Dr. Johannes S. Otterbach

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PROFESSIONAL DEVELOPMENT

VP of Machine Learning Research 04/2021 - present
Merantix Momentum, Berlin, Germany

Scientific AI Advisor to Syntegra.io 10/2019 - present
Syntegra.io, San Francisco, CA

Machine Learning Researcher 06/2018 - 02/2021
OpenAI, San Francisco, CA

Research Scientist and Software Engineer 04/2017 - 05/2018
Rigetti Quantum Computing, Berkeley, CA

Senior Data Scientist 12/2016 - 03/2017
Data Scientist 08/2015 - 11/2016
LendUp, San Francisco, CA

Infrastructure Quality Engineer (Machine Learning) 4/2014 - 7/2015
Palantir Technologies, London, UK (until 1/2015) and Palo Alto, CA

Postdoctoral Research Fellow (Theoretical Quantum Physics) 9/2011 - 3/2014
Harvard Quantum Optics Center, Cambridge, MA

EDUCATION

Ph.D. in Physics, *GPA: 4.0 with distinction*, 10/2011
Theoretical Quantum Optics Group of Prof. Dr. M. Fleischhauer
University of Kaiserslautern, Germany

MSc. (Diploma) in Physics, *GPA: 3.93*, 5/2008
University of Kaiserslautern, Germany

SCHOLARSHIPS AND AWARDS

OpenAI Fellowship 2018
Prize Fellowship of the Harvard Quantum Optics Center 2011-2013
2011 Award of the Friends of the University of Kaiserslautern for an outstanding scientific performance as a Ph.D. student in physics 2012
2009 Young Talent Award (Nachwuchspreis) of the Department of Physics of the TU Kaiserslautern for an outstanding MSc thesis 2009
Foundation of German Business scholarship 2005-2008

LANGUAGE SKILLS

German: Native speaker. English: Fluent. Swedish and French: Basic

PUBLICATION LIST

Also see: `https://scholar.google.com/citations?user=yZS4ce8AAAAJ&hl=en&authuser=1`

