

Abstract Submitted
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Non-classical higher-order photon correlations from a solid-state cQED system MICHAL BAJCSY, Univ of Waterloo, ARMAND RUNDQUIST, Stanford University, ARKA MAJUMDAR, Univ of Washington, TOMAS SARMIENTO, KEVIN FISCHER, KONSTANTINOS LAGOUDAKIS, SONIA BUCKLEY, ALEXANDER YUKIO PIGGOTT, JELENA VUČKOVIĆ, Stanford University — We use the third- and fourth-order autocorrelation functions $g^{(3)}(\tau_1, \tau_2)$ and $g^{(4)}(\tau_1, \tau_2, \tau_3)$ to detect the non-classical character of light transmitted through a photonic-crystal nanocavity containing a strongly-coupled quantum dot probed with a train of coherent light pulses. We contrast the observed values of $g^{(3)}(0, 0)$ with the conventionally used $g^{(2)}(0)$ and show that in addition to being necessary for detection of two-photon states emitted by a low-intensity source, $g^{(3)}$ provides a more clear indication of the non-classical character of a light source. We also present preliminary data that demonstrates bunching in the fourth-order autocorrelation function $g^{(4)}(\tau_1, \tau_2, \tau_3)$ as the first step toward detecting three-photon states.

Michal Bajcsy
Univ of Waterloo

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