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Silicon Photonic Quantum Computing –Towards Large-scale Systems

Tuesday 13 December 2022 09:00 (45 minutes)

Many efforts around the world are now pursuing the ambitious goal of utility-scale, fault-tolerant quantum computing. Consistent themes are emerging across the field, as teams attempt to scale from existing small systems to the millions of qubits needed for useful applications. Systems partitioning, manufacturability, cooling power, networking, and control electronics are recurring challenges across all qubit technologies.

PsiQuantum has pursued a photonic approach, based on qubits implemented using optical photons propagating in lithographically fabricated waveguides. In this talk we will give a broad overview of recent technical progress, framed against these major scaling challenges. We will describe progress at the micro, meso, and macro-scale, including high-throughput test, semiconductor manufacturing, device performance, integration, packaging, control, and cryogenic systems. We will also present new architectural results pertaining to fault-tolerant compilation.

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