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Highly efficient two photon generation from a coherently pumped quantum dot embedded in a microcavity[1] JITENDRA VERMA, PRADYUMNA KUMAR PATHAK, Indian Institute of Technology Mandi — We propose two schemes to realize a highly efficient solid-state source of photon pairs using four-wave mixing and stimulated Raman adiabatic passage in a single quantum dot embedded in a microcavity. A resonant continuous-wave laser applied between biexciton and exciton states and a pulsed laser applied between a ground state and exciton state are utilized to facilitate coherent pumping. We show in the case of four-wave mixing that, although the probability of generating two photons in a cavity mode is small without cavity damping, two-photon-resonant emission is enhanced by cavity damping within the strong-coupling regime. For strong continuous-wave laser, a single photon from a pulsed laser and two-photon-resonant transition through a strongly coupled cavity mode lead to a (1+2)-type Raman transition through the generated Autler-Townes doublet. We also discuss the spectrum of the generated photon pair and the photon-photon correlations in the generated photon pair.

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