Abstract Submitted
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Short Range Photoassociation of Rb_2 in a Broadband Dipole Trap[1] CARLOS RENATO MENEGATTI, JONATHAN EUGENE TALLANT, BRUNO SPOLON MARANGONI, LUIS GUSTAVO MARCASSA, University of Sao Paulo — The process of photoassociation has been studied using cold trapped atomic samples for the last 20 years. Due to poor Franck-Condon overlap, a free-to-bound transition followed by spontaneous decay results in a small production of electronic ground state molecules, which are spread over several high-lying vibrational states. If the photoassociation is done at short range, deeply bound ground state molecules can be formed. In our experiment, we have performed photoassociation on trapped ^{85}Rb atoms in a crossed broadband optical dipole trap. Our crossed beam configuration uses 40 W of power (at 1071 nm, bandwidth of 2 nm) in each beam with a 40 μm waist radius at the focus. A photoassociation laser is used and is detuned ~ -7 cm^{-1} from the Rb D1 line. The resulting cold Rb_2 molecules are photoionized by a pulsed dye laser. The time evolution of the molecule population indicates that the photoassociated molecules are being optically pumped by the high flux of 1071 nm photons present in the trapping beam. Optically pumping the molecules suggests deeply bound excited molecular states may be produced by photoassociation at short range by the broadband 1071 nm photons. A simple theoretical model is discussed.

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