Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Spectroscopic analysis of the $(2)^3\Sigma^+$ state of $^{41}K^{87}Rb$ towards ultracold rovibronic ground-state molecules KIYOTAKA AIKAWA, JUN KOBAYASHI, Univ. of Tokyo, MASAHITO UEDA, SHIN INOUYE, Univ. of Tokyo, JST, ERATO — Optical transitions from loosely bound $^{41}K^{87}Rb$ molecules to the $(2)^3\Sigma^+$ state were investigated to search for an optimal intermediate state in the STIRAP transfer into the rovibrational ground state. The loosely bound molecules were produced by photoassociation of laser-cooled ^{41}K and ^{87}Rb atoms and detected by resonance-enhanced multi-photon ionization. High-resolution depletion spectra were obtained by scanning Ti: Sapphire laser in the wavelength range 880-920nm where no information on the $(2)^3\Sigma^+$ state was available. Vibrational progressions over 17 levels and rotational progressions of J = 0-5 ($\Omega = 0$) and J = 1-5 ($\Omega = 1$) were observed. Rotational constants extracted from the spectra show a wide variation among vibrational levels which indicates spin-orbit mixing of the $(1)^3\Pi$ state into the $(2)^3\Sigma^+$ state. The observed small splitting in each rotational line was understood in terms of hyperfine interaction between the nuclear spin of ^{87}Rband electronic spin.

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Date submitted: 21 Jan 2010 Electronic form version 1.4