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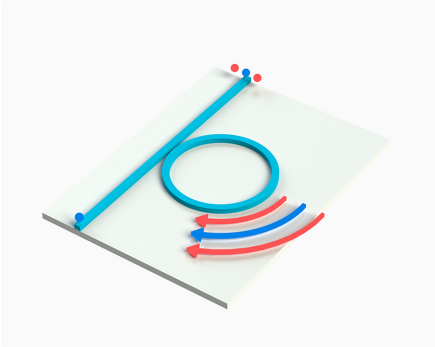
A review of chip-scale quantum light generation looks at how recent advances have helped propel the development of quantum photonics-based devices.



In the past decade, the field of quantum light generation has taken a quantum leap in development. Advances have taken simple devices from just a few components to become reconfigurable devices with nearly 1,000 components that are capable of chip-to-chip quantum teleportation, information processing with multiple qubits and quantum communication.

Moody et al. present a comprehensive review of chip-scale quantum light sources. While previous reviews have focused on the device technologies themselves, this highlights recent progress in the underlying field of quantum light generation with nonlinear photonics. The researchers hope the review can serve as a comprehensive reference and also help guide and motivate future research and development.

“What’s really exciting about the field of quantum photonics is that it’s become highly interdisciplinary and collaborative,” said author Galan Moody. “Many of the advances highlighted in this review are the result of researchers coming together from physics, engineering, materials science and computer science, and these types of collaborative efforts will continue to be important for maintaining progress in this field.”

The authors compare different approaches and material platforms used in the development of such light sources, including a look at microfabrication techniques, nonlinear optical platforms and methods for systems-level integration.

Advances in quantum photonics have helped launch chip-scale quantum light generation from proof-of-principle demonstrations to practical applications, including the beginnings of a quantum network, space-based quantum communications and the formation of startup companies to develop quantum photonic computing platforms.

Source: “Chip-scale nonlinear photonics for quantum light generation,” by Galan Moody, Lin Chang, Trevor J. Steiner, and John E. Bowers, *AVS Quantum Science* (2020). The article can be accessed at https://doi.org/10.1116/5.0020684.