

WOJCIECH DYBALSKI

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EDUCATION

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| 10/2018–04/2019 | Habilitation in Mathematics, Technical University of Munich. |
| 11/2004–03/2009 | PhD in Theoretical Physics, University of Göttingen. Advisor: D. Buchholz. |
| 09/2003–10/2004 | Graduate studies, University of Ottawa / NRC Ottawa. Advisor: P. Hawrylak. |
| 10/1998–06/2003 | MSc in Mathematical Physics, University of Warsaw. Advisor: J. Dereziński. |

PROFESSIONAL EXPERIENCE

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| 10/2017 – present | Technical University of Munich , Mathematics Department.
Group Leader within the Emmy Noether Programme
of the German Research Foundation (DFG). |
| 04/2017 – 09/2017 | Ludwig-Maximilian University of Munich , Mathematics Department.
Substitute Associate Professor. |
| 03/2014 – 03/2017 | Technical University of Munich , Mathematics Department.
Group Leader within the Emmy Noether Programme
of the German Research Foundation. |
| 04/2013 – 02/2014 | ETH Zürich , Theoretical Physics Department.
Postdoctoral Fellow; Advisor: G.M. Graf. |
| 12/2012 – 03/2013 | University of Paris-Sud , Mathematics Department.
Fellow of the DFG; Advisor: C. Gérard. |
| 09/2012 – 12/2012 | Hausdorff Research Institute for Mathematics, Bonn .
Group Leader, Junior Trimester Program ‘Mathematical Physics’. |
| 03/2012 – 08/2012 | University of Paris-Sud , Mathematics Department.
Fellow of the DFG; Advisor: C. Gérard. |
| 09/2011 – 02/2012 | University of Aarhus , Mathematics Department.
Postdoctoral Fellow; Advisor: J.S. Møller. |
| 04/2009 – 08/2011 | Technical University of Munich , Mathematics Department.
Postdoctoral Fellow; Advisor: H. Spohn. |

GRANTS AND AWARDS

- 12/2017 | **AHP Prize** for the most remarkable article in Annales Henri Poincaré in 2016: *Lieb-Robinson bounds, Arveson spectrum and Haag-Ruelle scattering theory in gapped quantum spin systems* jointly with S. Bachmann and P. Naaijken.
- Citation:** The article constructs rigorously the scattering theory for gapped quantum spin models, showing that in such systems one may speak about "quasiparticles" which behave very similarly to usual particles satisfying the bosonic statistics. By extending the Haag-Ruelle theory for relativistic QFT to interacting homogeneous non-relativistic systems, the authors solve an important open problem in mathematical physics. The main difficulty, consisting of the absence of Einstein's causality, is overcome by using the Lieb-Robinson bound on the propagation speed and conditions on the shape of the one-particle spectrum. The general construction, done using elegant and natural arguments, is illustrated on the example of the Ising model in transverse magnetic field. The techniques developed in the paper open new exciting perspectives in the study of nonequilibrium states of strongly coupled spin systems.
- 03/2014–08/2019 | **Emmy Noether Grant of the DFG (1.000.000 EUR)**
Host institution: Technical University of Munich.
- 09/2019–08/2020 | Emmy Noether Grant, extension (200.000 EUR)
Host institution: Technical University of Munich.
- 03/2014–02/2017 | Rita Levi Montalcini (190.000 EUR)
Research Grant of the Italian Ministry of Education (declined).
- 03/2012–03/2014 | Research Fellowship of the DFG (60.000 EUR)
University of Paris-Sud / ETH Zürich.
- 09/2012–12/2012 | Fellowship of the Hausdorff Research Institute for Mathematics (40.000 EUR)
Received jointly with K. Rejzner, J. Schlemmer and Y. Tanimoto.
- 05/2018–06/2019 | Grant of the Center for French-Bavarian University Collaboration (2.000 EUR)
Received jointly with M. Wrochna.

