

## Summary

- **>190 publications**, thereof  
**41 Nature/Science, 85 Physical Review Letters/Nature Physics/Physical Review X**
- **Citation Metrics:**  
Google Scholar citations: **(total) > 69.000, h-index: 109**  
Publons (formerly ISI WoS): **(total) > 42.600, h-index: 90**

## List of Publications

- 189** I. Bloch  
*Editorial: Künstliche Quantenwelten im Labor*  
Phys. Unserer Zeit **5**, 54: 211-211 (2023)
- 188** H. Schlömer, T. A. Hilker, I. Bloch, U. Schollwöck, F. Grusdt, A. Bohrdt  
*Quantifying hole-motion-induced frustration in doped antiferromagnets by Hamiltonian reconstruction*  
Communications Materials **4**, 64 (2023)
- 187** J. Trautmann, D. Yankelev, V. Klüsener, A.J. Park, I. Bloch, S. Blatt  
 *$IS0-3P2$  magnetic quadrupole transition in neutral strontium*  
Physical Review Research **5**, 013219 (2023)
- 186** K. Srakaew, P. Weckesser, S. Hollerith, D. Wei, D. Adler, I. Bloch, J. Zeiher  
*A subwavelength atomic array switched by a single Rydberg atom*  
Nature Physics **19**, 714-719 (2023)
- 185** M. Duda, X. Chen, A. Schindewolf, R. Bause, J.v. Milczewski, R. Schmidt, I. Bloch, X. Luo  
*Transition from a polaronic condensate to a degenerate Fermi gas of heteronuclear molecules*  
Nature Physics **19**, 720–725 (2023)
- 184** X. Chen, A. Schindewolf, S. Eppelt, R. Bause, M. Duda, S. Biswas, T. Karman, T.A. Hilker, I. Bloch, X. Luo  
*Field-linked resonances of polar molecules*  
Nature **614**, 59 - 63 (2023)
- 183** S. Hirthe, T. Chalopin, D. Bourgund, P. Bojovic, A. Bohrdt, E. Demler, F. Grusdt, I. Bloch, T.A. Hilker  
*Magnetically mediated hole pairing in fermionic ladders of ultracold atoms*  
Nature **613**, 463 - 467 (2023)
- 182** R. Bause, A. Christianen, A. Schindewolf, I. Bloch, X. Luo  
*Ultracold Sticky Collisions: Theoretical and Experimental Status*  
The Journal of Physical Chemistry A **127**, 729-741 (2023)
- 181** T. Kohlert, S. Scherg, P. Sala, F. Pollmann, B.H. Madhusudhana, I. Bloch, M. Aidelsburger  
*Exploring the Regime of Fragmentation in Strongly Tilted Fermi-Hubbard Chains*  
Physical Review Letters **130**, 010201 (2023)
- 180** E. Deist, Y.-H.Lu, J. Ho, M. K Pasha, J. Zeiher, Z. Yan, D.M. Stamper-Kurn  
*Mid-Circuit Cavity Measurement in a Neutral Atom Array*  
Physical Review Letters **129** (20), 203602 (2022)
- 179** I. Bloch, M. Greiner  
*The superfluid-to-Mott insulator transition and the birth of experimental quantum simulation*  
Nature Reviews Physics **4**, 739–740 (2022)
- 178** S. Flannigan, N. Pearson, G. Low, A. Buyskikh, I. Bloch, P. Zoller, M. Troyer, A. Daley  
*Propagation of errors and quantitative quantum simulation with quantum advantage*  
Quantum Science and Technology **7** (4), 045025 (2022)

- 177** N. Darkwah Oppong, G. Pasqualetti, O. Bettermann, P. Zechmann, M. Knap, I. Bloch, S. Fölling  
*Probing transport and slow relaxation in the mass-imbalanced Fermi-Hubbard model.*  
Physical Review X **12**, 031026 (2022)
- 176** A. J. Daley, I. Bloch, C. Kokail, S. Flannigan, N. Pearson, M. Troyer, P. Zoller  
*Practical quantum advantage in quantum simulation*  
Nature **607**, 667–676 (2022)
- 175** A. J. Park, J. Trautmann, N. Šantić, V. Klüsener, A. Heinz, I. Bloch, S. Blatt  
*Cavity-Enhanced Optical Lattices for Scaling Neutral Atom Quantum Technologies to Higher Qubit Numbers*  
PRX Quantum **3**, 030314 (2022)
- 174** A. Schindewolf, R. Bause, X. Chen, M. Duda, T. Karman, I. Bloch, X. Luo  
*Evaporation of microwave-shielded polar molecules to quantum degeneracy*  
Nature **607**, 677–681 (2022)
- 173** D. Wei, A. Rubio Abadal, B. Ye, F. Machado, J. Kemp, K. Srakaew, S. Hollerith, J. Rui, S. Gopalakrishnan, N. Y. Yao, I. Bloch, J. Zeiher  
*Quantum gas microscopy of Kardar-Parisi-Zhang superdiffusion*  
Science **376** (6594), 716 - 720 (2022)
- 172** X. Chen, M. Duda, A. Schindewolf, R. Bause, I. Bloch, X. Luo  
*Suppression of Unitary Three-body Loss in a Degenerate Bose-Fermi Mixture*  
Physical Review Letters **128** (15), 153401 (2022)
- 171** T. Klostermann, C. R. Cabrera, H. von Raven, J. F. Wienand, C. Schweizer, I. Bloch, M. Aidelsburger  
*Fast long-distance transport of cold cesium atoms*  
Physical Review A **105** (4), 043319 (2022)
- 170** S. Hollerith, K. Srakaew, D. Wei, A. Rubio Abadal, D. Adler, P. Weckesser, A. Kruckenhauser, V. Walther, R. van Bijnen, J. Rui, C. Gross, I. Bloch, J. Zeiher  
*Realizing distance-selective interactions in a Rydberg-dressed atom array*  
Physical Review Letters **128** (11), 113602 (2022)
- 169** A. Bohrdt; L. Homeier, I. Bloch, E. A. Demler, F. Grusdt  
*Strong pairing in mixed-dimensional bilayer antiferromagnetic Mott insulators*  
Nature Physics **18**, 651 - 656 (2022)
- 168** B. H. Madhusudhana, S. Scherg, T. Kohlert, I. Bloch, M. Aidelsburger  
*Benchmarking a Novel Efficient Numerical Method for Localized 1D Fermi-Hubbard Systems on a Quantum Simulator*  
PRX Quantum **2**, 040325 (2021)
- 167** R. Bause, A. Kamijo, X. Chen, M. Duda, A. Schindewolf, I. Bloch, X. Luo  
*Efficient conversion of closed-channel-dominated Feshbach molecules of  $^{23}\text{Na}^{40}\text{K}$  to their absolute ground state*  
Physical Review A **104** (4), 043321 (2021)
- 166** S. Scherg, T. Kohlert, P. Sala, F. Pollmann, B. H. Madhusudhana, I. Bloch, M. Aidelsburger  
*Observing non-ergodicity due to kinetic constraints in tilted Fermi-Hubbard chains*  
Nature Communications **12** (1), 4490 (2021)
- 165** R. Bause, A. Schindewolf, R. Tao, M. Duda, X. Chen, G. Quemener, T. Karman, A. Christianen, I. Bloch, X. Luo

