TONGYU ZHAO

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EDUCATION

University of Colorado Boulder — **Boulder, Colorado**
Doctor of Philosophy in Physics — Aug 2018 – Present

Nanjing University — **Nanjing, China**
Bachelor of Science in Physics — Aug 2014 – Jun 2018

- **Honors**: Elite Program
- **Thesis**: Stimulated Emission Tomography of Entangled Photon Pairs

RESEARCH EXPERIENCE

National Institute of Standards and Technology — **Boulder, Colorado**
Research Assistant — Jul 2021 – Present

- Advisor: Dr. Raymond Simmonds
- Investigate Si-fin-based transmon and merged-element transmon.
- Investigate quantum error correction with dual-rail encoding.
- Investigate quantum simulation experiments for small molecular systems with VQE.
- Develope quantum measurement programs.

Research Assistant — Mar 2019 – Jul 2021

- Advisor: Dr. David Pappas
- Investigate novel two-qubit gate with static ZZ interaction.
- Investigate merged-element transmon with Nb-amorphous-Si-Nb trilayer film.
- Build quantum measurement systems and carry out cryogenic measurements.
- Investigate novel inter-qubit coupler schemes.

Nanjing University — **Nanjing, Jiangsu, China**
Undergraduate Research Assistant — Sep 2017 – Jun 2018

- Advisor: Dr. Xiaosong Ma
- Build optics system for SET (Stimulated Emission Tomography) experiment.
- Build polarization analyzing systems.
- Theoretical work for clock synchronization with entangling photons.

University of California Berkeley — **Berkeley, California**
Summer Intern — May 2017 – Sep 2017

- Advisor: Dr. Dan Stamper-Kurn
- Build an optical transport system for a magneto-optical trap.
- Develope programs to characterize the performance of the transport system.

SKILLS

- **Programming**: Python, Julia, MATLAB
- **Tools**: Ansys EM, COMSOL Multiphysics, LabVIEW, Sonnet
- **Lab Skills**: Cryogenics, Measurement Electronics and Automation

PUBLICATIONS

In preparation:

"A Universal Quantum Gate Set for Transmon Qubits with Strong ZZ Interactions". Long, Junling, **Tongyu Zhao**, Mustafa Bal, Ruichen Zhao, George S. Barron, Hsiang-sheng Ku, Joel A. Howard, et al. arXiv, (March 2021). doi: 10.48550/arXiv.2103.12305

Published:

"Implementing Two-Qubit Gates at the Quantum Speed Limit". Howard, Joel, Alexander Lidiak, Casey Jameson, Bora Basyildiz, Kyle Clark, **Tongyu Zhao**, Mustafa Bal, et al. *Physical Review Research* 5, no. 4 (December 2023): 43194. doi:10.1103/PhysRevResearch.5.043194

"Towards Merged-Element Transmons Using Silicon Fins: The FinMET". Goswami, A., A. P. McFadden, **Tongyu Zhao**, H. Inbar, J. T. Dong, R. Zhao, C. R. H. McRae, R. W. Simmonds, C. J. Palmstrøm, and D. P. Pappas. *Applied Physics Letters* 121, no. 6 (August 2022): 64001. doi:10.1063/5.0104950

"Cryogenic Microwave Loss in Epitaxial Al/GaAs/Al Trilayers for Superconducting Circuits". McRae, C. R. H., A. McFadden, R. Zhao, H. Wang, J. L. Long, **Tongyu Zhao**, S. Park, M. Bal, C. J. Palmstrøm, and D. P. Pappas. *Journal of Applied Physics* 129, no. 2 (January 2021): 25109. doi:10.1063/5.0029855

"Overlap Junctions for Superconducting Quantum Electronics and Amplifiers". Bal, Mustafa, Junling Long, Ruichen Zhao, Haozhi Wang, Sungoh Park, Corey Rae Harrington McRae, **Tongyu Zhao**, et al. *Applied Physics Letters* 118, no. 11 (March 2021): 112601. doi:10.1063/5.0048621

"Merged-Element Transmon". Zhao, R., S. Park, **Tongyu Zhao**, M. Bal, C.R.H. McRae, J. Long, and D.P. Pappas. *Physical Review Applied* 14, no. 6 (December 2020): 64006. doi:10.1103/PhysRevApplied.14.064006