

# Curriculum Vitae Louk Rademaker

## Main Research Positions

January 2023 – now	<b>SNSF Professor, Université de Genève, Switzerland</b> Based on SNSF Starting Grant ‘ <i>Quantum Matter with a Twist – The Interplay of Correlations and Topology in Moiré Materials</i> ’
September 2018 – December 2022	<b>Ambizione Fellow, Université de Genève, Switzerland</b> Based on SNSF Ambizione grant ‘ <i>Sluggish quantum matter – Slow dynamics in many-body localized and glassy systems</i> ’
September 2017 – August 2018	<b>Senior Postdoctoral Researcher, Perimeter Institute for Theoretical Physics, Waterloo, Canada</b>
September 2014 – August 2017	<b>Postdoctoral Researcher, Kavli Institute for Theoretical Physics, University of California, Santa Barbara, USA</b> Based on NWO Rubicon grant ‘ <i>What’s the matter with frustration? Highly fluctuating phases in frustrated complex oxides</i> ’

## Education

December 2013	<b>PhD Theoretical Physics, Leiden University</b> Thesis: “ <i>Fermions and Bosons: Excitons in strongly correlated materials</i> ” Supervisors: Jan Zaanen and Hans Hilgenkamp
September 2008	<b>MSc Theoretical Physics, Leiden University</b> Thesis: “ <i>Phase Transitions in Matrix Models</i> ” (high energy physics), graduated with distinction Supervisor: Koenraad Schalm
September 2006	<b>BSc Mathematics and BSc Astronomy, Leiden University</b> Thesis: “ <i>Shock waves through inhomogeneous media</i> ” Supervisors: Vincent Icke and Vivi Rötttschafer

## Skills

- Fluent in Dutch, English; intermediate level (CEF level B1) in French; basic level in German and Russian.
- Highly skilled in Fortran, Mathematica and Python.
- Trained in classical Monte Carlo, Determinant Quantum Monte Carlo, diagrammatic techniques (including Eliashberg theory), Dynamical Mean Field Theory and Density Functional Theory (incl. Quantum Espresso, Wannier90).
- **International collaborations** in USA, China, Canada, Chile, Spain, Italy, France, the Netherlands, Switzerland and Japan.
- **Organized** local seminar series at all my positions, and various national and international conferences and workshops. Currently organizer and founder of the “Flat Club” in Genève, a biweekly seminar on two-dimensional materials.
- **Referee** for several high-quality journals, including Science, Physical Review Letters, Nature Communications, Europhysics Letters, Physica C and Physical Review B; and **reviewer** for the European Research Council and the US Department of Energy.

## Personal Information

Birthday	26 November 1986, Vleuten-De Meern, The Netherlands
Address	Rue des Draizes 55 2000 Neuchatel, Switzerland
Webpage	rademaker.unige.ch
Email	<i>louk.rademaker@gmail.com</i>
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ORCID	0000-0001-6053-8150

## Parental leave

Spring 2021	<b>Parental leave (Child 2)</b> Taking care of my new-born son Artur.
Winter 2016-2017	<b>Parental leave (Child 1)</b> Taking care of my new-born daughter Stefania.

## Other Positions

January 2014 – July 2014	<b>Temporary researcher, Leiden University</b> I continued working with Jan Zaanen on quantum matter, spin ices and correlated thermoelectrics. From May onwards I worked with Tjerk Oosterkamp on microwave circuits.
January 2013 – February 2013	<b>Visiting scholar, National High Magnetic Field Laboratory, Tallahassee, United States</b> Visiting the group of Vladimir Dobrosavljevic to study the influence of long-range interactions on stripe formation and glasses; and to learn DMFT.
July 2009 – August 2009	<b>Visiting student, Stanford University, USA</b> Visiting the group of Tom Devereaux and Jeroen van den Brink to learn DQMC.
March 2006 – March 2014	<b>Elected City Council Member, City Council of Leiden</b> The City of Leiden has about 120000 inhabitants and an annual budget of about 500 million euro. Served as member of the Urban Development Committee, the Regional Affairs Committee, the Committee for Social Welfare & Economics and the Budget Committee. Elected in March 2006, re-elected for a second term in March 2010.
January 2008 – December 2008	<b>Strategy Consultant, Instituut voor Maatschappelijke Innovatie (IMI)</b> Part-time position as consultant at the 'Institute for Social Innovation'. Main project was to advise the Ministry of Infrastructure on the long-term future of highway construction.
May 2004 – May 2005	<b>Teacher in Economics, Stichting Studiebegeleiding Leiden (SSL)</b> Teaching intensive 3-day courses in economics for high school students.
May 2004 – March 2006	<b>Political Assistant, Provinciale Staten van Zuid-Holland</b> Assisting the State Parliament of South-Holland.