- Collisions of ultracold molecules in bright and dark optical dipole traps*  
Physical Review Research **3** (3), 033013 (2021)
- 164** S. Hollerith, A. Rubio-Abadal, K. Srakaew, D. Wei, J. Zeiher, C. Groß, I. Bloch  
*Microscopic electronic structure tomography of Rydberg macrodimers*  
Physical Review Research **3** (1), 013252 (2021)
- 163** A. Heinz, J. Trautmann, N. Santic, A. J. Park, I. Bloch, S. Blatt  
*Crossed optical cavities with large mode diameters*  
Optics Letters **46** (2), 250 - 253 (2021)
- 162** J. Rui, D. Wei, A. Rubio-Abadal, S. Hollerith, J. Zeiher, D.M. Stamper-Kurn, C. Gross, I. Bloch  
*A subradiant optical mirror formed by a single structured atomic layer*  
Nature **583** (7816), 369 - 374 (2020)
- 161** A. Rubio-Abadal, N. Ippoliti, S. Hollerith, D. Wei, J. Rui, S.L. Sondhi, V. Khemani, C. Gross, I. Bloch  
*Floquet prethermalization in a Bose-Hubbard system*  
Physical Review X **10** (2), 021044 (2020)
- 160** J. Koenigsell, S. Hirthe, D. Bourgund, P. Sompet, J. Vijayan, G. Salomon, C. Gross, I. Bloch  
*Robust Bilayer Charge-Pumping for Spin- and Density-Resolved Quantum Gas Microscopy*  
Physical Review Letters **125**, 010403 (2020)
- 159** K. Wintersperger, C. Braun, F. Nur Ünal, A. Eckardt, M. Di Liberti, N. Goldman, I. Bloch, M. Aidelsburger  
*Realization of an anomalous Floquet topological system with ultracold atoms*  
Nature Physics **16**, (2020)
- 158** R. Bause, M. Li, A. Schindewolf, X.-Y. Chen, M. Duda, S. Kotochigova, I. Bloch, X.-Y. Luo  
*Tune-out and magic wavelengths for ground-state  $^{23}\text{Na}^{40}\text{K}$  molecules*  
Physical Review Letters **125**, 023201 (2020)
- 157** A. Heinz, A.J. Park, N. Santic, J. Trautmann, S.G. Porsev, M.S. Safronova, I. Bloch, S. Blatt  
*State-dependent optical lattices for the strontium optical qubit*  
Physical Review Letters **124**, 203201 (2020)
- 156** K. Wintersperger, M. Bukov, J. Näger, S. Lellouch, E. A. Demler, U. Schneider, I. Bloch, N. Goldman, M. Aidelsburger  
*Parametric Instabilities of Interacting Bosons in Periodically Driven 1D Optical Lattices*  
Physical Review X **10** (1), 011030 (2020)
- 155** J. Vijayan, P. Sompet, G. Salomon, J. Koenigsell, S. Hirthe, A. Bohrdt, F. Grusdt, I. Bloch, C. Gross  
*Time-Resolved Observation of spin-charge deconfinement in fermionic Hubbard chains*  
Science **367**, 186-189 (2020)
- 154** J. Koenigsell, J. Vijayan, P. Sompet, F. Grusdt, T. Hilker, E. Demler, G. Salomon, I. Bloch, C. Gross  
*Imaging magnetic polarons in the doped Fermi-Hubbard model*  
Nature **572**, 358-362 (2019)

- 153** D. A. Abanin, E. Altman, I. Bloch, M. Serbyn  
*Colloquium: Many-body localization, thermalization, and entanglement*  
Reviews of Modern Physics **91**, 021001 (2019)
- 152** C. Schweizer, F. Grusdt, M. Berngruber, L. Barbiero, E. Demler, Nathan Goldman, I. Bloch, M. Aidelsburger  
*Floquet approach to Z2 lattice gauge theories with ultracold atoms in optical lattices*  
Nature Physics **15**, 1168-1173 (2019)
- 151** A. Rubio-Abadal, J.-Y Choi, J. Zeiher, S. Hollerith, J. Rui, I. Bloch, C. Groß  
*Many-Body Delocalization in the Presence of a Quantum Bath*  
Physical Review **X 9** (4), 041014 (2019)
- 150** S. Hollerith, J. Zeiher, J. Rui, A. Rubio-Abadal, V. Walther, T. Pohl, D. M. Stamper-Kurn, I. Bloch, C. Gross  
*Quantum gas microscopy of Rydberg macrodimers*  
Science **364**, 664-667, 2019
- 149** S. Snigirev, A.J. Park, A. Heinz, I. Bloch, S. Blatt  
*Fast and dense magneto-optical traps for strontium*  
Phys. Rev. A **99**, 063421 (2019)
- 148** N. Darkwah Oppong, L. Riegger, O. Bettermann, M. Höfer, J. Levinsen, M. M. Parish, I. Bloch, S. Fölling  
*Observation of coherent multi-orbital polarons in a two-dimensional Fermi gas*  
Physical Review Letters **122**, 193604 (2019)
- 147** G. Salomon, J. Koepsell, J. Vijayan, T. A. Hilker, J. Nespolo, L. Pollet, I. Bloch, C. Gross  
*Direct observation of incommensurate magnetism in Hubbard chains*  
Nature **565**, 56-60 (2019)
- 146** T. Kohlert, S. Scherg, X. Li, H. P. Lüschen, S. Das Sarma, I. Bloch, M. Aidelsburger  
*Observation of many-body localization in a one-dimensional system with single-particle mobility edge*  
Physical Review Letters **122**, 170403 (2019)
- 145** I. Bloch  
*Quantum Simulations Come of Age*  
Nature **14**, 1159-1161 (2018)
- 144** F. Seeßelberg, X.-Y. Luo, M. Li, R. Bause, S. Kotochigova, I. Bloch, C. Gohle  
*Extending rotational coherence of interacting polar molecules in a spin-decoupled magic trap*  
Physical Review Letters **121**, 253401 (2018)
- 143** S. Scherg, T. Kohlert, J. Herbrych, J. Stolpp, P. Bordia, U. Schneider, F. Heidrich-Meisner, I. Bloch, M. Aidelsburger  
*Non-Equilibrium Mass Transport in the 1D Fermi-Hubbard Model*  
Physical Review Letters **121**, 130402 (2018)
- 142** L. Riegger, N. Darkwah Oppong, M. Höfer, D. R. Fernandes, I. Bloch, S. Fölling  
*Localized Magnetic Moments with Tunable Spin Exchange in a Gas of Ultracold Fermions*  
Physical Review Letter **120**, 143601 (2018)
- 141** M. Lohse, Ch. Schweizer, H. M. Price, O. Zilberberg, I. Bloch  
*Exploring 4D Quantum Hall Physics with a 2D Topological Charge Pump*

