**Supplementary Figure 1: PSF measurements**

**A.** Point spread functions of the system obtained by imaging 200nm beads using the 3D scanner at collimation and angular deviations corresponding to different axial and lateral positions. Only one half of one lateral field is shown since results are symmetrical. Sections were obtained using a similar protocol to that shown in figure 4c. Scale bars 1µm.

**B.** Relative size of the PSF full width half max (FWHM) at different axial and lateral locations (as assessed by averaging ~3-5 beads per location, standard deviations were all <10%). Figure drawn to scale. Numbers correspond to the factor increase in size of both the lateral (lat) and axial (ax) FWHM over the objective focus, which was ~490nm X 2.3µm.