## Publication List

1. Giacomo Morpurgo, **Louk Rademaker**, Christophe Berthod, Thierry Giamarchi, *Hall response of locally-correlated two-dimensional electrons at low density*, Phys. Rev. Research 6, 013112 (2024); arXiv:2310.10466.
2. Simone Fratini, Sergio Ciuchi, Vladimir Dobrosavljevic, **Louk Rademaker**, *Universal scaling near band-tuned metal-insulator phase transitions*, Phys. Rev. Lett 131, 196303 (2023); arXiv:2307.09292.
3. Dario Rossi, Johannes Motruk, **Louk Rademaker**, Dmitry A. Abanin, *Schwinger boson study of the J1-J2-J3 kagome Heisenberg antiferromagnet with Dzyaloshinskii-Moriya interactions*, Phys. Rev. B 108, 144406 (2023); arXiv:2305.15824.
4. Lihuan Sun, **Louk Rademaker**, Diego Mauro, Alessandro Scarfato, Árpád Pásztor, Ignacio Gutiérrez-Lezama, Zhe Wang, Jose Martinez-Castro, Alberto F. Morpurgo, Christoph Renner, *Determining spin-orbit coupling in graphene by quasiparticle interference imaging*, Nature Comm. 14, 3771 (2023); arXiv:2212.04926.
5. Johannes Motruk, Dario Rossi, Dmitry A. Abanin, **Louk Rademaker**, *Kagome Chiral Spin Liquid in Transition Metal Dichalcogenide Moiré Bilayers*, Phys. Rev. Research 5, L022049 (2023); arXiv:2211.15696.
6. Gianmarco Gatti, Julia Issing, **Louk Rademaker**, Florian Margot, Tobias A. de Jong, Sense Jan van der Molen, Jérémie Teyssier, Timur K. Kim, Matthew D. Watson, Cephise Cacho, Pavel Dudin, José Avila, Kumara Cordero Edwards, Patrycja Paruch, Nicolas Ubrig, Ignacio Gutiérrez-Lezama, Alberto Morpurgo, Anna Tamai, Felix Baumberger, *Observation of flat  $\Gamma$  moiré bands in twisted bilayer  $WSe_2$* , Phys. Rev. Lett. 131, 046401 (2023); arXiv:2211.01192.
7. Yuting Tan, Pak Ki Henry Tsang, Vladimir Dobrosavljević, **Louk Rademaker**, *Doping a Wigner-Mott insulator: Exotic charge orders in transition-metal dichalcogenide moiré heterobilayers*, Phys. Rev. Research 5, 043190 (2023); arXiv:2210.07926.
8. Yuting Tan, Vladimir Dobrosavljević, **Louk Rademaker**, *How to recognize the universal aspects of Mott criticality?* Crystals 12, 932 (2022); arXiv:2206.02055.
9. **Louk Rademaker**, *Spin-Orbit Coupling in Transition Metal Dichalcogenide Heterobilayer Flat Bands*, Phys. Rev. B 105, 195428 (2022); arXiv:2111.06208.
10. **Louk Rademaker**, *Scaling theory of few-particle delocalization*, Phys Rev. B 104, 214204 (2021); arXiv:2107.06364.
11. **Louk Rademaker**, Gustavo Alvarez-Suchini, Ken Nakatsukasa, Yan Wang, Steven Johnston, *Enhanced superconductivity in FeSe/SrTiO3 from the combination of forward scattering phonons and spin fluctuations*, Phys. Rev. B 103, 144504 (2021); arXiv:2101.08307.
12. **Louk Rademaker**, *A Practical Introduction to Density Functional Theory*, arXiv:2011.09888 (2020).
13. **Louk Rademaker**, Marco Gibertini, *Gate-tunable imbalanced Kane-Mele model in encapsulated bilayer jacutingaite*, Phys. Rev. Materials 5, 044201 (2021); arXiv:2007.09926.
14. Yu Saito, Jingyuan Ge, **Louk Rademaker**, Kenji Watanabe, Takashi Taniguchi, Dmitry A. Abanin, Andrea F. Young, *Hofstadter subband ferromagnetism and symmetry broken Chern insulators in twisted bilayer graphene*, Nature Physics 17, 478 (2021); arXiv:2007.06115.
15. **Louk Rademaker**, Ivan Protopopov, Dmitry Abanin, *Topological Flat Bands and Correlated States in Twisted Monolayer-Bilayer Graphene*, Phys Rev. Research 2, 033150 (2020); arXiv:2004.14964.