- Nature **553**, 55 (2018)
- 140** H P. Lüschen, S. Scherg, T. Kohlert, M. Schreiber, P. Bordia, X. Li, S. D. Sarma, I. Bloch  
*Single-Particle Mobility Edge in a One-Dimensional Quasiperiodic Optical Lattice*  
Physical Review Letters **120**, 130402 (2018)
- 139** F. Seeßelberg, N. Buchheim, Z.K. Lu, T. Schneider, X.-Y. Luo, I. Bloch and C. Gohle  
*Modeling the adiabatic creation of ultracold, polar  $^{23}\text{Na}^{40}\text{K}$  molecules*  
Physics Review A **97**, 013405 (2018)
- 138** J. Zeiher, Jae-yoon Choi, A. Rubio-Abadal, T. Pohl, R. van Bijnen, I. Bloch, Christian Gross  
*Coherent many-body spin dynamics in a long-range interacting Ising chain*  
Physical Review X **7**, 041063 (2017)
- 137** C. Gross, I. Bloch  
*Quantum simulations with ultracold atoms in optical lattices*  
Science **357**, 995 (2017)
- 136** L. Riegger, N. Darkwah Oppong, M. Höfer, D. R. Fernandes, I. Bloch, S. Fölling  
*Localized magnetic moments with tunable spin exchange in a gas of ultracold fermions*  
Physical Review Letters **120** (14), 143601 (2018)
- 135** T. Hilker, G. Salomon, F. Grusdt, A. Omran, M. Boll, E. Demler, I. Bloch, C. Gross  
*Revealing hidden antiferromagnetic correlations in doped Hubbard chains via string correlators*  
Science **357**, 484 (2017)
- 134** M. Reitter, J. Näger, K. Wintersperger, Ch. Sträter, I. Bloch, A. Eckardt, U. Schneider  
*Interaction dependent heating and atom loss in a periodically driven optical lattice*  
Physical Review Letters **119**, 200402 (2017)
- 133** P. Bordia, H. Lüschen, S. Scherg, S. Gopalakrishnan, M. Knap, U. Schneider, I. Bloch  
*Probing Slow Relaxation and Many-Body Localization in Two-Dimensional Quasi-Periodic Systems*  
Physical Review X **7**, 041047
- 132** H. P. Lüschen, P. Bordia, S. Scherg, F. Alet, E. Altman, U. Schneider, I. Bloch  
*Observation of Slow Dynamics near the Many-Body Localization Transition in One-Dimensional Quasiperiodic Systems*  
Physical Review Letters **119**, 260401 (2017)
- 131** H. P. Lüschen, P. Bordia, S. S. Hodgman, M. Schreiber, S. Sarkar, A. J. Daley, M. H. Fischer, E. Altman, I. Bloch, U. Schneider  
*Signatures of Many-Body Localization in a Controlled Open Quantum System*  
Physical Review X **7**, 011034 (2017)
- 130** P. Bordia, H. Lüschen, U. Schneider, M. Knap, I. Bloch  
*Periodically Driving a Many-Body Localized Quantum System*  
Nature Physics **13**, 460–464 (2017)

