Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Progress towards an experimental study of microscopic dipole trap loading and an investigation of atom dynamics in configurable microscopic double-wells TYLER BLUM, PASAD KULATUNGA, Hobart & William Smith Colleges — We present our progress towards an experiment to investigate microscopic optical dipole traps, trap loading and atom dynamics in microscopic optical traps. Loading mechanics of large dipole traps from a laser cooled atomic molasses or a magneto-optically trapped atoms have been extensively investigated, and the loading dynamics are relatively well understood. While microscopic traps are finding increasing number of uses, little is known of the loading dynamics or of the optimal loading conditions. Several recent experiments of sub-micron traps have found size dependent differences in the loading dynamics. We propose to investigate loading dynamics as well as the lifetime and the temperature of dipole traps of waist 8 μm to $\sim$2.5 μm. Also microscopic dipole traps that we propose to study are well suited for investigating the dynamics of atoms of two adjacent microscopic traps. We also propose to investigate atoms in two adjacent dynamically configurable traps to study the effect of the presence of one trap on the other separated by a variable barrier height. Finally a collection of atoms localized to a very small volume in space lends to studying an untested cooling scheme particularly suited for deep microscopic traps. We also propose to investigate this cooling scheme.

Pasad Kulatunga
Hobart & William Smith Colleges

Date submitted: 27 Jan 2010 Electronic form version 1.4