

PUBLISHED CONTENT AND CONTRIBUTIONS

- [1] Samantha I. Davis, Joseph Lykken, Damian Musk, Neil Sinclair, and Maria Spiropulu. “Wormhole genesis and Bell violations.” In: Manuscript in preparation. (2025).
S.I.D. conceived the project and developed all theory.
- [2] Samantha I. Davis, Prathwiraj Umesh, Ioana Craiciu, Raju Valivarthi, Boris Korzh, Matthew Shaw, and Maria Spiropulu. “Photon number resolution with superconducting nanowire arrays.” In: Manuscript in preparation. (2025).
S.I.D. conceived the project and models, collected data, performed all theoretical work, and wrote the manuscript.
- [3] Samantha I. Davis, Raju Valivarthi, Andrew Cameron, Cristian Pena, Si Xie, Lautaro Narváez, Nikolai Lauk, Chang Li, Kelsie Taylor, Rahaf Youssef, et al. “Entanglement swapping systems toward a quantum internet.” In: arXiv preprint arXiv:2503.18906. Submitted. (2025).
S.I.D. performed all experimental work, led and conducted theoretical modeling, performed all data analysis, and wrote the manuscript.
- [4] Volkan Gurses, Samantha I. Davis, Raju Valivarthi, Neil Sinclair, Maria Spiropulu, and Ali Hajimiri. “An on-chip phased array for non-classical light.” In: Nature Communications 16.1 (2025), p. 6849.
S.I.D. conceived of all ideas, designed and built the experiment, developed the theory, performed all measurements, developed the analytical methods, performed the data analysis, and wrote the manuscript.
- [5] Neil Sinclair, Samantha I. Davis, Nikolai Lauk, Chang Li, Damian R. Musk, Kelsie Taylor, Raju Valivarthi, and Maria Spiropulu. “Analytical Modeling of Real-World Photonic Quantum Teleportation.” In: arXiv preprint arXiv:2503.18306. Submitted. (2025).
S.I.D. led the theoretical modeling and contributed to writing the manuscript.
- [6] Prathwiraj Umesh, Samantha I. Davis, Jordan Smith, Sophie Hermans, Joaquin Chung, Prem Kumar, Boris Korzh, and Raju Valivarthi. “Regional quantum networks: recent progress and outlook.” In: Manuscript in preparation for Optica Quantum. (2025).
Invited review article. S.I.D wrote the sources and quantum network testbeds sections.
- [7] Volkan Gurses, Debjit Sarkar, Samantha Davis, and Ali Hajimiri. “An integrated photonic-electronic quantum coherent receiver for sub-shot-noise-limited optical links.” In: Optical Fiber Communication Conference. Optica Publishing Group. 2024, Tu2C–1.
S.I.D. conceived the project, collected data, and contributed to writing the paper.
- [8] Andrew Mueller, Samantha I. Davis, Boris Korzh, Raju Valivarthi, Andrew D. Beyer, Rahaf Youssef, Neil Sinclair, Cristián Peña, Matthew D Shaw, and Maria Spiropulu. “High-rate multiplexed entanglement source based on time-bin qubits

- for advanced quantum networks.” In: Optica Quantum 2.2 (2024), pp. 64–71.
S.I.D. performed theoretical modeling and participated in writing the manuscript.
- [9] Samantha I. Davis, Chang Li, Rahaf Youssef, Neil Sinclair, Raju Valivarthi, and Maria Spiropulu. “Generation of Time-bin GHZ States.” In: Optica Quantum 2.0 Conference and Exhibition. Optica Publishing Group, 2023, QTh4A.7. DOI: 10.1364/QUANTUM.2023.QTh4A.7. URL: <https://opg.optica.org/abstract.cfm?URI=QUANTUM-2023-QTh4A.7>.
S.I.D. performed all experimental work, led the theoretical modeling, performed the data analysis, and wrote the paper.
- [10] Volkan Gurses, Samantha I. Davis, Ali Hajimiri, and Maria Spiropulu. “Quantum Phased Arrays.” Patent Application Filed: 2023-06-2023. 2023.
- [11] Volkan Gurses, Samantha I. Davis, Esme Knabe, Raju Valivarthi, Maria Spiropulu, and Ali Hajimiri. “A compact silicon photonic quantum coherent receiver with deterministic phase control.” In: CLEO: Applications and Technology. Optica Publishing Group. 2023, AM4N–4.
S.I.D. conceived the project, collected data, and contributed to writing the paper.
- [12] Keshav Kapoor, Si Xie, Joaquin Chung, Raju Valivarthi, Cristián Peña, Lautaro Narváez, Neil Sinclair, Jason P. Allmaras, Andrew D. Beyer, Samantha I. Davis, et al. “Picosecond synchronization system for the distribution of photon pairs through a fiber link between Fermilab and Argonne National Laboratories.” In: IEEE Journal of Quantum Electronics 59.4 (2023), pp. 1–7.
S.I.D. conducted foundational work for the experiment, developed the data acquisition and monitoring systems, and wrote code used for data analysis.
- [13] Samantha I. Davis, Andrew Mueller, Raju Valivarthi, Nikolai Lauk, Lautaro Narváez, Boris Korzh, Andrew D. Beyer, Olmo Cerri, Marco Colangelo, Karl K. Berggren, et al. “Improved heralded single-photon source with a photon-number-resolving superconducting nanowire detector.” In: Physical Review Applied 18.6 (2022), p. 064007.
S.I.D. performed all experimental work, conceived and conducted all theoretical modeling, and wrote the manuscript.
- [14] Daniel Jafferis, Alexander Zlokap, Joseph D. Lykken, David K. Kolchmeyer, Samantha I. Davis, Nikolai Lauk, Hartmut Neven, and Maria Spiropulu. “Traversable wormhole dynamics on a quantum processor.” In: Nature 612.7938 (2022), pp. 51–55.
S.I.D. helped develop and conduct the classical simulation and the decomposition of the protocol into quantum gates.
- [15] Raju Valivarthi, Lautaro Narváez, Samantha I. Davis, Nikolai Lauk, Cristián Peña, Si Xie, Jason P. Allmaras, Andrew D. Beyer, Boris Korzh, Andrew Mueller, et al. “Picosecond synchronization system for quantum networks.” In: Journal of Lightwave Technology 40.23 (2022), pp. 7668–7675.
S.I.D. conducted foundational work for the experiment, developed the data acquisition and monitoring systems, and contributed to the data analysis.