- 129** C. Schweizer, M. Lohse, R. Citro, and I. Bloch  
*Spin Pumping and Measurement of Spin Currents in Optical Superlattices*  
Physical Review Letters **117**, 170405 (2016)
- 128** M. Boll, T. Hilker, G. Salomon, A. Omran, J. Nespolo, L. Pollet, I. Bloch, C. Gross  
*Spin- and Density-Resolved Microscopy of Antiferromagnetic Correlations in Fermi-Hubbard Chains*  
Science **353**, 6305 (2016)
- 127** J. Zeiher, R. van Bijnen, P. Schauß, S. Hild, J.-y. Choi, T. Pohl, I. Bloch, C. Gross  
*Many-body interferometry of a Rydberg-dressed spin lattice*  
Nature Physics **12**, 1095–109 (2016)
- 126** J.-y. Choi, S. Hild, J. Zeiher, P. Schauß, A. Rubio-Abadal, T. Yefsah, V. Khemani, D. A. Huse, I. Bloch, C. Gross  
*Exploring the many-body localization transition in two dimensions*  
Science **352**, 1547 (2016)
- 125** C. Hofrichter, L. Riegger, F. Scazza, M. Höfer, D. R. Fernandes, I. Bloch, S. Fölling  
*Direct probing of the Mott crossover in the  $SU(N)$  Fermi-Hubbard model*  
Physical Review X **6**, 021030 (2016)
- 124** L. Vidmar, J. P. Ronzheimer, M. Schreiber, S. Braun, S. S. Hodgman, S. Langer, F. Heidrich-Meisner, I. Bloch, U. Schneider  
*Dynamical Quasicondensation of Hard-Core Bosons at Finite Momenta*  
Physical Review Letters **115**, 175301 (2015)
- 123** A. Omran, M. Boll, T. Hilker, K. Kleinlein, G. Salomon, I. Bloch, C. Gross  
*Microscopic Observation of Pauli Blocking in Degenerate Fermionic Lattice Gases*  
Physical Review Letters **115**, 263001 (2015)
- 122** M. Höfer, L. Riegger, F. Scazza, C. Hofrichter, D.R. Fernandes, M. M. Parish, J. Levinsen, I. Bloch, S. Fölling  
*Observation of an orbital interaction-induced Feshbach resonance in  $173\text{-Yb}$*   
Physical Review Letters **115**, 265302 (2015)
- 121** T. Li, L. Duca, M. Reitter, F. Grusdt, E. Demler, M. Endres, M. Schleier-Smith, I. Bloch, U. Schneider  
*Bloch state tomography using Wilson lines*  
Science **352**, 1094 (2016)
- 120** P. Bordia, H. P. Lüschen, S. S. Hodgman, M. Schreiber, I. Bloch, U. Schneider  
*Coupling Identical 1D Many-Body Localized Systems*  
Physical Review Letters **116**, 140401 (2016)
- 119** J. Zeiher, P. Schauß, S. Hild, T. Macrì, I. Bloch, Ch. Gross  
*Microscopic Characterization of Scalable Coherent Rydberg Superatoms*  
Physical Review X **5**, 031015 (2015)
- 118** M. Schreiber, S. S. Hodgman, P. Bordia, H. P. Lüschen, M. H. Fischer, R. Vosk, E. Altman, U. Schneider, I. Bloch  
*Observation of many-body localization of interacting fermions in a quasi-random optical lattice*  
Science **349**, 842 (2015)
- 117** M. Lohse, Ch. Schweizer, O. Zilberberg, M. Aidelsburger, I. Bloch  
*A Thouless Quantum Pump with Ultracold Bosonic Atoms in an Optical Superlattice*

- Nature Physics **12**, 350–354 (2016)
- 116** T. Fukuhara, S. Hild, J. Zeiher, P. Schauß, I. Bloch, M. Endres, Ch. Gross  
*Spatially Resolved Detection of a Spin-Entanglement Wave in a Bose-Hubbard Chain*  
Physical Review Letters **115**, 035302 (2015)
- 115** L. Vidmar, J. P. Ronzheimer, M. Schreiber, S. Braun, S. S. Hodgman, S. Langer, F. Heidrich-Meisner, I. Bloch, U. Schneider  
*Dynamical Quasicondensation of Hard-Core Bosons at Finite Momenta*  
Physical Review Letters **115**, 175301 (2015)
- 114** P. Schauß, J. Zeiher, T. Fukuhara, S. Hild, M. Cheneau, T. Macrì, T. Pohl, I. Bloch, Ch. Gross  
*Crystallization in Ising quantum magnets*  
Science **347**, 1455 (2015)
- 113** S. Braun, M. Friesdorf, S. S. Hodgman, M. Schreiber, J. P. Ronzheimer, A. Riera, M. del Rey, I. Bloch, J. Eisert, U. Schneider  
*Emergence of coherence and the dynamics of quantum phase transitions*  
PNAS **112**, 3461 (2015)
- 112** M. Aidelsburger, M. Lohse, C. Schweizer, M. Atala, J.T. Barreiro, S. Nascimbène, N.R. Cooper, I. Bloch, N. Goldman  
*Measuring the Chern number of Hofstadter bands with ultracold bosonic atoms*  
Nature Physics **11**, 162–166 (2015)
- 111** L. Duca, T. Li, M. Reitter, I. Bloch, M. Schleier-Smith, U. Schneider  
*An Aharonov-Bohm interferometer for determining Bloch band topology*  
Science **347**, 288-292 (2015)
- 110** S. Hild, T. Fukuhara, P. Schauss, J. Zeiher, M. Knap, E. Demler, I. Bloch, C. Gross  
*Far-from-equilibrium spin transport in Heisenberg quantum magnets*  
Physical Review Letters **113**, 147205 (2014)
- 109** U. Schneider, S. Mandt, A. Rapp, S. Braun, H. Weimer, I. Bloch, A. Rosch  
*Comment on “Consistent thermostatics forbids negative absolute temperatures”*  
arXiv:1407.4127
- 108** S. Braun, M. Friesdorf, S. Hodgman, M. Schreiber, J.P. Ronzheimer, A. Riera, M del Rey, I. Bloch, J. Eisert, U. Schneider  
*Emergence of coherence and the dynamics of quantum phase transitions*  
PNAS **112**, 3641 (2015)
- 107** F. Scazza, C. Hofrichter, M. Höfer, P. C. De Groot, I. Bloch, S. Fölling  
*Observation of two-orbital spin-exchange interactions with ultracold  $SU(N)$ -symmetric fermions*  
Nature Physics **10**, 779 (2014)
- 106** M. Atala, M. Aidelsburger, M. Lohse, J. T. Barreiro, B. Paredes, I. Bloch,  
*Observation of Chiral Currents with Ultracold Atoms in Bosonic Ladders*  
Nature Physics **10**, 588 (2014)
- 105** M. Knap, A. Kantian, Th. Giamarchi, I. Bloch, M. Lukin, E. Demler  
*Probing Real-Space and Time-Resolved Correlation Functions with Many-Body Ramsey Interferometry*  
Physical Review Letters **111**, 147205 (2013)