16. Simone Lisi, Xiaobo Lu, Tjerk Benschop, Tobias A. de Jong, Petr Stepanov, Jose R. Duran, Florian Margot, Irène Cucchi, Edoardo Cappelli, Andrew Hunter, Anna Tamai, Viktor Kandyba, Alessio Giampietri, Alexei Barinov, Johannes Jobst, Vincent Stalman, Maarten Leeuwenhoek, Kenji Watanabe, Takashi Taniguchi, **Louk Rademaker**, Sense Jan van der Molen, Milan Allan, Dmitri K. Efetov, Felix Baumberger, *Observation of flat bands in twisted bilayer graphene*, Nature Physics 17, 189 (2021); arXiv:2002.02289.
17. **Louk Rademaker**, Dmitry A. Abanin, *Slow Nonthermalizing Dynamics in a Quantum Spin Glass*, Phys. Rev. Lett. 125, 260405 (2020); arXiv:1910.04421.
18. **Louk Rademaker**, Aron J. Beekman, Jasper van Wezel, *Stability and Absence of a Tower of States in Ferrimagnets*, Phys. Rev. Research 2, 013304 (2020), arXiv:1909.11381.
19. **Louk Rademaker**, *Exact Ground State of Lieb-Mattis Hamiltonian as a Superposition of Néel states*, Phys. Rev. Research 1, 032018(R) (2019); arXiv:1909.09663.
20. Aron J. Beekman, **Louk Rademaker**, Jasper van Wezel, *An Introduction to Spontaneous Symmetry Breaking*, SciPost Phys. Lect. Notes 11 (2019); arXiv:1909.01820.
21. **Louk Rademaker**, Dmitry A. Abanin, Paula Mellado, *Charge Smoothing and Band Flattening due to Hartree corrections in Twisted Bilayer Graphene*, Phys. Rev. B 100, 205114 (2019); arXiv:1907.00940.
22. Miguel Ortuño, Andres M. Somoza, **Louk Rademaker**, *Construction of Many-Body Eigenstates with Displacement Transformations*, Phys. Rev. B 100, 085115 (2019); arXiv:1901.10368.
23. Thomas H. A. van der Reep, **Louk Rademaker**, Xander G. A. Le Large, Ruben H. Guis, Tjerk H. Oosterkamp, *An Experimental Proposal to Study Collapse of the Wave Function in Traveling-Wave Parametric Amplifiers*, Phys. Status Solidi B 2000567 (2020); arXiv:1811.01698.
24. **Louk Rademaker**, and Paula Mellado, *Charge-transfer insulation in twisted bilayer graphene*, Phys. Rev. B 98, 235158 (2018); arXiv:1805.05294.
25. **Louk Rademaker**, *Quenching the Kitaev honeycomb model*, SciPost Phys. 7, 071 (2019); arXiv:1710.09761.
26. **Louk Rademaker**, Jan Zaanen, *Quantum Thermalization and the Expansion of Atomic Clouds*, Sci. Rep. 7, 6118 (2017); arXiv:1703.02489.
27. Yan Wang, **Louk Rademaker**, Elbio Dagotto, and Steve Johnston, *Phonon linewidth due to electron-phonon interactions with strong forward scattering in FeSe thin films on oxide substrates*, Phys. Rev. B. 96, 054515 (2017); arXiv:1703.02013.
28. **Louk Rademaker**, Miguel Ortuno, and Andres M. Somoza, *Many-body localization and delocalization from the perspective of Integrals of Motion*, Ann. Phys. (Berlin) 529, 1600322 (2017); arXiv:1610.06238.
29. **Louk Rademaker**, Valerii V. Vinokur, and Alexey Galda, *Universality and critical behavior of the dynamical Mott transition in a system with long-range interactions*, Sci. Rep. 7, 44044 (2017); arXiv:1608.07779.
30. **Louk Rademaker**, Zohar Nussinov, Leon Balents, Vladimir Dobrosavljevic, *Suppressed Density of States in Self-Generated Coulomb Glasses*, New J. Phys. 20, 043026 (2018); arXiv:1605.01822.
31. Yan Wang, Ken Nakatsukasa, **Louk Rademaker**, Tom Berlijn, and Steve Johnston, *Aspects of electron-phonon interactions with strong forward scattering in FeSe Thin Films on SrTiO<sub>3</sub> substrates*, Supercond. Sci. Technol. 29, 054009 (2016); arXiv:1602.00656.

