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Enhanced photon indistinguishability in pulse-driven quantum emitters HERBERT F FOTSO, Unversity at Albany SUNY — Photon indistinguishability is an essential ingredient for the realization of scalable quantum networks. For quantum bits in the solid state, this is hindered by spectral diffusion[1, 2], the uncontrolled random drift of the emission/absorption spectrum as a result of fluctuations in the emitter's environment. We study optical properties of a quantum emitter in the solid state when it is driven by a periodic sequence of optical pulses with finite detuning with respect to the emitter. We find that a pulse sequence can effectively mitigate spectral diffusion and enhance photon indistinguishability. The bulk of the emission occurs at a set target frequency[3]; Photon indistinguishability is enhanced and is restored to its optimal value after every even pulse. Also, for moderate values of the sequence period and of the detuning, both the emission spectrum and the absorption spectrum have lineshapes with little dependence on the detuning. We describe the solution and the evolution of the emission/absorption spectrum as a function time. [1] K.-M. Fu et al, PRL 103, 256404 (2009); V. M. Acosta et al, PRL 108, 206401 (2012). [2] S. Yang et al., Nat. Photonics 10, 507 (2016); N. Trautmann and G. Alber, Phys. Rev. A 93, 053807 (2016). [3] H. F. Fotso et al, PRL 116, 033603 (2016).

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