- 104** M. Aidelsburger, M. Atala, M. Lohse, J.T. Barreiro, B. Paredes, I. Bloch  
*Realization of the Hofstadter Hamiltonian with ultracold atoms in optical lattices*  
Physical Review Letters **111**, 185301 (2013)
- 103** T. Fukuhara, P. Schauß, M. Endres, S. Hild, M. Cheneau, I. Bloch, C. Gross  
*Microscopic observation of magnon bound states and their dynamics*  
Nature **502**, 76 (2013)
- 102** M. Aidelsburger, M. Atala, S. Nascimbène, S. Trotzky, Y.-A. Chen, I. Bloch  
*Experimental realization of strong effective magnetic fields in optical superlattice potentials*  
Appl. Phys. **B 113**, 1 (2013)
- 101** M. Endres, M. Cheneau, T. Fukuhara, C. Weitenberg, P. Schauß, C. Gross, L. Mazza, M. Carmen Banuls, L. Pollet, I. Bloch, S. Kuhr  
*Single-site- and single-atom-resolved measurement of correlation functions*  
Appl. Phys. **B 113**, 1 (2013)
- 100** J.P. Ronzheimer, M. Schreiber, S. Braun, S. Hodgman, S. Langer, I.P. McCulloch, F. Heidrich-Meisner, I. Bloch, U. Schneider  
*Expansion dynamics of interacting bosons in homogeneous lattices in one and two dimensions*  
Physical Review Letters **110**, 205301 (2013)
- 99** M. Atala, M. Aidelsburger, J.T. Barreiro, D. Abanin, T. Kitagawa, E. Demler, I. Bloch  
*Direct Measurement of the Zak Phase in Topological Bloch Bands*  
Nature Physics **9**, 795 (2013)
- 98** D. Abanin, T. Kitagawa, I. Bloch, E. Demler  
*Interferometric approach to measuring band topology in 2D optical lattices*  
Physical Review Letters **110**, 165304 (2013)
- 97** T. Fukuhara, A. Kantian, M. Endres, M. Cheneau, P. Schauß, S. Hild, D. Bellem, U. Schollwöck, Th. Giamarchi, Ch. Gross, I. Bloch, S. Kuhr  
*Quantum dynamics of a single, mobile spin impurity*  
Nature Physics **9**, 235 (2013)
- 96** S. Braun, J. P. Ronzheimer, M. Schreiber, S. S. Hodgman, T. Rom, I. Bloch, U. Schneider  
*Negative Absolute Temperature for Motional Degrees of Freedom*  
Science **339**, 52 (2013)
- 95** P. Schauß, M. Cheneau, M. Endres, T. Fukuhara, S. Hild, A. Omran, Th. Pohl, Ch. Gross, S. Kuhr, I. Bloch  
*Observation of spatially ordered structures in a two-dimensional Rydberg gas*  
Nature **491**, 87 (2012)
- 94** M. Endres, T. Fukuhara, D. Pekker, M. Cheneau, P. Schauss, Ch. Gross, E. Demler, S. Kuhr, I. Bloch  
*The ‘Higgs’ amplitude mode at the two-dimensional superfluid-Mott insulator transition*  
Nature **487**, 454 (2012)
- 93** S. Nascimbène, Y.-A. Chen, M. Atala, M. Aidelsburger, S. Trotzky, B. Paredes, I. Bloch  
*Experimental realization of plaquette resonating valence-bond states with ultracold atoms in optical lattices*  
Physical Review Letters **108**, 205301 (2012)

- 92** I. Bloch, J. Dalibard, S. Nascimbène  
*Quantum simulations with ultracold atoms*  
Nature Physics **8**, 267 (2012)
- 91** S. Trotzky, Y.-A. Chen, A. Flesch, I. McCulloch, U. Schollwöck, J. Eisert, I. Bloch  
*Probing the relaxation towards equilibrium in an isolated strongly correlated 1D Bose gas*  
Nature Physics **8**, 325 (2012)
- 90** U. Schneider, L. Hackermüller, J.-P. Ronzheimer, S. Will, S. Braun, Th. Best, I. Bloch, E. Demler, S. Mandt, D. Rasch, A. Rosch  
*Fermionic transport and out-of-equilibrium dynamics in a homogeneous Hubbard model with Ultracold atoms*  
Nature Physics **8**, 213 (2012)
- 89** M. Cheneau, P. Barmettler, D. Poletti, M. Endres, P. Schauss, T. Fukuhara, C. Gross, I. Bloch, C. Kollath, S. Kuhr  
*Light-Cone-Like Spreading of Correlations in a Quantum Many-Body System*  
Nature **481**, 484 (2012)
- 88** M. Aidelsburger, M. Atala, S. Nascimbène, S. Trotzky, Y.-A. Chen, I. Bloch  
*Experimental Realization of Strong Effective Magnetic Fields in an Optical Lattice*  
Physical Review Letters **107**, 255301 (2012)
- 87** M. Endres, M. Cheneau, T. Fukuhara, Ch. Weitenberg, P. Schauss, L. Mazza, M.-C. Banuls, L. Pollet, I. Bloch & S. Kuhr  
*Direct Observation of Quantum Correlated Particle Hole Pairs and Non-Local String Order in Low Dimensional Mott Insulators*  
Science **334**, 200 (2011)
- 86** Y.-A. Chen, S. Nascimbene, M. Aidelsburger, M. Atala, S. Trotzky & I. Bloch  
*Controlling Correlated Tunneling and Superexchange Interactions with AC-Driven Optical Lattices*  
Physical Review Letters **107**, 210405 (2011)
- 85** C. Kasztelan, S. Trotzky, Y.-A. Chen, I. Bloch, I.P. McCulloch, U. Schollwöck , G. Orso  
*Landau-Zener sweeps and sudden quenches in coupled Bose-Hubbard chains*  
Physical Review Letters **106**, 155302 (2011)
- 84** M. Snoek, I. Titvinidze, I. Bloch & W. Hofstetter  
*Effect of Interactions on Harmonically Confined Bose-Fermi Mixtures in Optical Lattices*  
Physical Review Letters **106**, 155301 (2011)
- 83** Ch. Weitenberg, P. Schauß, T. Fukuharam, M. Cheneau, M. Endres, I. Bloch, S. Kuhr  
*Coherent light scattering from a two-dimensional Mott insulator*  
Physical Review Letters **106**, 215301 (2011)
- 82** Ch. Weitenberg, M. Endres, J.F. Sherson, M. Cheneau, P. Schauss, T. Fukuhara, I. Bloch, S. Kuhr  
*Single-Spin Addressing in an Atomic Mott Insulator*  
Nature **471**, 319 (2011)

