Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Loading cold atoms into a time averaged optical dipole trap PEYMAN AHMADI, BRIAN TIMMONS, GIL SUMMY, Oklahoma State University — We describe our investigations of optical dipole traps for neutral atoms using a high power CO_2 laser beams (FORT). Studies of these quasi-electrostatic traps lead us to the creation of a Bose-Einstein condensate (BEC) by all optical means. We have developed a new technique to increase the optical trap population, improving spatial and phase space densities of the atomic cloud. This enhances the evaporative cooling efficiency to realize a BEC. This technique is based on a fast sweeping of the CO_2 beam while loading the atoms from a Magneto optical trap. We have found that the FORT population (N_{FORT}), being proportional to the FORT volume, also saturates once a certain potential depth is reached. The goal would be to engineer the sweeping amplitude and frequency to increase the effective volume and keep the potential depth at its saturation limit. A considerable increase in the $N_{FORT}$is observed for a proper choice of the amplitude and frequency of the sweeping. A detailed study of these time averaged optical traps will be presented.

Peyman Ahmadi
Oklahoma State University

Date submitted: 11 Mar 2005 Electronic form version 1.4