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Optical dipole trap using a Fabry-Perot interferometer as a power buildup cavity DONGHYUN CHO, Department of Physics, Korea University, SEUNG KOO LEE, HYUN SOOK LEE, JANG MYUN KIM, LASER SPECTROSCOPY LABORATORY TEAM — We construct an optical dipole trap using a Fabry-Perot interferometer as a power buildup cavity. Large power enhancement allows us to produce 9-mK deep potential wells with 48μm spot size and 100 nm detuning from the rubidium $D1$ resonance. The optical trap is loaded from a dark-spot MOT which, in turn, is loaded from a low-velocity intense source of ^{85}Rb atoms. Under typical experimental conditions, there are 1.4×10^6 atoms in 2,000 antinodes of the optical trap. Average atom density is 1.1×10^{12} cm^{-3}. The number of trapped atoms is limited by the atom density, or trapping volume. The standing wave configuration with tight longitudinal confinement has much smaller trapping volume compared with the equivalent travelling wave. A method to convert the trap to a travelling- wave like configuration using phase modulation is studied. In addition, we studied possibilities of tuning the resonance frequency of the Fabry-Perot resonator by using trapped atoms.

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