- 81** S. Will, Th. Best, S. Braun, U. Schneider, I. Bloch  
*Coherent Interaction of a Single Fermion with a Small Bosonic Field*  
Physical Review Letters **106**, 115305 (2011)
- 80** I. Bloch  
*Ultracold Bosonic Atoms in Optical Lattices in Understanding Quantum Phase Transitions*, ed. by L. Carr, CRC Press (2010)
- 79** S. Trotzky, Y.-A. Chen, U. Schnorrberger, P. Cheinet & Immanuel Bloch  
*Controlling and Detecting Spin Correlations of Ultracold Atoms in Optical lattices*  
Physical Review Letters **105**, 265303 (2010)
- 78** I. Bloch  
*Paired in one dimension*  
Nature **467**, 535-536 (2010)
- 77** Y. Chen, S. Huber, S. Trotzky, I. Bloch & E. Altman  
*Many-body Landau-Zener dynamics in coupled 1D Bose liquids*  
Nature Physics **7**, 61-67 (2011)
- 76** J. Sherson, C. Weitenberg, M. Endres, M. Cheneau, I. Bloch, S. Kuhr  
*Single-atom resolved fluorescence Imaging of an Atomic Mott Insulator*  
Nature **467**, 68-72 (2010)
- 75** S. Will, T. Best, U. Schneider, L. Hackermüller, D. Lühmann, I. Bloch  
*Time-resolved observation of coherent multi-body interactions in quantum phase revivals*  
Nature **465**, 197-201 (2010)
- 74** Immanuel Bloch, Achim Rosch  
*Exploring strongly correlated quantum many-body systems with ultracold atoms in optical lattices*  
Physica Status Solidi B 247, No 3, 530-536 (2010)
- 73** L. Hackermüller, U. Schneider, M. Moreno, S. Will, T. Best, T. Kitagawa, E. Demler, I. Bloch, B. Paredes  
*Anomalous Expansion of Attractively Interacting Fermionic Atoms in Optical Lattices*  
Science **327**, 1621 (2010)
- 72** I. Bloch,  
*Strongly Correlated Quantum Phases of Ultracold Atoms in Optical Lattices*  
Proc. Int. School of Physics “Enrico Fermi” Course CLXXIII. eds. R. Kaiser, D. S. Wiersma and L. Fallani (2009)
- 71** U. Schnorrberger, J. D. Thompson, S. Trotzky, R. Pugatch, N. Davidson, S. Kuhr, I. Bloch  
*Electromagnetic induced transparency and light storage in a Mott insulator*  
Physical Review Letters **103**, 033003 (2009)
- 70** S. Trotzky, L. Pollet, F. Gerbier, U. Schnorrberger, I. Bloch, N. V. Prokof'ev, B. Svistunov, M. Troyer  
*Suppression of the critical temperature for superfluidity near the Mott transition: validating a quantum simulator*  
Nature Physics **6**, 998 (2010)
- 69** Th. Best, S. Will, U. Schneider, L. Hackermüller, D. van Oosten, I. Bloch  
*Role of interactions in  $^{87}\text{Rb}$ - $^{40}\text{K}$  Bose-Fermi mixtures in a 3d optical lattice*  
Physical Review Letters **102**, 030408 (2009)

- 68** U. Schneider, L. Hackermueller, S. Will, Th. Best, I. Bloch, T.A. Costi, R.W. Helmes, D. Rasch, A. Rosch  
*Metallic and Insulating Phases of Repulsively Interacting Fermions in a 3D Optical Lattice*  
Science **322**, 1520-1525 (2008)
- 67** I. Bloch  
*Quantum coherence and entanglement with ultracold atoms in optical lattices*  
Nature **453**, 1016-1022 (2008)
- 66** P. Cheinet, S. Trotzky, M. Feld, S. Fölling, U. Schnorrberger, M. Moreno, B. Paredes, I. Bloch  
*Counting Atoms using Interaction Blockade with Ultracold Atoms in Optical Superlattices*  
Physical Review Letters **101**, 090404 (2008)
- 65** P. Barmettler, A.-M. Rey, I. Bloch, E. Demler, M.D. Lukin, V. Gritsev  
*Controllable dynamical generation of entanglement and frustrated spin states in ultracold bosonic double well superlattices*  
Physical Review A **78**, 012330 (2008)
- 64** I. Bloch, J. Dalibard and W. Zwerger  
*Many-Body Physics with Ultracold Gases*  
Rev. Mod. Phys. **80**, 885 (2008)
- 63** I. Bloch  
*Quantum Gases*  
Science **319**, 1202 (2008)
- 62** A. Koetsier, R. A. Duine, I. Bloch and H. Stoof  
*Achieving the Néel state in an optical lattice*  
Physical Review A **77**, 023623 (2008)
- 61** B. Paredes, I. Bloch  
*Minimum Instances of Topological Matter in an Optical Plaquette*  
Physical Review A **77**, 023603 (2008)
- 60** S. Trotzky, P. Cheinet, S. Fölling, M. Feld, U. Schnorrberger, A.M. Rey, A. Polkovnikov, E. Demler, M. Lukin, I. Bloch  
*Direct observation and control of superexchange interactions with ultracold atoms in optical lattices*  
Science **319**, 295 (2008)
- 59** A. Widera, S. Trotzky, P. Cheinet, S. Fölling, F. Gerbier, V. Gritsev, E. Demler, I. Bloch  
*Quantum spin dynamics of squeezed Luttinger liquids in two-component atomic gases*  
Physical Review Letters **100**, 140401 (2008)
- 58** S. Fölling, S. Trotzky, P. Cheinet, M. Feld, R. Saers, T. Müller, A. Widera, I. Bloch  
*Direct observation of second order atom tunnelling*  
Nature **448**, 1029-1032 (2007)
- 57** I. Bloch  
*Strongly Correlated Quantum Phases of Ultracold Atoms in Optical Lattices*  
*Proceedings of the International School of Physics "Enrico Fermi"*,

