**Supporting Information**



Figure S1. Experiment for controlled in-plane deflection using red laser light ( nm). The deflection grating is adjusted for the wavelength with a grating period Λ=333 nm and a deflection angle deg. (a) Photograph of a slab waveguide with an applied field strength of V/mm, (b) V/mm and (c) measurement of the detrapped power during the first interaction.

In Figure S1, we present an experiment using red laser light at a wavelength of  nm and an azimuthal angle. To achieve nearly perpendicular deflection for the alternative wavelength, the structure for this slab waveguide is adjusted with a grating period of nm and a grating angle deg, resulting in a deflection angle of  deg, according to Equation 3.

The application of an electric field, similar to that in Figure 3 of the manuscript, via water electrodes modulates the beam pair’s deflection. In Figure S1a, the first interaction is enhanced and the second is suppressed, while in Figure S1b, the first interaction is suppressed and the second is enhanced. The difference in field strength, ΔE V/mm matches the calculated value of equation 4.

The first detrapped beam was measured using a referenced photodiode (Thorlabs, PM100USB, S150C). The manufacturer gives a resolution of 10 pW and a measurement uncertainty of ±3%. The detrapped power is controlled between nW and nW. Figure S1c shows the corresponding graph, with crosses marking the positions of the photographs in a und c.