CONFERENCE ORGANIZATION

- 07/2017-present | Workshop series: 'Munich-Regensburg Seminar',
Technical University of Munich / LMU / University of Regensburg.
Co-organized biannually with F. Finster and D. Deckert.
- 03/2017 | Workshop: 'Macroscopic Limits of Quantum Systems',
Technical University of Munich / LMU. **Main organizer.**
- 05/2016 | 38th LQP Workshop: 'Foundations and Constructive Aspects of QFT',
Institute for Advanced Study, Technical University of Munich. **Main organizer.**
- 10/2015 | 'Quantum Field Theory: Infrared and Constructive Aspects',
Mathematics Department, Technical University of Munich. **Main organizer.**
- 09/2012 | 'Algebraic Quantum Field Theory and Local Symmetries',
Hausdorff Research Institute for Mathematics, Bonn. **Main organizer.**

INVITED CONFERENCE TALKS (selection)

- 07/2019 **W. Dybalski.** *Large gauge transformations, asymptotic charges and soft-photon theorems.* ‘Mathematics of interacting QFT models’, University of York, UK.
- 08/2018 **W. Dybalski.** *Infrared problems in QED: Some topics of current research.* ‘Physics and Mathematics of QFT’, BIRS Banff, Canada.
- 07/2018 S. Bachmann, **W. Dybalski**, P. Naaijken. *Lieb-Robinson bounds, Arveson spectrum and Haag-Ruelle scattering theory in gapped quantum spin systems.* ‘International Congress of Mathematical Physics’, Montreal. AHP Prize session.
- 07/2017 **W. Dybalski.** *From infrared problems to non-commutative recurrence.* ‘Mini-workshop Mathematical Physics’, LMU Munich.
- 05/2017 **W. Dybalski.** *Non-relativistic QED in different gauges.* ‘Foundational and Structural Aspects of Gauge Theories’, MITP Mainz.
- 05/2017 **W. Dybalski.** *From LSZ ideas to non-commutative recurrence.* ‘Wolfhart Zimmermann Memorial Symposium’, MPI Munich.
- 12/2016 **W. Dybalski.** *Non-relativistic QED in different gauges.* ‘Infrared Problems in QED and Quantum Gravity’, Perimeter Institute, Waterloo, Canada.
- 11/2016 **W. Dybalski.** *Mathematical foundations of Quantum Field Theory.* ‘Autumn School on Mathematical Foundations of Physics’, LMU Munich.
- 07/2016 **W. Dybalski** and C. Gérard. *Asymptotic observables and the problem of asymptotic completeness in QFT.* Workshop ‘Recent Mathematical Developments in Quantum Field Theory’, Mathematical Research Institute of Oberwolfach.
- 02/2016 **W. Dybalski** and C. Gérard. *A criterion for asymptotic completeness in local relativistic QFT.* Spring Meeting of the German Physical Society, University of Hamburg.
- 07/2015 S. Alazzawi and **W. Dybalski.** *Compton scattering in the Buchholz-Roberts framework of relativistic QED.* Conference ‘Operator Algebras and Quantum Physics’, University of Sao Paulo, Brazil.
- 09/2014 **W. Dybalski** and A. Pizzo. *Towards a consistent description of Coulomb scattering in QFT.* Conference ‘Mathematical Physics in Jena’, University of Jena.
- 03/2014 **W. Dybalski** and A. Pizzo. *Coulomb scattering in QFT. A status report.* Workshop ‘Many body quantum systems’, University of Warwick.
- 11/2013 **W. Dybalski** and A. Pizzo. *Towards a consistent description of Coulomb scattering in QFT.* Workshop ‘Mathematical Physics’, ETH Zürich.
- 04/2013 **W. Dybalski** and C. Gérard. *Towards asymptotic completeness in local relativistic QFT.* Conference ‘Variational and spectral methods in QFT’, Henri Poincaré Institute, Paris.
- 09/2012 **W. Dybalski** and C. Gérard. *Towards asymptotic completeness in massive relativistic QFT.* Conference ‘Modern trends in algebraic QFT’, National Institute for Nuclear Physics, Frascati.
- 09/2011 **W. Dybalski.** *Inclusive cross-sections in relativistic and non-relativistic QED.* Workshop ‘Rigorous quantum field theory in the LHC era’, Erwin Schrödinger Institute, Vienna.

