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(G*) Indistinguishable Photon Generation on Hybrid Photonic Integrated Circuits

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Quantum dots embedded within photonic nanowires can act as highly efficient single-photon generators. Integrating such sources on-chip offers enhanced stability and miniaturization; both of which are important in many applications involving quantum information processing. We employ a "pick and place" technique to transfer nanowires to on-chip waveguides where each nanowire contains a single quantum dot emitter. This approach provides for efficient coupling of the quantum light generated in an InP photonic nanowire to a SiN-based photonic integrated circuit. We have previously demonstrated that such devices can efficiently generate single photons on chip. Here we study the potential for generating indistinguishable photons from such sources. We demonstrate post-selected two-photon interference visibilities of up to 70% between sequential photons emitted from the same quantum dot. These findings show that the proposed approach offers a viable route for the integration of a stable source of indistinguishable photons on chip.

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