Abstract Submitted
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Depletion spectroscopy of ultracold $\nu_x = 0$ $^{85}Rb_2$ molecules trapped in a crossed optical dipole trap[1] HENRY PASSAGEM, University of Sao Paulo, NADIA BOULOUFA-MAAFA, OLIVIER DULIEU, Laboratoire Aime Cotton - University Paris-Sud, LUIS MARCASSA, University of Sao Paulo — In this work, we have loaded $\nu_x = 0$ $^{85}Rb_2$ ultracold molecules into a crossed optical dipole trap from a standard magneto optical trap using a single light beam. Such beam is composed of a single frequency coherent light source, which is responsible for short range PA of cold rubidium atoms, and an incoherent broadband light source which transfers the molecules in different vibrational levels (ν_x) of the singlet-ground-state X, into $\nu_x = 0$, through optical pumping. The molecules were observed, by REMPI technique, through 11 transitions from the $\nu_x = 0$ $X^1\Sigma_g^+$ ground state to the $2^1\Sigma_u^+$ excited state in the 20853-20985 cm^{-1} energy range. Due to the bandwidth of the REMPI laser we were unable to resolve the rotational distribution of the $\nu_x = 0$. Therefore, we have performed depletion spectroscopy in the $\nu_x = 0$ trapped molecules using a diode laser at 682 nm to drive transitions from $v_X = 0$ to $v = 0$ of the $b^1\Pi_u$ potential. The pulsed dye laser frequency was set at the largest peak at 20966.9 cm^{-1}. The experimental depletion spectrum, which is in good agreement with theoretical predictions, allows us to determine that 75% the $\nu_x = 0$ molecules are in J= 0, 1 and 2 rotational states.

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