminar at Iowa State University, February 15, 2018, Ames (USA).
39. *Evidence for topological order in the pseudogap metal from DMFT and QMC*, group seminar at Harvard University, October 27, 2017, Cambridge (USA).
40. *Mechanismus, Symmetrie und Topologie geordneter Phasen in korrelierten Systemen*, at Otto-Haxel Symposium, April 7, 2017, Karlsruhe (Germany).
41. *Interplay between mechanism, symmetry and topology at superconducting interfaces*, at conference *Condensed Matter Physics in the City 2016*, July 7, 2016, London (England).
42. *Mechanism, symmetry, and topology of noncentrosymmetric superconductors*, Condensed Matter Seminar at University of St Andrews, June 1, 2016, St Andrews (Scotland).
43. *Interaction-induced topological superconductivity in 2D interfaces*, Landau Seminar at Loughborough University, October 14, 2015, Loughborough (England).
44. *Topological superconductivity and unconventional pairing in oxide interfaces*, at conference *Materials & Mechanisms of Superconductivity 2015*, August 27, 2015, Geneva (Switzerland).
45. *Time-reversal symmetry in superconducting interfaces and 2D sheets*, Seminar of the Institute for Theoretical Condensed Matter Physics, Karlsruhe Institute of Technology, June 25, 2015, Karlsruhe (Germany).
46. *Topological superconductivity in two-dimensional interfaces*, Seminar at University of Würzburg, May 29, 2015, Würzburg (Germany).
47. *Topological superconductivity and unconventional pairing in oxide interfaces*, DPG Spring Meeting 2015, March 16, 2015, Berlin (Germany).
48. *Superconductivity: Aspects of symmetry and topology*, at conference *Matière et Symétries*, December 3, 2014, Grenoble (France).
49. *Topological superconductivity and unconventional pairing in oxide interfaces*, at conference *Quantum Critical Matter – From Atoms to Bulk*, August 21, 2014, Obergurgl (Austria).
50. *Topological superconductivity and unconventional pairing in oxide interfaces*, Seminar of the Institute for Theoretical Condensed Matter Physics, Karlsruhe Institute of Technology, June 12, 2014, Karlsruhe (Germany).

51. *Interaction-induced instabilities in LaAlO₃/SrTiO₃ interfaces*, DPG Spring Meeting 2014, April 2, 2014, Dresden (Germany).

Posters

52. *Zero-field superconducting diode effect in twisted trilayer graphene*, at conference *Novel Electronic Properties of Two-Dimensional Materials*, July 11-15, 2022, San Sebastian (Spain).

53. *Zero-field superconducting diode effect in twisted trilayer graphene*, at conference *Correlations in Novel Quantum Materials 2022*, June 20-23, 2022, MPI Stuttgart (Germany).

54. *Theory of nematic order in twisted double-bilayer graphene*, at CIFAR-QM Meeting, Nov 2-3, 2020, virtually (on slack).

55. *Identifying topological order via unsupervised machine learning*, at postdoc meeting at Harvard University, September 12, 2018, Hull (USA).

56. *Topological order and broken symmetries in the pseudogap metal*, at *Gordon Conference on Correlated Electron Systems*, June 24–29, 2018, Mount Holyoke College (USA).

57. *Topological order and broken symmetries in the pseudogap metal*, at conference *Correlated Electron Systems – Novel Developments*, May 16–19, 2018, Minneapolis (USA).

58. *Evidence for topological order in the pseudogap metal from dynamical mean-field theory and quantum Monte Carlo*, at postdoc meeting at Harvard University, September 13, 2017, Hull (USA).

59. *Topological order and DMFT/QMC spectra for the pseudogap metal*, at conference *Intertwined order and fluctuations in quantum materials*, July 31–August 5, 2017, University of California, Santa Barbara (USA).

60. *Topological order near the Néel state of the square-lattice antiferromagnet*, at *Gordon Conference on Novel trends in superconductivity of correlated electrons*, June 4–9, 2017, Waterville Valley (USA).

61. *Interaction-induced topological superconductivity in interfaces*, at summer school *COR. S.O.: New physics due to Spin-Orbit coupling in CORrelated electron systems*, August 4–14, 2015, Cargèse (France).

62. *Interaction-induced instabilities in perovskite heterointerfaces*, at *Gordon Conference on Correlated Electron Systems*, June 22–27, 2014, Mount Holyoke College (USA).

63. *Non-adiabatic effects due to the motion of Majorana fermions*, at conference *Majorana Fermions in Condensed Matter*, July 2–6, 2012, Leiden (Netherlands).