Curriculum vitae Hendrik Weimer

Personal data

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Nationality:	German
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Education

2018	Habilitation in Physics, Leibniz Universität Hannover
2007–2010	Ph.D., Physics, University of Stuttgart (summa cum laude)
	Thesis: "Quantum many-body physics with strongly interacting Rydberg atoms"
	Advisor: Prof Hans Peter Büchler
2005–2007	Diploma, Physics, University of Stuttgart
	Thesis: "A quantum-thermodynamic approach to transport phenomena"
	Advisor: Prof Günter Mahler
2004–2005	Durham University
2002–2004	Prediploma, University of Stuttgart

Scientific work experience

2014–present	Junior Research Group Leader, Leibniz University Hannover
2012–2014	Postdoctoral Research Assistant, Leibniz University Hannover
2010–2012	Postdoctoral Fellow, Harvard University and Institute for Theoretical Atomic, Molecular and Optical Physics (ITAMP)
2007–2010	Research Assistant, University of Stuttgart

Awards and Fellowships

- Journal of Physics B "Emerging Leader" (2017)

- Freigeist Fellow of the Volkswagen Foundation (since 2014)

- ITAMP Postdoctoral Fellow (2010–2012)

- DAAD Postdoctoral Fellow (2010–2012)

- CO.CO.MAT Dissertation Prize (2011)

- Research cited by *Science* as a "Breakthrough of the Year" (2010)

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Research interests

Quantum many-body physics, driven-dissipative quantum systems, Rydberg atoms, nitrogen-vacancy centers in diamond, ultracold quantum gases, quantum information processing, topological states of matter

List of publications

Total number:	40
Highlights:	1 × *Nature Physics*, 3 × *Nature Communications*, 12 × *Physical Review Letters*
Citations:	2564 (Google Scholar)
h-Index:	20 (Google Scholar)

[1] L. Timm, H. Weimer, L. Santos, T.E. Mehlstäubler. Energy localization in interacting atomic chains with topological solitons *arXiv:1910.02135* (2019).

[2] S. Whitlock, H. Wildhagen, H. Weimer, M. Weidemüller. Diffusive to non-ergodic dipolar transport in a dissipative atomic medium. *Phys. Rev. Lett.* (in press), arXiv:1809.07532.

[3] H. Weimer, A. Kshetrimayum, R. Orus. Simulation methods for open quantum many-body systems. *arXiv:1907.07079* (2019),

[4] F. Carollo, E. Gillman, H. Weimer, I. Lesanovsky. Critical behavior of the quantum contact process in one dimension *Phys. Rev. Lett.* **123**, 100604 (2019).

[5] M. Raghunandan, F. Wolf, C. Ospelkaus, P. O. Schmidt, and H. Weimer. Initialization of Quantum Simulators by Sympathetic Cooling. *arXiv:1901.02019* (2019).

[6] A. Jamadagni, H. Weimer, A. Bhattacharyya. Robustness of Topological Order in the Toric Code with Open Boundaries. *Phys. Rev. B* **98**, 235147 (2018).

[7] M. Roghani, H. Weimer. Dissipative Preparation of Entangled Many-Body States with Rydberg Atoms. *Quantum Sci. Technol.* **3**, 035002 (2018).

[8] M. Raghunandan, J. Wrachtrup, H. Weimer. High-density quantum sensing with dissipative first order transitions.*Phys. Rev. Lett.* **120**, 150501 (2018).

[9] A. Kshetrimayum, H. Weimer, R. Orus. A simple tensor network algorithm for two-dimensional steady states.*Nature Commun.* **8**. 1291 (2017).

[10] V. R. Overbeck, M. F. Maghrebi, A. V. Gorshkov, and H. Weimer. Multicritical behavior in dissipative Ising models. *Phys. Rev. A* **95**, 042133 (2017).

[11] H. Weimer. Tailored jump operators for purely dissipative quantum magnetism. *J. Phys. B* **50**, 024001 (2017).

[12] J. Lammers, H. Weimer, and K. Hammerer. Open-system many-body dynamics through interferometric measurements and feedback. *Phys. Rev. A* **94**, 052120 (2016).

[13] J. Kaczmarczyk, H. Weimer, and M. Lemeshko. Dissipative preparation of antiferromagnetic order in the Fermi-Hubbard model. *New J. Phys.* **18**, 093042 (2016).