- Course CLXIV, Varenna, 20 - 30 June 2006, edited by M. Inguscio, W. Ketterle, C. Salomon  
(IOS Press, Amsterdam) 2008
- 56 T. Müller, S. Fölling, A. Widera, I. Bloch  
*State preparation and dynamics of ultracold atoms in higher lattice orbitals*  
Physical Review Letters **99**, 200405 (2007)
- 55 A. M. Rey, V. Gritsev, I. Bloch, E. Demler, M. Lukin  
*Preparation and detection of magnetic quantum phases in optical superlattices*  
Physical Review Letters **99**, 140601 (2007)
- 54 F. Gerbier, S. Fölling, A. Widera, I. Bloch  
*Visibility of a Bose-condensed gas released from an optical lattice at finite temperature*  
arXiv:0701.420
- 53 Ch. Gross, Th. Best, D. van Oosten, I. Bloch  
*Coherent and incoherent spectral broadening in a photonic crystal fiber*  
Opt. Lett. **32**, 1767-1769 (2007)
- 52 T. Gericke, F. Gerbier, A. Widera, S. Fölling, O. Mandel; I. Bloch  
*Adiabatic loading of a Bose-Einstein condensate in a 3D optical lattice*  
J. Mod. Phys. **54**, 735 (2007)
- 51 T. Rom, Th. Best, D. van Oosten, U. Schneider, S. Fölling, B. Paredes, I. Bloch  
*Free fermion antibunching in a degenerate Fermi gas released from an optical lattice*  
Nature **444**, 733-736 (2006)
- 50 I. Bloch, S. Fölling, A. Widera, T. Müller, T. Rom, Th. Best, D. van Oosten, U. Schneider, B. Paredes, F. Gerbier  
*Strongly correlated quantum matter in optical lattices*  
XX International Conference on Atomic Physics - ICAP 2006. AIP Conference Proceedings, **869**, 191-200 (2006)
- 49 P. Treutlein, T. Steinmetz, Y. Colombe, B. Lev, P. Hommelhoff, J. Reichel, M. Greiner, O. Mandel, A. Widera, T. Rom, I. Bloch, T. W. Hänsch  
*Quantum information processing in optical lattices and magnetic microtraps*  
Fortschr. Phys. **54**, 702-718 (2006)
- 48 S. Fölling, A. Widera, T. Müller, F. Gerbier, I. Bloch  
*Formation of spatial shell structures in the superfluid to Mott insulator transition*  
Physical Review Letters **97**, 060403 (2006)
- 47 A. Widera, F. Gerbier, S. Fölling, T. Gericke, O. Mandel, I. Bloch  
*Precision measurement of spin-dependent interaction strengths for spin-1 and spin-2  $^{87}\text{Rb}$  atoms*  
New J. Phys. **8**, 152 (2006)
- 46 I. Bloch  
*Engineering multi-particle entanglement with neutral atoms in optical lattices*  
Proc. Int. School of Physics "Enrico Fermi", eds. G. Casati, D.L. Shepelyansky and P. Zoller, IOS Press, p. 521-548 (2006)
- 45 F. Gerbier, A. Widera, S. Fölling, O. Mandel, I. Bloch  
*Resonant control of spin dynamics in ultracold quantum gases by microwave dressing*  
Physical Review A **73**, 041602R (2006)

- 44 F. Gerbier, S. Fölling, A. Widera, O. Mandel, I. Bloch  
*Probing the number statistics of ultracold atoms across the superfluid-Mott insulator transition*  
Physical Review Letters **96**, 090401 (2006)
- 43 I. Bloch, M. Greiner,  
*Exploring Quantum Matter with Ultracold Atoms in Optical Lattices*  
Adv. At. Mol. Phys **52**, 1-47 (2005)
- 42 F. Gerbier, A. Widera, S. Fölling, O. Mandel, T. Gericke I. Bloch  
*Interference pattern and visibility of a Mott insulator*  
Physical Review A **72**, 053606, (2005)
- 41 I. Bloch  
*Ultracold Quantum Gases in Optical Lattices*  
Nature Physics **1**, 23-30 (2005)
- 40 A. Widera, F. Gerbier, S. Fölling, O. Mandel, T. Gericke, I. Bloch  
*Coherent collisional spin dynamics in optical lattices*  
Physical Review Letters **95**, 190405 (2005)
- 39 F. Gerbier, A. Widera, S. Fölling, O. Mandel, T. Gericke, I. Bloch  
*Phase coherence of an atomic Mott insulator*  
Physical Review Letters **95**, 050404 (2005)
- 38 S. Fölling, S., F. Gerbier, A. Widera, O. Mandel, T. Gericke, I. Bloch  
*Spatial quantum noise interferometry in expanding ultracold atom clouds*  
Nature **434**, 481 (2005)
- 37 I. Bloch  
*Exploring Quantum Matter with Ultracold Atoms in Optical Lattices*  
J. Phys. B, B38, S629-S643, 2005 selected as J. Phys. B's 2005 Highlight,  
see <http://herald.iop.org/jphysb-highlights2005/m51/crk/162052/link/211>
- 36 I. Bloch  
*Engineering Multi particle entanglement with neutral atoms in optical lattice*  
Atomic Physics 19: XIX International Conference on Atomic Physics (ICAP 2004), AIP Conf. Proc. **770**, 323-332 (2005), DOI:10.1063/1.1928866
- 35 I. Bloch  
*Experimentieren mit den kältesten Objekten des Universums*  
Forschungsmagazin der Johannes Gutenberg-Universität, 42-45, 2004
- 34 T. Rom, T. Best, O. Mandel, A. Widera, M. Greiner, T.W. Hänsch, I. Bloch  
*State selective production of molecules in optical lattices*  
Physical Review Letters **93**, 073002 (2004)
- 33 B. Paredes, A. Widera, V. Murg, O. Mandel, S. Fölling, I. Cirac, G.V. Shlyapnikov, T.W. Hänsch, I. Bloch  
*Tonks-Girardeau gas of ultracold atoms in optical lattices*  
Nature **429**, 277-281 (2004)
- 32 I. Bloch  
*Quantum gases in optical lattices*  
Phys. World **17**, 25-29 (2004)
- 31 A. Widera, O. Mandel, M. Greiner, S. Kreim, T.W. Hänsch, I. Bloch  
*Entanglement interferometry for precision measurement of atomic scattering properties*  
Physical Review Letters **92**, 160406, (2004)

