

Integrated Single Photon Circuits

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Abstract: Quantum technologies can be utilized for secure communication or computational speed-ups. Waveguide integrated quantum photonic circuits are promising for large scale integration of photonic quantum bit functionalities on a single-chip and we report the development of such a platform on GaAs. This includes waveguide single photon sources based on InGaAs quantum dots, superconducting single photon detectors, electro-optic tuners, directional couplers and splitters. Single-photon sources coupled to waveguides are realized with quantum dots in photonic crystal cavities [1]. Waveguide single-photon detectors are demonstrated by patterning superconducting NbN nanowires on top of ridge waveguides [2], which they can be utilized for on-chip photon auto-correlation measurements [3] and photon number resolved detection [4].

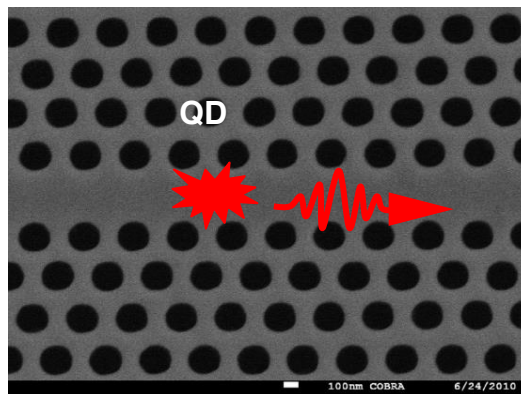


Fig. 1. Photonic crystal waveguide structure with integrated quantum dots for on-chip single photon generation.

References

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