32. **Louk Rademaker** and John A. Mydosh, *Quantum Critical Matter and Phase Transitions in Rare-Earths and Actinides*, Handbook of Chemistry and Physics of Rare Earths and Actinides, Vol. 49, 293 (2016).
33. **Louk Rademaker**, Arnaud Ralko, Simone Fratini and Vladimir Dobrosavljevic, *Avoiding Stripe Order: Emergence of the Supercooled Electron Liquid*, J. Supercond. Nov. Magn. 29, 601 (2016); arXiv:1508.03065.
34. **Louk Rademaker**, Miguel Ortuño, *Explicit Local Integrals of Motion for the Many-Body Localized State*, Phys. Rev. Lett. 116, 010404 (2016); arXiv:1507.07276.
35. **Louk Rademaker**, *The Tower of States and the Entanglement Spectrum in a Coplanar Antiferromagnet*, Phys. Rev. B 92, 144419 (2015); arXiv:1507.04402.
36. **Louk Rademaker**, Yan Wang, Tom Berlijn and Steve Johnston, *Enhanced superconductivity due to forward scattering in FeSe thin films on SrTiO<sub>3</sub> substrates*, New J. Phys. 18, 022001 (2016); arXiv:1507.03967.
37. Robert-Jan Slager, **Louk Rademaker**, Jan Zaanen and Leon Balents, *Impurity Bound States and Greens Function Zeroes as Local Signatures of Topology*, Phys. Rev. B 92, 085126 (2015); arXiv:1504.04881.
38. Samiyeh Mahmoudian, **Louk Rademaker**, Arnaud Ralko, Simone Fratini and Vladimir Dobrosavljevic, *Glassy dynamics in geometrically frustrated Coulomb liquids without disorder*, Phys. Rev. Lett. 115, 025701 (2015); arXiv:1412.4441.
39. **Louk Rademaker**, Thomas van der Reep, Nick Van den Broeck, Bob van Waarde, Marc de Voogd and Tjerk Oosterkamp, *The Instability of a Quantum Superposition of Time Dilations*; arXiv:1410.2303 (2014)
40. Kai Wu, **Louk Rademaker** and Jan Zaanen, *Bilayer Excitons in Two-Dimensional Nanostructures for Greatly Enhanced Thermoelectric Efficiency*, Phys. Rev. Applied 2, 054013 (2014); arXiv:1401.7770.
41. **Louk Rademaker**, Steve Johnston, Jan Zaanen and Jeroen van den Brink, *Determinant quantum Monte Carlo study of exciton condensation in the bilayer Hubbard model*, Phys. Rev. B 88, 235115 (2013); arXiv:1310.0623.
42. **Louk Rademaker**, Jeroen van den Brink, Jan Zaanen and Hans Hilgenkamp, *Exciton condensation in strongly correlated electron bilayers*, Phys. Rev. B 88, 235127 (2013); arXiv:1310.0685.
43. **Louk Rademaker**, Yohanes Pramudya, Jan Zaanen and Vladimir Dobrosavljevic, *Influence of long-range interactions on charge ordering phenomena on a square lattice*, Phys. Rev. E 88, 032121 (2013); arXiv:1306.4765.
44. **Louk Rademaker**, Jeroen van den Brink, Hans Hilgenkamp and Jan Zaanen, *Enhancement of spin propagation due to interlayer exciton condensation*, Phys. Rev. B 88, 121101(R) (2013); arXiv:1304.3643.
45. **Louk Rademaker**, Kai Wu and Jan Zaanen, *Dynamics of a single exciton in strongly correlated bilayers*, New J. Phys. 14, 3040 (2012); arXiv:1202.3616.
46. **Louk Rademaker**, Kai Wu, Hans Hilgenkamp and Jan Zaanen, *The dynamical frustration of interlayer excitons delocalizing in bilayer quantum antiferromagnets*, Europhys. Lett. 97, 27004 (2012); arXiv:1106.5347.
47. **Louk Rademaker**, Jan Zaanen and Hans Hilgenkamp, *Prediction of quantization of magnetic flux in double-layer exciton superfluids*, Phys. Rev. B 83, 012504 (2011); arXiv:1009.1793.

48. **Louk Rademaker**, *PhD Thesis: Fermions and Bosons: Excitons in strongly correlated materials*, Leiden University (2013).

## Grants and scholarships

- **Rubicon grant (2014) from Dutch Science Foundation (NWO)**  
*Amount:* € 127.690,-  
*Duration:* 2 years (September 2014 – August 2016)  
*Title:* What's the matter with frustration? Highly fluctuating phases in frustrated complex oxides
- **Ambizione grant (2017) from Swiss National Science Foundation (SNSF)**  
*Amount:* € 517.327,-  
*Duration:* 4 years (September 2018 – August 2022)  
*Title:* Sluggish quantum matter – Slow dynamics in many-body localized and glassy systems
- **SNSF Starting Grant (2022) from Swiss National Science Foundation (SNSF)**  
*Amount:* CHF 1.649.558,-  
*Duration:* 5 years (January 2023 – December 2027)  
*Title:* Quantum Matter with a Twist – The Interplay of Correlations and Topology in Moiré Materials.