- 30 M. Greiner, O. Mandel, T. Rom, A. Altmeyer, A. Widera, T.W. Hänsch, I. Bloch  
*Quantum phase transition from a superfluid to a Mott insulator in an ultracold gas of atoms*  
Physica B **11-12**, 329-333 (2003)
- 29 O. Mandel, M. Greiner, A. Widera, T. Rom, T.W. Hänsch, I. Bloch  
*Controlled collisions for multi-particle entanglement of optically trapped atoms*  
Nature **425**, 937 (2003)
- 28 O. Mandel, M. Greiner, A. Widera, T. Rom, T.W. Hänsch, I. Bloch  
*Coherent transport of neutral atoms in spin-dependent optical lattice potentials*  
Physical Review Letters **91**, 010407 (2003)
- 27 I. Bloch, M. Greiner, O. Mandel, and T.W. Hänsch,  
*Coherent cold collisions with neutral atoms in optical lattices*  
Phil. Trans. R. Soc. Lond. A **361**, 1409 (2003)
- 26 M. Greiner, O. Mandel, A. Altmeyer, A. Widera, T. Rom, T.W. Hänsch, I. Bloch  
*Beyond Mean Field Physics with Bose-Einstein Condensates in Optical Lattices*  
Proceedings of the XVIII International Conference on Atomic Physics, 171-180,  
World Scientific
- 25 M. Greiner, O. Mandel, T.W. Hänsch, I. Bloch,  
*Collapse and Revival of the Macroscopic Wave Function of a Bose-Einstein Condensate*  
Nature **419**, 51 (2002)
- 24 M. Greiner, T.W. Hänsch, I. Bloch,  
*Mott-Isolator-Zustand - Perfekte Ordnung am Nullpunkt*  
Physik in unserer Zeit **33**, 51 (2002)
- 23 M. Greiner, O. Mandel, T. Esslinger, T.W. Hänsch, I. Bloch  
*Quantum phase transition from a superfluid to a Mott insulator in a gas of ultracold atoms*  
Nature **415**, 39 (2002)
- 22 M. Greiner, I. Bloch, O. Mandel, T.W. Hänsch, T. Esslinger  
*Bose-Einstein condensates in 1D-and 2D optical lattices*  
Applied Physics B **73**, 769 (2001)
- 21 M. Greiner, I. Bloch, O. Mandel, T.W. Hänsch, T. Esslinger  
*Exploring phase coherence in a 2D lattice of Bose-Einstein condensates*  
Physical Review Letters **87**, 160405 (2001)
- 20 M. Greiner, I. Bloch, T.W. Hänsch, T. Esslinger  
*Magnetic transport of trapped cold atoms over a large distance*  
Physical Review A **63**, 031401 (2001)
- 19 I. Bloch  
*Atomlaser und Phasenkohärenz atomarer Bose-Einstein-Kondensate*  
MPQ Report **264** (2001)
- 18 I. Bloch, M. Kohl, M. Greiner, T.W. Hänsch, T. Esslinger  
*Optics with an atom laser beam*  
Physical Review Letters **87**, 030401 (2001)
- 17 I. Bloch, M. Greiner, O. Mandel, T.W. Hänsch, T. Esslinger  
*Sympathetic cooling of  $^{85}\text{Rb}$  and  $^{87}\text{Rb}$ .*  
Physical Review A **64**, 021402 (2001)
- 16 I. Bloch, T.W. Hänsch, T. Esslinger  
*Atom lasers and phase coherence of atomic Bose gases*  
Riken Review **33**, 6 (2001)

- 15 T. Esslinger, I. Bloch, T.W. Hänsch  
*Atomlaser*  
Physikalische Blätter **56**, 47 (2000)
- 14 T. Esslinger, I. Bloch, T.W. Hänsch,  
*Probing first-order spatial coherence of a Bose-Einstein condensate*  
Journal of Modern Optics, **47**, 2725 (2000)
- 13 I. Bloch, T.W. Hänsch, T. Esslinger  
*Wenn Materie Quantenwellen schlägt*  
Spektrum der Wissenschaft **7** (2000)
- 12 I. Bloch  
*Atomlaser und Phasenkohärenz atomarer Bose-Einstein-Kondensate*  
PhD thesis, Ludwig-Maximilians-Universität Munich (2000)
- 11 I. Bloch, T.W. Hänsch, T. Esslinger,  
*Measurement of the spatial coherence of a trapped Bose gas at the phase transition*  
Nature **403**, 166 (2000)
- 10 T. Esslinger, I. Bloch, M. Greiner, T.W. Hänsch  
*Generating and Manipulating Atom Laser Beams*  
in Proceedings of the International School of Quantum Electronics, 27th course.  
(1999)
- 9 T. Esslinger, I. Bloch, T.W. Hänsch  
*From novel magnetic traps to atom lasers*  
in 14th International Conference ICOLS99 on Laser Spectroscopy (1999)  
Innsbruck, Austria: World Scientific, Singapore.
- 8 I. Bloch, T.W. Hänsch, T. Esslinger  
*Materiewellen im Gleichschritt*  
Physik in unserer Zeit **30**, 131 (1999)
- 7 I. Bloch, T.W. Hänsch, T. Esslinger  
*Atom laser with a cw output coupler*  
Physical Review Letters **82**, 3008 (1999)
- 6 T. Esslinger, I. Bloch, T.W. Hänsch  
*The QUIC-trap: A Simple Magnetic Trap for Bose-Einstein Condensation*  
in Proceedings of the International School of Physics "Enrico Fermi" on Bose-Einstein Condensation. 1998. Varenna, Italy.
- 5 T. Esslinger, I. Bloch, T.W. Hänsch  
*Bose-Einstein condensation in a quadrupole-Ioffe-configuration trap*  
Physical Review A **58**, R2664 (1998)
- 4 D. Meschede, I. Bloch, A. Goepfert, D. Haubrich, M. Kreis, F. Lison, R. Schutze, R. Wynands  
*Atom optics with permanent magnetic components*  
Atom Optics, Proceedings of the SPIE. 1997. San Jose, USA
- 3 A. Goepfert, I. Bloch, D. Haubrich, F. Lison, R. Schutze, R. Wynands, D. Meschede  
*Stimulated focusing and deflection of an atomic beam using picosecond laser pulses*  
Physical Review A **56**, R3354 (1997)
- 2 I. Bloch  
*Stimulierte Lichtkräfte mit Pikosekunden-Laserpulsen*



Diploma thesis, Institut für Angewandte Physik. Rheinische-Friedrich-Wilhelms University of Bonn, 1997.

- 1** I. Bloch, A. Goepfert, D. Haubrich, F. Lison, R. Schutze, R. Wynands, D. Meschede  
*Stimulated light forces using picosecond laser pulses*  
*Atom Optics, Proceedings of the SPIE*. 1997. San Jose, USA