

Abstract Submitted
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Towards single time-bin entangled photons from a quantum dot.

CHRISTOPHE COUTEAU, GREGOR WEIHS, University of Waterloo — We present our results on photon statistics of quantum dots. We show evidence for photon antibunching and cross-correlation measurements within the biexciton-exciton cascade. We also discuss directions towards a demonstration of time-bin entangled photons from a dot. Recently, it has been showed theoretically that a quantum dot could provide pairs of time-bin entangled photons. The temporal entanglement is due to the fact that we know the twin photons will come in pairs but we don't know when: either both the photons are really or both are late. Under the right conditions and using a double excitation of the dot corresponding to the two time bins, Simon and Poizat showed that one could get deterministic emission of pairs for time-bin entanglement using a single quantum dot. We will present our latest results on photon statistics and our demonstration of photon antibunching as well as cross-correlations within the biexciton-exciton cascade using an original new set-up. Based on these measurements we are confident that we will be able to demonstrate time-bin entangled photons in the near future.

Christophe Couteau
University of Waterloo

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