TEACHING

	Technical University of Munich.
10/2018–02/2019	Lecturer: ‘Quantum Field Theory’, Physics Master Course, 4 hours/week.
10/2017–02/2018	Lecturer: ‘Quantum Field Theory’, Physics Master Course, 4 hours/week. <i>I taught the above two courses jointly with a colleague from the Physics Department and my part was 14 hours/semester on mathematical foundations. I participated in the development of this core module of the Elite Master Course ‘Theoretical and Mathematical Physics’.</i>
04/2016–07/2016	Lecturer: ‘Non-relativistic QED’, specialised course, 2 hours/week.
10/2014–02/2015	Lecturer: ‘Algebraic Quantum Field Theory’, specialized course, 4 hours/week.
	Ludwig-Maximilian University of Munich.
04/2017–07/2017	Lecturer: ‘Mathematics II for Physicists’, basic course, 4 hours/week.
04/2017–07/2017	Lecturer: ‘Algebraic Quantum Field Theory’, specialized course, 4 hours/week.
	University of Göttingen.
10/2007–02/2008	Head Teaching Assistant: ‘Statistical Mechanics and Thermodynamics’.
04/2007–07/2007	Teaching Assistant: ‘Quantum Mechanics I’.
10/2006–02/2007	Teaching Assistant: ‘Classical Mechanics’.
04/2006–07/2006	Teaching Assistant: ‘Quantum Mechanics I’.
	University of Ottawa.
09/2003–04/2004	Teaching Assistant: ‘First Physics Lab’.
	University of Warsaw.
02/2002–06/2002	Teaching Assistant: ‘Theory of Linear Operators’.

PROFESSIONAL TEACHING QUALIFICATION

09/2015	Participation in a workshop ‘ University didactics: development of competence oriented teaching ’ of the German Research Foundation and Center for Science and Research Management.
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SUPERVISION

03/2019–present	Postdoc: Dr. Maximilian Duell. Topic: ‘Asymptotic completeness in wedge-local QFT’.
01/2017–09/2018	Postdoc: Dr. Daniela Cadamuro. Topic: ‘Infravacuum representations in QED’.
10/2014–09/2016	Postdoc: Dr. Sabina Alazzawi. Topic: ‘Compton scattering in the Buchholz-Roberts setting’.
04/2015–02/2019	PhD student: Maximilian Duell. Thesis: ‘Non-local methods in Haag-Ruelle scattering theory.’ Defended on 27/02/2019 (<i>summa cum laude</i>).
09/2018–present	MSc project ‘Quantum field theory with theta-interaction’.
09/2018–07/2019	MSc thesis: ‘On self-adjointness of Noether charges in AQFT’.
04/2018–05/2019	MSc thesis ‘The necessity of indefinite metric Hilbert space in QED’.
06/2017–08/2018	MSc thesis: ‘External current QED in different gauges’.
08/2015–03/2017	MSc thesis ‘LSZ reduction in QFT and lattice systems’.
04/2013–12/2013	MSc thesis: ‘Scattering in quantum field theories without mass gap’.
10/2013–03/2014	MSc thesis: ‘Construction of detectors of charged particles in algebraic QFT’.
04/2018–09/2018	BSc thesis: ‘Soliton solutions and scattering theory of Maxwell-Newton equations’.
04/2017–09/2017	BSc thesis: ‘Existence of solutions for a coupled system of Maxwell-Newton equations’.

PROFESSIONAL SUPERVISION QUALIFICATION

12/2016	Participation in a workshop ‘ Leading a research group ’ of the German Research Foundation and Center for Science and Research Management.
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PROFESSIONAL SERVICES

Member of the advisory council of the Mathematical Physics section of the German Physical Society.

Proposal review for German Research Foundation.

Book review for Springer Mathematics.

Article review for Commun. Math. Phys., J. Math. Phys., Lett. Math. Phys., Ann. Henri Poincaré, Rep. Math. Phys., SIGMA, Phys. Rev. Lett., Phys. Rev. A., Math. Phys. Anal. Geom., J. Non-Equilibrium Thermodynamics.

Editor of the proceedings volume ‘Macroscopic Limits of Quantum Systems’ within the PROMS series of Springer.

REFERENCES

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Universität Göttingen
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