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Loading of multiple micro-optical traps VIJAYASHANKAR RAMAREDDY, PEYMAN AHMADI, GIL SUMMY, Oklahoma State University, Stillwater, OK — Pioneering work has been done in the use of far off-resonant laser fields to create potentials to trap and manipulate neutral atoms in the last few decades. More recently multiple traps with variable separation between them have become useful for various experiments ranging from quantum information research to cold collisions and atom interferometry. We present a new method of generating a linear array of far off resonant-traps (FORTs) making use of the intensity pattern associated with the spherical aberration of a focused CO_2 laser beam [1]. The spherical aberration is introduced by the lenses in the path of the laser beam. Atoms are trapped at the local maxima of the intensity pattern. We show that the separation of these micro-traps can be varied over a range of about one millimeter. The variation of the separation of these micro-traps is achieved by changing the amount of spherical aberration which is made possible by changing the CO_2 laser beam size on the lenses. We could load about $2 \times 10^5 - 1 \times 10^6$ atoms in these micro-traps at 70 μK. Since the spacial extent of the magneto optical trap (MOT) (from where the FORT is loaded) is limited, 2 - 3 micro-traps are realized at a time. However by changing the relative position of the MOT with respect to FORT up to 10 micro-traps are observed.
[1] P Ahmadi, V Ramareddy and G S Summy, New. J. Phys. **7**, 4 (2005).

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