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Unconventional ultra-efficient photon blockade and single-photon emitters from weakly nonlinear systems based on coupled cavities MOTOAKI BAMBA, CRISTIANO CIUTI, Laboratory MPQ, University Paris Diderot - Paris 7 and CNRS — Single photons are usually generated by non-resonant excitation of single (artificial) atoms or by resonant excitation of Kerr systems with a giant nonlinear interaction much larger than the losses of the system (standard photon blockade). Here, we present a general class of destructive quantum interference effects [1,2], which provide a robust protocol to achieve strong photon antibunching and single-photon emission in a double cavity system, where one resonantly driven cavity is coupled to an auxiliary nonlinear cavity. An original scheme [2] shows the single-photon emission can be also produced by the auxiliary cavity with orthogonal polarization with respect to the pump beam, hence providing a direct way to get spatial and polarization selection.

[1] M. Bamba, A. Imamoğlu, I. Carusotto, C. Ciuti, *Origin of strong photon antibunching in weakly nonlinear photonic molecules*, Phys. Rev. A **83**, 021802 (2011) and references therein.
[2] M. Bamba, C. Ciuti, *Counter-polarized single-photon generation from the auxiliary cavity of a weakly nonlinear photonic molecule*, Appl. Phys. Lett. **99**, 171111 (2011).

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