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Theoertical investigation of quantum waveform shaping for single-photon emitters LENO M. PEDROTTI, Department of Physics, University of Dayton, Dayton, Ohio 45469, IMAD AGHA, Department of Physics and Electro-Optics Graduate Program University of Dayton, Dayton, Ohio 45469 — In this work, we investigate a new technique for quantum-compatible waveform shaping that goes beyond the time-lens limit. Under realistic experimental conditions, it is shown that it is possible to both temporally compress and shape optical waveforms in the nanosecond to hundreds of picoseconds range, which is generally difficult to achieve using standard dispersive pulse-shaping techniques. The results of our theoretical investigation indicate that it is possible not only to perform wavelength translation, but also to change the spectro-temporal shape of input waveforms in a coherent manner and lossless manner, as our approach involves phase operations only. We calculate both the necessary phase operations and show how they can be performed under realistic experimental conditions. Numerical simulations under these conditions indicate that the technique is well suited to the regime of operation of single photon emitters that are characterized by photon lifetimes that are too long for standard dispersive waveform shaping.

Imad Agha
Department of Physics and Electro-Optics Graduate Program University of Dayton, Dayton, Ohio 45469

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