DANIEL KAMRATH WEISS

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EDUCATION

Yale University *September 2022-Present*
Postdoctoral Associate (advisors Prof. Steve Girvin and Prof. Shruti Puri)

Northwestern University *September 2017 - August 2022*
PhD in physics (advisor Prof. Jens Koch)
Thesis: Control and coherence of next-generation superconducting qubits

Wesleyan University *August 2013- May 2017*
B.A. in physics with High Honors (advisor Prof. Reinhold Blümel)
Thesis: Phase transitions of charged particles in a Paul trap

RESEARCH INTERESTS

Superconducting circuits, noise/error protected qubits, simulating quantum systems, quantum optimal control

PUBLICATIONS

1. Jacob Bryon, **D. K. Weiss**, Xinyuan You, Sara Sussman, Xanthe Croot, Ziwen Huang, Jens Koch and Andrew Houck, "Experimental verification of the treatment of time-dependent flux in circuit quantization," arXiv:2208.03738 (2022)
2. **D. K. Weiss**, Helin Zhang, Chunyang Ding, Yuwei Ma, David I. Schuster and Jens Koch, "Fast high-fidelity gates for galvanically-coupled fluxonium qubits using strong flux modulation," arXiv:2207.03971 (2022)
3. **D. K. Weiss**, Wade DeGottardi, Jens Koch and D. G. Ferguson, "Variational tight-binding method for simulating large superconducting circuits," Phys. Rev. Research 3, 033244 (2021)
4. H. Zhang, S. Chakram, T. Roy, N. Earnest, Y. Lu, Z. Huang, **D. K. Weiss**, J. Koch and D. I. Schuster, "Universal Fast-Flux Control of a Coherent, Low-Frequency Qubit," Phys. Rev. X 11, 011010 (2021)
5. **D. K. Weiss**, Andy C. Y. Li, D. G. Ferguson and Jens Koch, "Spectrum and Coherence Properties of the Current-Mirror Qubit," Phys. Rev. B 100, 224507 (2019)
6. Y.S. Nam, **D. K. Weiss** and R. Blümel, "Explicit, analytical radio-frequency heating formulas for spherically symmetric nonneutral plasmas in a Paul trap," Phys. Lett. A 381, 3441 (2017)
7. **D. K. Weiss**, Y.S. Nam and R. Blümel, "Lifetimes of metastable ion clouds in a Paul trap: Power-law scaling," Phys. Rev. A 93, 043424 (2016)

HONORS, PRIZES AND FELLOWSHIPS

Quantum Computing Graduate Research Fellowship, funded by the Army Research Office, 2019-2022

Bertman Prize, Wesleyan University, 2017
· Awarded to a senior majoring in physics who displays a particularly resourceful and creative approach to physics research

Phi Beta Kappa, Wesleyan University, early election, Fall 2016

Karl van Dyke Prize, Wesleyan University, 2016
· Awarded each year to one or more students majoring in physical science who show outstanding achievement in academic work and a promise of productivity in a professional career

Dean's List, Wesleyan University, 2014-2017

CONTRIBUTED PRESENTATIONS

1. **D. K. Weiss**, Helin Zhang, Chunyang Ding, David I. Schuster and Jens Koch, "High-fidelity entangling gates for fluxonium qubits via flux modulation of a tunable coupler," APS March Meeting 2022, T41.05

2. **D. K. Weiss**, Wade DeGottardi, Jens Koch and D. G. Ferguson, "Tight binding as a numerical tool for diagonalizing superconducting-circuit Hamiltonians," APS March Meeting 2021, X30.02

3. **D. K. Weiss**, D. G. Ferguson, M. S. Khalil, Andy C. Y. Li, Jens Koch, "Numerical Methods for Current Mirror Qubit Simulations," APS March Meeting 2019, B29.04

4. **D. K. Weiss**, Y.S. Nam and R. Blümel, "Discovery of an Unexpected Liquid Phase in the Periodically Driven Paul Trap," APS March Meeting 2017, P13.09

5. **D. K. Weiss**, Y.S. Nam and R. Blümel, "Universal critical phenomena of the cloud crystal phase transition in the Paul trap: Powerlaws," APS March Meeting 2016, X50.05

INVITED PRESENTATIONS

1. **D. K. Weiss**, J. Bryon, Z. Huang, X. You, Jens Koch, A. A. Houck, "Allocation of time-dependent flux: towards experimental verification," Quantum Computing Program Review (QCPR) July 2021

2. **D. K. Weiss**, Wade DeGottardi, Jens Koch and D. G. Ferguson, "Tight binding as a numerical tool for diagonalizing superconducting-circuit Hamiltonians," QCPR October 2020

TEACHING EXPERIENCE

Northwestern University

1. College Physics I — *Fall 2018*
2. College Physics I — *Winter 2018-2019*
3. College Physics I — *Spring 2019*

Wesleyan University

1. Principles of Chemistry — *Fall 2014*
2. General Physics II — *Spring 2015*
3. Quantum Mechanics I — *Spring 2016*
4. Vectors and Matrices — *Fall 2016*
5. General Physics I — *Fall 2016*
6. Quantum Mechanics I — *Spring 2017*

MENTORING EXPERIENCE

1. **Athena Zheng and Sydney Wang**, Illinois Math and Science Academy — *Fall 2018-Spring 2020*
Introduced high-school students to quantum algorithms as well as introductory superconducting circuit theory

2. **Elijah Hansen**, Northwestern University — *Spring 2021-Present*
Mentor undergraduate in superconducting circuit theory and best practices for contributing to scqubits

REFERENCES

1. Jens Koch, Northwestern University **email**: jens-koch@northwestern.edu
2. David Schuster, University of Chicago **email**: david.schuster@uchicago.edu
3. David Ferguson, Northrop Grumman Corporation **email**: david.george.ferguson@ngc.com
4. Reinhold Blümel, Wesleyan University **email**: rblumel@wesleyan.edu

MISCELLANEOUS

Played NCAA DIII ice hockey as a goaltender for Wesleyan University.