Abstract Submitted
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Moving Single Atoms DUSTIN STUART, University of Oxford — Single neutral atoms are promising candidates for qubits, the fundamental unit of quantum information. We have built a set of optical tweezers for trapping and moving single Rubidium atoms. The tweezers are based on a far off-resonant dipole trapping laser focussed to a 1 μm spot with a single aspheric lens. We use a digital micromirror device (DMD) to generate dynamic holograms of the desired arrangement of traps. The DMD has a frame rate of 20 kHz which, when combined with fast algorithms[1], allows for rapid reconfiguration of the traps. We demonstrate trapping of up to 20 atoms in arbitrary arrangements, and the transport of a single-atom over a distance of 14 μm with continuous laser cooling, and 5 μm without. In the meantime, we are developing high-finesse fibre-tip cavities, which we plan to use to couple pairs of single atoms to form a quantum network.

[1]D. Stuart et. al., *Fast algorithms for generating binary holograms*, http://arxiv.org/abs/1409.1841

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