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Development and Characterization of Cavity-Enhanced Bright Parametric Down-Conversion Single-Photon Source Tailored To Match Frequency and Bandwidth of InAs Quantum Dots for Quantum Information Protocols UTTAM PAUDEL, University Of Michigan, Ann Arbor, JIA JUN WONG, University of Illinois, Urbana-Champaign, ALEXANDER BURGERS, University Of Michigan, Ann Arbor, MICHAEL GOGGIN, Truman State University, Kirksville, Missouri, PAUL KWIAT, University of Illinois, Urbana-Champaign,, DUNCAN STEEL, University Of Michigan, Ann Arbor — Quantum networks are an integral part of many quantum information protocols where information is transferred between distant stationary nodes, such as quantum dots, using flying qubits through two-photon interference measurement. A realistic quantum network could be composed of various different quantum nodes, necessitating highly customizable flying qubits to link such disparate sources. Spontaneous parametric down-conversion (SPDC) can be an excellent source of such customizable correlated photons. A cavity placed around an SPDC crystal acts as an active filter that not only narrows the bandwidth but also enhances the photon count rate. We have constructed such a cavity-enhanced parametric down-conversion source to interface with single photons emitted by InAs single quantum dots. In this talk I will present a realization of a high signal-to-noise ratio, heralded, single-mode, single-photon source to interface with quantum dots. I will give a detailed characterization of such a cavity-enhanced SPDC source and present our ongoing efforts to link the single photons with quantum dots.

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