

# TONGYU ZHAO

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## EDUCATION

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### University of Colorado Boulder

*Doctor of Philosophy in Physics*

**Boulder, Colorado**

Aug 2018 – Present

### Nanjing University

*Bachelor of Science in Physics*

**Nanjing, China**

Aug 2014 – Jun 2018

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

## RESEARCH EXPERIENCE

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### National Institute of Standards and Technology

*Research Assistant*

**Boulder, Colorado**

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.
- Develop 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

*Undergraduate Research Assistant*

**Nanjing, Jiangsu, China**

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

*Summer Intern*

**Berkeley, California**

May 2017 – Sep 2017

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

## SKILLS

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

## PUBLICATIONS

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### In preparation:

“A Universal Quantum Gate Set for Transmon Qubits with Strong ZZ Interactions”. Junling Long, **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”. Joel Howard, 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”. Aranya Goswami, Anthony P. McFadden, **Tongyu Zhao**, Hadass Inbar, Jason T. Dong, Ruichen Zhao, Corey Rae H. McRae, Raymond W. Simmonds, Christopher J. Palmstrøm, and David 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”. Corey Rae H. McRae, Anthony P. McFadden, Ruichen Zhao, Haozhi Wang, Junling Long, **Tongyu Zhao**, Sungoh Park, Mustafa Bal, Christopher J. Palmstrøm, and David 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”. Mustafa Bal, Junling Long, Ruichen Zhao, Haozhi Wang, Sungoh Park, Corey Rae H. McRae, **Tongyu Zhao**, et al. *Applied Physics Letters* 118, no. 11 (March 2021): 112601. doi:10.1063/5.0048621

“Merged-Element Transmon”. Ruichen Zhao, Sungoh Park, **Tongyu Zhao**, Mustafa Bal, Corey Rae H. McRae, Junling Long, and David P. Pappas. *Physical Review Applied* 14, no. 6 (December 2020): 64006. doi:10.1103/PhysRevApplied.14.064006