## Awards and Honors

- **Selected Superconductor Science and Technology Highlight 2016** for our paper '*Aspects of electron-phonon interactions with strong forward scattering in FeSe Thin Films on SrTiO<sub>3</sub> substrates*'. Awarded in February 2017.
- **Early Career Award 2016** from the Handbook on the Physics and Chemistry of Rare Earths, for my contribution '*Quantum Critical Matter and Phase Transitions in Rare Earths and Actinides*' published in Volume 49. Awarded in January 2017.
- **Best 2016 Scientific Paper Award of the Computer Science and Mathematics Division at the Oak Ridge National Laboratory** for 'providing new insight into enhancing superconductivity via the engineering of interfaces between materials', as proposed in our paper '*Enhanced superconductivity due to forward scattering in FeSe thin films on SrTiO<sub>3</sub> substrates.*' Awarded in January 2017.
- **Runner-up at the Best Poster Presentation award at the DRSTP Trends in Theory conference**, Dalfsen, The Netherlands, May 2013.
- **Winner of the Best Oral Presentation award at the Casimir Spring School**, Arnhem, The Netherlands, June 2010.
- **Winner of the Shell Stipendium 2008**, for best Master students in Theoretical Physics in The Netherlands, Rijswijk, The Netherlands, October 2008.
- **Participant of Stockholm International Youth Science Seminar**, an international seminar centered around the Nobel Prize ceremony, Stockholm, Sweden, December 2004.
- **Participant of European Union Contest for Young Scientists**, Vienna, Austria, September 2002.
- **Winner of the National Contest for Young Scientist**, for research on the binary star SS 433, Amsterdam, The Netherlands, March 2002.

**Co-organizer of:**

- **Workshop “Correlations, Topology in Moiré Materials: Theory vs Experiment”**, Ascona, Switzerland, July 2025.
- **Manep Winter School**, Saas-Fee, January 2025.
- **UNIGE Physics Day**, 12 January 2024. One-day meeting with 135 participants from the whole Physics Section of the University of Geneva.
- **‘Flat Club’ seminar series**; on average biweekly seminar at the Université de Genève on theory and experiments on two-dimensional materials. Initiated by me in February 2019.
- **Perimeter Institute Condensed Matter Seminar series**; an on average weekly seminar, from September 2017 to August 2018.
- **KITP Locals lunches and retreat** in 2014-2017. Meetings were held on an irregular basis at the Kavli Institute for Theoretical Physics and contain talks by members and postdocs - amongst the speakers were David Gross, Matthew Fisher and Boris Shraiman.
- **Trends in Theory**, 16-17 May 2013. Biannual conference of the Dutch Research School of Theoretical Physics, Dalfsen, The Netherlands. Key-note speakers were amongst others Xiao-Gang Wen and Mischa Katsnelson.
- **DRSTP PhD Day** in 2011, 2012 and 2013. Annual conference for Ph.D. students in Theoretical Physics in The Netherlands.

**Invited talks and other presentations****2024**

- Invited **talk**, UNIGE Physics Day, Geneva, Switzerland, *More is Different*, 12 January 2024.

**2023**

- **Invited seminar** at the *Quantum Club Geneva*, Geneva, Switzerland, *Diamonds and pencils: the quantum magic of carbon*, 16 November 2023.
- **Invited seminar**, KU Leuven, Belgium, *Forget graphene: More exotic moiré physics with TMDs*, 8 September 2023.
- **Invited talk** at *New Generation in Strongly Correlated Electron Systems* conference, Lido di Fermo, Italy, *Forget graphene: more exotic moiré physics with TMDs*, 28 August – 1 September 2023.
- **Invited talk** at *Stripes, Planckian dissipation and Quantum Supremacy*, Leiden, The Netherlands, *Charge-transfer insulators in moiré materials*, 17-18 July 2023.
- **Invited seminar**, MPI Stuttgart, Germany, *Forget graphene: More exotic moiré physics with TMDs*, 13 April 2023.
- Talk at the “Novel States of Quantum Matter in Moiré Materials” conference, Aspen Center for Physics (Aspen, CO, USA), *Metal-Insulator Transitions and the “Fake Insulator” regime*, 17 March 2023.

**2022**

- **Invited seminar**, LPS Orsay, France, *Forget graphene: More exotic moiré physics with TMDs*, 7 October 2022.
- Contributed talk at the CMD29 conference, Manchester, UK, *Scaling Theory of Few-Particle Delocalization*, 21-26 August 2022.
- **Invited talk** at *New Spin on Molecular Quantum Materials* workshop, SPICE, Ingelheim, Germany, *Fake Insulators*, 24-26 May 2022.



- **Invited seminar**, Center for the Study of Complex Systems, Belgrade, Serbia, *Symmetry breaking and Chern insulators in twisted graphene structures*, 14 April 2022.
- **Invited colloquium**, University of Connecticut, Mansfield CT, USA, *Quantum Matter with a Twist*, 28 February 2022.
- **Invited colloquium**, Dartmouth University, Hanover, NH, USA, *Quantum Matter with a Twist*, 28 January 2022.
- **Invited colloquium**, Florida State University, Tallahassee, FL, USA, *Quantum Matter with a Twist*, 20 January 2022.
- Invited for Conference *New Directions in Strong Correlation Physics: From Strange Metals to Topological Superconductivity*, Aspen Center for Physics, Aspen, CO, USA, 24-28 January 2022.

