CURRICULUM VITAE ROBERT-JAN SLAGER

PERSONAL DATA AND CONTACT INFORMATION

Date of birth	24^{th} of March 1988
Place of birth	Goes, Zeeland, The Netherlands (Dutch citizen)
Address	Max Planck Institute for the Physics of Complex Systems
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RESEARCH INTERESTS

My research interests revolve around **theoretical condensed matter** physics with a particular emphasis on **topological phases of matter**. Relevant keywords describing my work include: Topological insulators, zero-mode physics, monodromy defects, spin-charge separation, solitons, topological classification of order, Green's function formalism, lattice gauge theory, Non-Abelian discrete gauge theories, impurity problems and spinon hybridization problems. Nonetheless, I think that in modern science a **broad** and sometimes even interdisciplinary area of research, in addition to a specific long-term subject of focus, is a prerequisite. In this regard I have also worked on quantum nematic phases and try to maintain an active and open view. More recently, I have accordingly also become interested in Floquet states as well as tensor network approaches.

EDUCATION AND RESEARCH POSITIONS

Bilingual pre-university stream vwo Goese Lyceum	September 2000 - August 2006 Goes, the Netherlands
\cdot Classical track, Gymnasium.	
· Including Cambridge and IB certificates.	
Bachelor Physics Leiden University	September 2006 - August 2009 Leiden, the Netherlands
\cdot Thesis: "From elasticity to equations (part I)".	
· Supervisor: prof. dr. M. van Hecke.	
Bachelor Mathematics Leiden University	September 2006 - August 2009 Leiden, the Netherlands
\cdot Thesis: "From elasticity to equations (part II)".	
· Supervisor: dr. V. Röttschafer.	
Master Theoretical Physics Leiden University	September 2009 - August 2011 Leiden, the Netherlands

- $\cdot\,$ Graduated cum laude, highest honor in Dutch system.
- $\cdot\,$ Thesis: "Topological aspects of Aharonov-Bohm vortices in topological band insulators"
- · Supervisor: prof. dr. J. Zaanen

Ph.D. Theoretical PhysicsOctober 2011 - January 2016Instituut Lorentz for Theoretical Physics, Leiden UniversityLeiden, the Netherlands

- \cdot Graduated *cum laude*, highest honor formally awarded to the top 5 % University-wide.
- · Thesis: "The symmetry of crystals and the topology of electrons"
- \cdot Defended 12^{th} of January 2016: position was absorbed into a national FOM program starting January 1^{st} 2012.

January 2016 - September 2016

Leiden, the Netherlands

September 2016 - present

Dresden, Germany

 \cdot Advisor: prof. dr. J. Zaanen

Postdoctoral Researcher

Instituut Lorentz for Theoretical Physics, Leiden University

 $\cdot\,$ Short term stay

Guest Researcher

Max Planck Institute for the Physics of Complex Systems

 \cdot Present postion

AWARDS AND HONORS

- Winner of the National Shell prize for Physics for results during the master track, Koninklijke Hollandsche Maatschappij der Wetenschappen, December 2011
- $\bullet\,$ Paper on the space group classification featured as $Science\,Magazine\,$ editors' choice, January 2013
- Wrote FOM highlight for the annual report, January 2014
- Nominee C.J. Kok award, University of Leiden, January 2017

VARIOUS

• Certified Participant "Nyenrode Business Orientation Program for Physics graduates", Neyenrode Business University, April 2015.

COMMUNITY SERVICES

Member of the LION Council Leiden Institute of Physics (LION)	September 2013 - 2016 Leiden, the Netherlands
\cdot Representing the Theoretical Physics PhD students in the LION cou	ncil.
Reviewer for the American Department of Energy Reviewed a research proposal for the Department of Energy.	September 2015
Reviewer for Phys. Rev. B • Referee for Physical Review B of various articles.	2014-Present
Reviewer for Science Magazine	2016

 $\cdot\,$ Acted as an invited referee for Science.

Reviewer for Review of Modern Physics	2017
\cdot Acted as an invited referee for Review of Modern Physic	cs.
Reviewer for Science Advances	2016
\cdot Acted as an invited referee for Science Advances.	
Reviewer for Phys. Rev. Letters	2016-Present
· Referee for Physical Review Letters.	
Reviewer for Physics Letters A	2016
\cdot Acted as an invited referee for Physics Letters A.	
Organizer of several reading clubs	2012-Present
\cdot Informal reading clubs on standard works for Ph.D. stud	dents of the institute
Science tutor for high school students Various places in the Netherlands	September 2003 - September 2010
• Tutoring science courses on a pre-university level on a w	veekly basis.

