

Silicon photonic quantum computing

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Abstract

PsiQuantum is building the world's first useful quantum computer using silicon photonic chips to process quantum information with single photons. This linear optical approach to quantum computing offers highly coherent qubits, high fidelity single qubit gates, and probabilistic entangling operations that can be implemented using well-known quantum optical methods. PsiQuantum's fusion-based quantum computing (FBQC) architecture based on these operations has a very low optical depth and extremely high tolerance to optical loss. The key advantage of photonic quantum computing is the fact that the required silicon photonic chips can be mass manufactured in semiconductor fabrication facilities, allowing scaling to achieve large-scale error correction. In this talk, we will show how unique technology in the areas of silicon photonics and quantum system architecture enable the path to large-scale, fault-tolerant, general-purpose quantum computing.