1. W. Lötzsch, S. Ohler & J. S. Otterbach *Learning the Solution Operator of Boundary Value Problems using Graph Neural Networks*, 2nd AI4Science Workshop at the 39th ICML 2022, arxiv:2206.14092
2. S. Ohler, D. S. Brady, W. Lötzsch, M. Fleischhauer & J. S. Otterbach, *Towards Learning Self-Organized Criticality of Rydberg Atoms using Graph Neural Networks*, 2nd AI4Science Workshop at the 39th ICML 2022
3. K. Ditschuneit, & J.Otterbach, *Auto-Compressing Subset Pruning for Semantic Image Segmentation*, arXiv:2201.11103
4. D. Sreenivasaiah, J. Otterbach & T. Wollmann, *MEAL: Manifold Embedding-based Active Learning*, 2021 IEEE/CVF International Conference on Computer Vision Workshops (ICCVW), 2021, pp. 1029-1037, doi: 10.1109/ICCVW54120.2021.00120.
5. S. v. Baußnern†, J. Otterbach†, A. Loy, M. Salzmann & T. Wollmann, *DAAIN: Detection of Anomalous and Adversarial Input using Normalizing Flows*, arxiv:2105.14638
6. J. Otterbach & T. Wollmann, *Chameleon: A Semi-AutoML framework targeting quick and scalable development and deployment of production-ready ML systems for SMEs*, arxiv:2105.03669 (Accepted at KI-KMU 2021)
7. J. Otterbach, J. Ward, M. P. da Silva, N. C. Rubin,*Selecting parameters for a quantum approximate optimization algorithm (QAOA)*, Patent number: 10846366 (USA).
8. C. M. Wilson, J. Otterbach & Rigetti Computing, *Quantum Kitchen Sinks: An algorithm for machine learning on near-term quantum computers*, arxiv:1806.08321
9. S. Caldwell & Rigetti Computing *Parametrically-Activated Entangling Gates Using Transmon Qubits*, Physical Review Applied 10 (3), 034050 (2018).
10. M. Reagor & Rigetti Computing, *Demonstration of Universal Parametric Entangling Gates on a Multi-Qubit Lattice*, Science Advances, 4, eaao3603 (2018)
11. J. Otterbach & Rigetti Computing, *Unsupervised Machine Learning on a Hybrid Quantum Computer*, arxiv:1712.05771
12. Q. Wang, J. Otterbach, S. F. Yelin *Interacting in-plane molecular dipoles in a zig-zag chain*, Phys. Rev. A 96, 043615 (2017)
13. J. Otterbach & M. Lemeshko, *Dissipative Preparation of Spatial Order in Rydberg-Dressed Bose-Einstein Condensates*, Phys. Rev. Lett. 113, 070401 (2014).
14. F. Bariani, J. Otterbach, H. Tan, P. Meystre, *Single-atom quantum control of macroscopic mechanical oscillators*, Phys. Rev. A 89, 011801(R) (2014).
15. J. Otterbach, M. Moos, D. Muth, M. Fleischhauer, *Wigner Crystallization of Single Photons in Cold Rydberg Ensembles*, Phys. Rev. Lett. 111, 113001 (2013).
16. E. G. Dalla Torre, J. Otterbach, E. Demler, V. Vuletic, M. D. Lukin, *Dissipative Preparation of Spin Squeezed Atomic Ensembles in a Steady State*,, Phys. Rev. Lett. 110, 120402 (2013).
17. S. D. Bennett, N. Y. Yao, J. Otterbach, P. Zoller, P. Rabl, M. D. Lukin, *Phonon-induced spin-spin interactions in diamond nanostructures: application to spin squeezing*, Phys. Rev. Lett. 110, 156402 (2013).
18. M. J. Edmonds, J. Otterbach, R. G. Unanyan, M. Fleischhauer, M. Titov, P. Öhberg, *From Anderson to anomalous localization in cold atomic gases with effective spin-orbit coupling*, New J. Phys. 14, 073056 (2012).
19. J. Ruseckas, V. Kudriasov, G. Juzeliunas, R. G. Unanyan, J. Otterbach, M. Fleischhauer, *Photonic band-gap properties for two-component slow light*, Phys. Rev. A 83, 063811 (2011).
20. A. V. Gorshkov, J. Otterbach, M. Fleischhauer, T. Pohl, M. D. Lukin, *Photon-Photon Interactions via Rydberg Blockade*, Phys. Rev. Lett. 107, 133602 (2011).
21. D. Petrosyan, J. Otterbach, and M. Fleischhauer, *Electromagnetically induced transparency with Rydberg atoms*, Phys. Rev. Lett. 107, 213601 (2011).
22. J. Otterbach, J. Ruseckas, R. G. Unanyan, G. Juzeliunas, and M. Fleischhauer, *Effective magnetic fields for stationary light*, Phys. Rev. Lett. 104, 033903 (2010).

23. A. V. Gorshkov, J. Otterbach, E. Demler, M. Fleischhauer, and M. D. Lukin, *Photonic Phase Gate via an Exchange of Fermionic Spin Waves in a Spin Chain*, Phys. Rev. Lett. 105, 060502 (2010).

24. R. G. Unanyan, J. Otterbach, M. Fleischhauer, J. Ruseckas, V. Kudriasov, and G. Juzeliunas, *Spinor Slow-Light and Dirac particles with variable mass*, Phys. Rev. Lett. 105, 173603 (2010).

25. J. Otterbach, R. G. Unanyan, M. Fleischhauer, *Confining stationary light: Dirac dynamics and Klein tunneling*, Phys. Rev. Lett. 102, 063602 (2009).

26. R. G. Unanyan, J. Otterbach, M. Fleischhauer, *Confinement Limit of Dirac particles in scalar 1D potentials*, Phys. Rev. A 79, 044101 (2009).

27. F. E. Zimmer, J. Otterbach, R. G. Unanyan, B. W. Shore, M. Fleischhauer, *Dark-State Polaritons for multi-component and stationary light fields*, Phys. Rev. A 77, 063823 (2008).

28. M. Fleischhauer, J. Otterbach, R. G. Unanyan, *Bose-Einstein condensation of stationary-light polaritons*, Phys. Rev. Lett. 101, 163601 (2008).