TEACHING

- Tutor for freshman physics and mathematics students, Leiden University, 2008 2010
- Teaching assistant, Classical Mechanics by prof. dr. M. Orrit, Leiden University, fall 2010
- Lecturer, Renewable Energy course, University college the Hague, fall 2011
- Teaching assistant, *Elementary particles* by prof. dr. Ana Achúcarro, Leiden University, fall 2012
- Teaching assistant, *Theory of special relativity* by prof. dr. J.-W. van Holten, Leiden University, fall 2013
- Teaching assistant, Statistical Physics by dr. P. Denteneer, Leiden University, fall 2014

SUPERVISION

- Master Thesis "Topology and geometry in Weyl semimetals", Olfa Jaïbi, graduated in March 2016.
- Bachelor Thesis "Topology in band theory", Rien Vanneste [at the University of Amsterdam by request], graduated Juli 2016.

SKILLS

- Fluent in Dutch, English; intermediate level in France and German.
- Highly skilled in Fortran and Mathematica, working knowledge of C++.
- Independent researcher: able to set up a project, execute it and finalize the according paper.

Published papers:

- Universal probes of two-dimensional topological insulators: Dislocation and π -flux, Vladimir Juričić, Andrej Mesaros, Robert-Jan Slager and Jan Zaanen, Phys. Rev. Lett. **108**, 106403 (2012); arXiv:1108.3337.
- Zero-energy states bound to a magnetic π-flux vortex in a two-dimensional topological insulator, Andrej Mesaros, Robert-Jan Slager, Jan Zaanen and Vladimir Juričić, Nucl. Phys. B 867, 977 (2012); arXiv:1208.5708.
- The space group classification of topological band insulators, Robert-Jan Slager, Andrej Mesaros, Vladimir Juričić and Jan Zaanen, Nat. Phys. 9, 98 (2013); arXiv:1209.2610.
- Interplay between electronic topology and crystal symmetry: Dislocation-line modes in topological band insulators, Robert-Jan Slager, Andrej Mesaros, Vladimir Juričić and Jan Zaanen, Phys. Rev. B **90**, 241403 (R) (2014); arXiv:1401.4044.
- Classification of nematic order in 2+1D: Dislocation Melting and $O(2)/Z_n$ lattice gauge theory, Ke Liu, Jaakko Nissinen, Zohar Nussinov, Robert-Jan Slager, Kai Wu and Jan Zaanen, Phys. Rev. B **91**, 075103 (2015); arXiv:1405.2963.
- Impurity bound states and Green's functions zeroes as local signatures of topology, Robert-Jan Slager, Louk Rademaker, Jan Zaanen and Leon Balents, Phys. Rev. B 92, 085126 (2015); arXiv:1504.04881.
- Self-organized pseudo-graphene on grain boundaries in topological band insulators, Robert-Jan Slager, Vladimir Juričić, Ville Lahtinen and Jan Zaanen, Phys. Rev. B **93**, 245406 (2016); arXiv:1509.07705.
- Generalized liquid crystals: giant fluctuations and the vestigial chiral order of I, O and T matter, Ke Liu, Jaakko Nissinen, Robert-Jan Slager, Kai Wu and Jan Zaanen, Phys. Rev. X 6, 041025 (2016); arXiv:1512:07822.
- Classification of point-group-symmetric orientational ordering tensors, Jaakko Nissinen, Ke Liu, Robert-Jan Slager, Kai Wu and Jan Zaanen, Phys. Rev. E **94**, 022701 (2016); arXiv:1603.04794.

