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Optimizing Photon Collection from Point Sources with Adaptive Optics ALEXANDER HILL, DAVID HERVAS, JOSEPH NASH, MARTIN GRAHAM, Univ of Illinois - Urbana, ALEXANDER BURGERS, UTTAM PAUDEL, DUNCAN STEEL, Univ of Michigan, PAUL KWIAT, Univ of Illinois - Urbana — Collection of light from point-like sources is typically poor due to the optical aberrations present with very high numerical-aperture optics. In the case of quantum dots, the emitted mode is nonisotropic and may be quite difficult to couple into single- or even few-mode fiber. Wavefront aberrations can be corrected using adaptive optics at the classical level by analyzing the wavefront directly (e.g., with a Shack-Hartmann sensor); however, these techniques are not feasible at the single-photon level. We present a new technique for adaptive optics with single photons using a genetic algorithm to optimize collection from point emitters with a deformable mirror. We first demonstrate our technique for improving coupling from a subwavelength pinhole, which simulates isotropic emission from a point source. We then apply our technique *in situ* to InAs/GaAs quantum dots, obtaining coupling increases of up to 50% even in the presence of an artificial source of drift.

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