Abstract Submitted
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High Efficiency Light Collection for Use in a Modular Quantum Network[1] ALLISON CARTER, MARTIN LICHTMAN, CLAYTON CROCKER, KSENIA SOSNOVA, SOPHIA SCARANO, CHRISTOPHER MONROE, Joint Quantum Institute and University of Maryland — Remote entanglement of ions is useful as a tool in the development of a scalable quantum network. To generate entanglement, we collect and fiber couple the emitted photons from ions in separate vacuum chambers. We aim to achieve diffraction-limited light collection, imaging or fiber coupling with 10% of the emitted photons through the use of a number of supporting technologies. The objective lens is designed to work at 0.6 NA for both Yb^+ and Ba^+ light spanning wavelengths from 370 nm to 650 nm. We then correct residual aberrations from the vacuum chamber and lens system using a deformable mirror. A Shack-Hartmann wavefront sensor and Zernike polynomial decomposition of intensity can be used for initial settings of the mirror, and closed-loop optimization is performed using feedback from photon counts through the fiber.

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