Preprints/In press:

- Dual gauge field theory of quantum liquid crystals in two dimensions, Aron J. Beekman, Jaakko Nissinen, Kai Wu, Ke Liu, Robert-Jan Slager, Zohar Nussinov, Vladimir Cvetkovic and Jan Zaanen, Under review of Physics Reports; arXiv:1603.04254.
- Hierarchy of orientational phases and axial anisotropies in the gauge theoretical description of generalized nematics, Ke Liu, Jaakko Nissinen, Josko de Boer, Robert-Jan Slager and Jan Zaanen, Accepted by Physical Review E; arXiv:1606.04507.
- Global phase diagram of a dirty Weyl semimetal, Bitan Roy, Robert-Jan Slager and Vladimir Juričić, to be submitted to PRX shortly, in view of recent extra results; arXiv:1610.08973.
- Topological classification of crystalline insulators through band structure combinatorics, Jorrit Kruthoff, Jan de Boer, Jasper van Wezel, Charles L. Kane, and Robert-Jan Slager, submitted to PRX; arXiv:1612.02007.

PhD Thesis

• The symmetry of crystals and the topology of electrons, Leiden University (2016).

CONFERENCES, VISITS AND WORKSHOPS

Oral presentations

- DRSTP School on Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands, "Flux modes in topological band insulators", March 2012.
- Casimir Spring School, Arnemuiden, the Netherlands, "Translationally active topological band insulators", June 2012 (invited).
- DRSTP School on Statistical Physics and Theory of Condensed Matter, Doorn, the Netherlands, "Helical defect modes and the classification paradigm of topological phases", March 2013.
- van Ruitenbeek group meeting, Leiden University, Leiden, the Netherlands "The space group classification of topological band insulators", April 2013 (invited).
- Golden group meeting, University of Amsterdam, Amsterdam, the Netherlands, "The space group classification of topological band insulators", April 2013 (invited).
- E-MRS meeting, Warsaw University of Technology, Warsaw, Poland, "The space group classification of topological band insulators", September 2014 (invited).
- TI meeting FOM, Amsterdam, the Netherlands, "Helical defect modes in 3D topological band insulators", May 2014 (invited).
- National Physics@FOM conference, Veldhoven, the Netherlands, "Helical defect modes in 3D topological band insulators", January 2015.
- NanoFront Winter Retreat, Courchevel, France, "Isospinless graphene on grain boundaries in topological band insulators", March 2015.
- This Week's Discoveries colloquium, Leiden, the Netherlands, "Crystal symmetries and electronic topology: where the physics of the EPR paradox meets the mathematics of samurai swords", December 2016 (invited).
- Talk MPI-PKS, Dresden, Germany, "Topological insulators revisited: A space group perspective on classification procedures and new defect phenomena", March 2016 (invited).
- Talk EPFL, Lausanne, Switzerland, "Topological insulators revisited: A space group perspective on classification procedures and new defect phenomena", April 2016 (invited).
- Talk at workshop "From From Quantum Field Theories to Numerical Methods", NORDITA, Stockholm, Sweden, *Self-organized semi-metals on grain boundaries in topological band insulators*, May 2016.
- Talk at MPI-CPfS, Dresden, Germany, Crystalline symmetries and topological phases: physics beyond the edge, January 2017.

Poster presentations

• National Physics@FOM conference, Veldhoven, the Netherlands, "Translationally active topological band insulators", 17-18 January 2012.

- National Physics@FOM conference, Veldhoven, the Netherlands, "The space group classification of topological band insulators", January 2013.
- DRSTP Trends in Theory conference, Dalfsen, the Netherlands, "The space group classification of topological band insulators", May 2013.
- Workshop 'Topological Phases in Condensed Matter and Cold Atom Systems: towards quantum computations', Cargèse, France, " Defects and classification principles of topological insulating phases", June 2013.
- Gordon conference on strongly correlated electron systems, Massachusetts, USA, "Topological insulating phases beyond the tenfold way", June 2014.
- NanoFront Winter Retreat, Courchevel, France, "Nematic phases and a gauge theory description", March 2015.

Schools

• Prospects in Theoretical Physics - Princeton Summer School on Condensed Matter Physics, Princeton University and Institute of Advanced Study, Princeton, USA, July 2015.

REFERENCES

Prof. dr. J. Zaanen jan@lorentz.leidenuniv.nl · Lorentz Institute for Theoretical Physics, Leiden University, Leiden, The Netherlands.

Prof. dr. M. Golden

· University of Amsterdam, Amsterdam, the Netherlands.

dr. V. Juričić

· Nordic Institute for Theoretical Physics, Stockholm, Sweden.

Prof. dr. K. E. Schalm

· Lorentz Institute for Theoretical Physics, Leiden University, Leiden, The Netherlands.

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