## 2021

- **Invited seminar**, National Tsing Hua University, Taiwan, *Spin-valley symmetry breaking and Chern insulators in twisted graphene structures*, 8 December 2021.
- **Invited seminar**, Budapest, Hungary, *Spin-valley symmetry breaking and Chern insulators in twisted graphene structures*, 26 November 2021.
- **Invited talk** at the LQSS 2021, Geneva, Switzerland, *Correlated Twisted Heterostructures*, 15 November 2021.
- **Invited seminar**, Würzburg, Germany, *Spin-valley symmetry breaking and Chern insulators in twisted graphene structures*, 12 October 2021.
- Grenoble Quantum Nanoelectronics **invited seminar**, Grenoble, France, *Spin-valley symmetry breaking and Chern insulators in twisted graphene structures*, 28 September 2021.
- Contributed talk at the Quantum Matter Agora, Les Diablerets, Switzerland, *Spin-valley symmetry breaking and Chern insulators in twisted graphene structures*, 31 August 2021.
- Contributed talk at the TYC Moiré-Twistronics workshop, online, *Spin-valley symmetry breaking and Chern insulators in twisted graphene structures*, 13 August 2021.
- **Invited seminar**, University of Nijmegen, The Netherlands, *Why won't it thermalize?*, 12 January 2021.

## 2020

- DQMP Seminar, University of Geneva, Switzerland, *Understanding Correlated Insulators with Moiré-Wigner-Mott crystals in  $WS_2/WSe_2$* , 24 November 2020.
- Contributed talk at the Flat Band Moiré Symposium at #CMD2020GEFES, <http://www.cmd2020gefes.eu/>, *Correlated Topology in Twisted Graphene Sandwiches*, 3 September 2020.
- **Invited talk** at the Online Summer Seminars for Correlated Electrons and Frustrated Magnets <https://sites.google.com/umn.edu/cm-weekly-seminar/home>, *Correlated Topology in Twisted Graphene Sandwiches*, 1 September 2020.
- **Invited talk** at the workshop 'Electronic Correlations and Topology in Narrow Band Systems', International Institute of Physics, Natal, Brazil, June 25 to July 03, 2020. (Cancelled due to Covid-2019)
- ToolBoX Seminar, University of Geneva, Switzerland, *A Practical Introduction to Density Functional Theory*, 12-13 March 2020.
- Contributed talk at the APS March Meeting 2020, Denver, CO, USA, *Charge Smoothing and Band Flattening due to Hartree corrections in Twisted Bilayer Graphene*, 3 March 2020. (Cancelled due to Covid-2019)
- 'Flat Club' meeting, University of Geneva, Switzerland, *High  $T_c$  in monolayer FeSe*, 14 February 2020.

- Seminar at the Paul Scherrer Institute, Switzerland, *Correlations with a twist*, 4 February 2020.
- Seminar at ETH Zurich, Switzerland, *Strong correlations with a twist*, 23 January 2020.

## 2019

- ‘Flat Club’ meeting, University of Geneva, Switzerland, *Quantum Anomalous Hall Effect in Twisted Bilayer Graphene*, 11 October 2019.
- **Invited talk** at the Conference on “Complex Quantum Systems out of Equilibrium”, Murcia, Spain, 26-30 August 2019.
- **Invited talk** at the “Mottness, Poor Conductors, and Strange Metals” Workshop at the Tsung-Dao Lee Institute, Shanghai, China, August 19-23, 2019.
- Participant at the Aspen Center for Physics 2019 Summer program on “Moiré Materials: Strong Correlations in Synthetic Superlattices”, Aspen, Colorado, USA, 23 June – 7 July 2019.
- **Invited talk** at the 2019 ICTP meeting “Complex quantum systems out of equilibrium in many-body physics and beyond” in Yerevan, Armenia, 3-7 June 2019.
- Contributed talk at the conference “New Trends in Complex Quantum Systems Dynamics 2019” in Venezia, Italy, *Unconventional many-body localization in long-range quantum glasses*, 11 April 2019.
- ‘Flat Club’ inaugural meeting, University of Geneva, Switzerland, *Latest developments in Twisted Bilayer Graphene*, 22 February 2019.

## 2018

- Seminar at the Department of Quantum Matter Physics Forum, at University of Geneva, Switzerland, *Charge-transfer insulation and superconductivity in twisted bilayer graphene*, 11 December 2018.
- **Invited talk** at the ICTP-SAIFR Workshop on Strong Electron Correlations in Quantum Materials: Inhomogeneities, Frustration, and Topology, São Paulo, Brazil, *Charge-transfer insulation in twisted bilayer graphene*, 16 August 2018.
- **Invited talk** at the Gordon Research Seminar on Conductivity and Magnetism in Molecular Materials, Bryant University, Rhode Island, USA, *Charge Order and Spin Liquids in Frustrated Mott Organics*, 12 August 2018.
- Seminar at the Institut-Néel, CNRS Grenoble, France, *Quenching the Kitaev model*, 20 April 2018.
- Talk at the APS March Meeting, Los Angeles, USA, *Quenching the Kitaev model*, 8 March 2018.
- Seminar at the University of Tennessee, Knoxville, USA, *Quenching the Kitaev model*, 22 February 2018.
- Seminar at Trent University, Peterborough, Canada, *Quantum thermalization and its breakdown*, 31 January 2018.