[14] V. R. Overbeck and H. Weimer. Time evolution of open quantum many-body systems. *Phys. Rev. A* **93**, 012106 (2016).

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[15] H. Weimer. Variational analysis of driven-dissipative Rydberg gases. *Phys. Rev. A* **91**, 063401 (2015).

[16] H. Weimer. Variational Principle for Steady States of Dissipative Quantum Many-Body Systems. *Phys. Rev. Lett.* **114**, 040402 (2015).

[17] U. Schneider, S. Mandt, A. Rapp, S. Braun, H. Weimer, I. Bloch, and A. Rosch. Comment on "Consistent thermostatistics forbids negative absolute temperatures". *arXiv:1407.4127* (2014).

[18] H. Weimer. String order in dipole-blockaded quantum liquids. *New J. Phys.* **16**, 093040 (2014).

[19] H. Weimer. Quantum simulation of many-body spin interactions with ultracold polar molecules. *Mol. Phys.* **111**, 1753–1758 (2013).

[20] M. Lemeshko and H. Weimer. Dissipative binding of atoms by non-conservative forces. *Nature Commun.* **4**, 2230 (2013).

[21] M. Lemeshko, N. Y. Yao, A. V. Gorshkov, H. Weimer, S. D. Bennett, T. Momose, and S. Gopalakrishnan. Controllable quantum spin glasses with magnetic impurities embedded in quantum solids. *Phys. Rev. B* **88**, 014426 (2013).

[22] N. Y. Yao, C. R. Laumann, A. V. Gorshkov, H. Weimer, L. Jiang, J. I. Cirac, P. Zoller, and M. D. Lukin. Topologically protected quantum state transfer in a chiral spin liquid. *Nature Commun.* **4**, 1585 (2013).

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[24] M. Lemeshko, R. V. Krems, and H. Weimer. Nonadiabatic Preparation of Spin Crystals with Ultracold Polar Molecules. *Phys. Rev. Lett.* **109**, 035301 (2012).

[25] R. Löw, H. Weimer, J. Nipper, J. B. Balewski, B. Butscher, H. P. Büchler, and T. Pfau. An experimental and theoretical guide to strongly interacting Rydberg gases. *J. Phys. B* **45**, 113001 (2012).

[26] H. Weimer, N. Y. Yao, C. R. Laumann, and M. D. Lukin. Long-Range Quantum Gates using Dipolar Crystals. *Phys. Rev. Lett.* **108**, 100501 (2012).

[27] H. Weimer and H. P. Büchler. In situ measurement of the dynamic structure factor in ultracold quantum gases. *New J. Phys.* **13**, 113018 (2011).

[28] H. Weimer, M. Müller, H. P. Büchler, and I. Lesanovsky. Digital quantum simulation with Rydberg atoms. *Quant. Inf. Proc.* **10**, 885–906 (2011).

[29] J. Honer, R. Löw, H. Weimer, T. Pfau, and H. P. Büchler. Artificial Atoms Can Do More Than Atoms: Deterministic Single Photon Subtraction from Arbitrary Light Fields. *Phys. Rev. Lett.* **107**, 093601 (2011).

[30] H. Weimer and H. P. Büchler. Two-stage melting in systems of strongly interacting Rydberg atoms. *Phys. Rev. Lett.* **105**, 230403 (2010).

[31] J. Honer, H. Weimer, T. Pfau, and H. P. Büchler. Collective Many-Body Interaction in Rydberg Dressed Atoms. *Phys. Rev. Lett.* **105**, 160404 (2010).

[32] H. Weimer, M. Müller, I. Lesanovsky, P. Zoller, and H. P. Büchler. A Rydberg quantum simulator. *Nature Phys.* **6**, 382–388 (2010).

[33] R. Löw, H. Weimer, U. Krohn, R. Heidemann, V. Bendkowsky, B. Butscher, H. P. Büchler, and T. Pfau. Universal scaling in a strongly interacting Rydberg gas. *Phys Rev. A* **80**, 033422 (2009).

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[38] H. Weimer, M. Michel, J. Gemmer, and G. Mahler. Transport in anisotropic model systems analyzed by a correlated projection superoperator technique. *Phys. Rev. E* **77**, 011118 (2008).

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