document Suppression of Dephasing of Optically Trapped Atoms M. F. Andersen, A. Kaplan, T. Grünzweig and N. Davidson. Department of Physics of Complex Systems,

abstract Ultra-cold atoms trapped in an optical dipole trap and prepared in a coherent superposition of their hyperfine ground states, decohere as they interact with their environment. We demonstrate than the loss in coherence in an "echo" experiment, which is caused by mechanisms such as Rayleigh scattering, can be suppressed by the use of a new pulse sequence. We also show that the coherence time is then limited by mixing to other vibrational levels in the trap and by the finite lifetime of the internal quantum states of the atoms.