## 2017

- Seminar at the University of Toronto, Canada, *Quenching the Kitaev model*, 18 October 2017.
- Talk at the Quantum Matter Day, Perimeter Institute, Waterloo, Canada, *Quantum thermalization and its breakdown*, 3 October 2017.
- APS March Meeting, New Orleans, LA, United States, *Quantum thermalization and the expansion of atomic clouds*, 13 March 2017.
- **Invited talk** at 'Topological Science Workshop' at Keio University, Hiyoshi Campus, Yokohama, Japan, *Thermalization in Quantum Systems - and its breakdown*, 24 February 2017.
- **Invited talk** at the Workshop 'Theory of Correlated Topological Materials' at the University of Tokyo, Japan, *Thermalization in Quantum Systems - and its breakdown*, 23 February 2017.

**2016**

- Seminar at the TU Dresden, Germany, *Thermalization in Quantum Systems - and its breakdown*, 28 November 2016.
- Seminar at the Perimeter Institute, Waterloo, Canada, *Thermalization in Quantum Systems - and its breakdown*, 23 November 2016.
- Seminar at Oxford University, United Kingdom, *MBL-to-Ergodic Transition from the perspective of Integrals of Motion*, 30 August 2016.
- **Invited talk** at the 16th International Conference on Transport in Interacting Disordered Systems (TIDS16) in Granada, Spain, *MBL-to-Ergodic Transition from the perspective of Integrals of Motion*, 23 August 2016.
- IRG-2 Seminar at the Material Research Laboratory at UC Santa Barbara, USA, *Electron glasses without quenched disorder in Organic Crystals*, 10 June 2016.
- Contributed talk at the International Conference on Superconductivity and Magnetism, Fethiye, Turkey, *New theoretical tools for quantum glasses, with and without quenched disorder*, 29 April 2016.
- **Invited talk** at the APS March Meeting, *New theoretical tools for quantum glasses, with and without quenched disorder*, 15 March 2016.
- Special Condensed Matter Seminar at the Abdus Salam ICTP, Trieste, Italy, *New theoretical tools for quantum glasses, with and without quenched disorder*, 25 February 2016.
- Hard Times group meeting talk, University of California, Santa Barbara, USA, *Impurity Bound States and Greens Function Zeroes as Local Signatures of Topology*, 29 January 2016.

**2015**

- **Invited talk** at SPICE-Workshop on Bad Metal Behavior in Mott Systems, Mainz, Germany, *Glassy dynamics in geometrically frustrated Coulomb liquids*, 30 June 2015.
- Café KITP, public outreach talk with the title *Quasiparticles - The Dreams that Stuff is Made Of*, Santa Barbara, CA, United States, 7 May 2015.
- APS March Meeting, San Antonio, TX, United States, *Efros-Shklovskii Coulomb gap in the absence of disorder*, 5 March 2015.
- 'Hot Topic Talk' at the National High Magnetic Field Laboratory, Tallahassee, FL, United States, *Glassy dynamics in geometrically frustrated Coulomb liquids without disorder*, 13 January 2015.

**2014**

- Seminar at Lorentz Institute, Leiden University, The Netherlands, *Self-generated electron glasses in frustrated organic crystals*, 4 December 2014.
- Theoretical Physics Seminar, Washington University, St. Louis, MO, United States, *Self-generated electron glasses in frustrated organic crystals*, 6 November 2014.
- APS March Meeting, Denver, CO, United States, *Dynamical frustration versus kinetic enhancement with excitons in strongly correlated bilayers*, 3-7 March 2014.

**2013**

- UK-NL Condensed Matter Meeting, Bristol, United Kingdom, *Dynamical frustration versus kinetic enhancement with excitons in strongly correlated bilayers*, 30-31 August 2013.
- National High Magnetic Field Laboratory Seminar, Tallahassee, FL, United States, *Bilayer Excitons in Strongly Correlated Materials*, 1 February 2013.

**2012**

- Interfaces and Correlated Electron systems UK tour, Bristol, United Kingdom, *Mott insulator bilayers*, 29 March 2012.
- Hilgenkamp group Seminar, Twente University, Enschede, The Netherlands, *Theoretical physics for experimentalists*, 1 February 2012.

**2011**

- BEC-meeting in the group of Stoof, Duine and De Morais Smith, Utrecht, the Netherlands, *Frustrated interlayer excitons in antiferromagnets*, 9 September 2011.
- Presentation in the group of professor Millis, Columbia University, New York, NY, United States, *Emergent Ising confinement of excitons in strongly correlated bilayers*, 16 May 2011.
- DRSTP School on Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands, *Excitons and spins in strongly correlated systems*, 9 March 2011.

**2010**

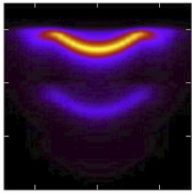
- Casimir Spring School, Arnemuiden, the Netherlands, *Flux Quantization in Double Layer Exciton Superfluids*, 16 June 2010.
- DRSTP School on Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands, *Magnetic Flux Quantization in Double Layer Exciton Superfluids*, 12 April 2010.

## Teaching track record

- Lecturer, *Quantum Transport and Topological Insulators*, University of Geneva, Spring 2023, Spring 2024
- Lecturer, *Physics Laboratory IV (theory)*, University of Geneva, Spring 2022
- Lecturer, *Quantum Matter and Light*, University of Geneva, Fall 2021, Fall 2022
- Lecturer, *Introduction to Density Functional Theory*, University of Geneva, Spring 2020
- Substitute lecturer for Prof. Leon Balents (*Condensed Matter Physics II*) and Prof. Matthew Fisher (*Graduate Quantum Mechanics*) at UC Santa Barbara (2014-2017)
- Teaching assistant, *Effective Field Theory* by professor Koenraad Schalm (Leiden University, Spring 2011, 2012 and 2013)
- Teaching assistant, *Quantum Field Theory* by professor Koenraad Schalm (Leiden University, Spring 2011, 2012 and 2013)
- Teaching assistant, *Quantum Field Theory* by professor Ana Achucarro (Leiden University, Spring 2010)
- Teaching assistant, *Theory of Condensed Matter* by professor Jan Zaanen (Leiden University, Spring 2009)
- Lecturer, *Introduction to LabView* (Khartoum University, Sudan, Spring 2008 and Spring 2012)
- Teaching experience as **Teacher in Economics** for high-school students at the **Stichting Studiebegeleiding Leiden (SSL)** in 2004 and 2005. At this company we organized intensive 3-day courses in Economics for students to prepare them for their high school exams. My reviews were very positive.

## Top theoretical publications

L. Rademaker, Y. Wang, T. Berlijn and S. Johnston,



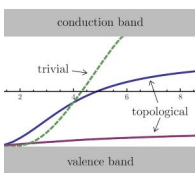
**Enhanced superconductivity due to forward scattering in FeSe thin films on SrTiO<sub>3</sub> substrates**

*New J. Phys.* 18, 022001 (2016)

Our theory provides one of the most prominent explanations of enhanced superconductivity in single layer FeSe on STO substrates. It has inspired novel experiments (for example on the phonon linewidth) and lead to many theoretical discussions about the subtleties of two-dimensional superconductivity. Cited 129 times.

R.-J. Slager, L. Rademaker, J. Zaanen and L. Balents,

**Impurity Bound States and Greens Function Zeroes as Local Signatures of Topology**



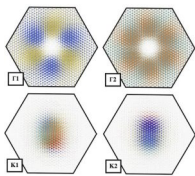
*Phys. Rev. B* 92, 085126 (2015)

The classification of topological phases of matter is of utmost importance in modern condensed matter physics. We provide a simple yet effective way of observing topology by means of the experimentally accessible local tunneling spectrum. Cited 172 times.

L. Rademaker, P. Mellado,

**Charge-transfer insulation in twisted bilayer graphene**

*Phys. Rev. B* 98, 235158 (2018)



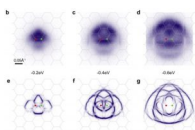
The discovery of superconductivity and Mott insulation in twisted bilayer graphene has inspired this work, where we show that the correlated insulator state stems from a macroscopic charge transfer between AA and AB regions of the Moiré unit cell. We were the first to point out the importance of real-space charge transfer, and our predictions were later confirmed experimentally. Cited 102 times.

## Top experimental publications

S. Lisi, L. Rademaker, et al.

**Observation of flat bands in twisted bilayer graphene**

*Nature Physics* 17, 189 (2021)

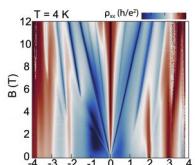


Using angle-resolved photo-emission spectroscopy we are the first to report a direct observation of the flat bands in twisted bilayer graphene. I calculated the matrix elements that determine how the flat bands are visible. Cited 96 times.

Y. Saito, J. Ge, L. Rademaker, et al.

**Hofstadter subband ferromagnetism and symmetry-broken Chern insulators in twisted bilayer graphene**

*Nature Physics* 17, 478 (2021)



Transport measurements of twisted bilayer graphene reveal a sequence of spin and valley polarized states with Chern numbers  $C=1, 2, 3$ . I showed that we can understand these states using a Hartree theory on top of a Hofstadter butterfly. Cited 106 times.