Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

Spin-orbit coupling effect on the $2^3\Pi$ state of ^{39}K^{85}Rb JIN-TAE KIM, Department of Photonic Engeering, Chosun University, Gwangju, 501-759, Korea, ANDREY V. STOLYAROV, Department of Chemistry, Moscow State University, Moscow, 119991, Russian Federation, WILLIAM C. STWALLEY, Department of Physics, University of Connecticut, Storrs, CT 06269-3046, USA —
Recently we investigated the spin-orbit components ($\Omega = 0^+$, 0^-, 1, and 2) of the $2^3\Pi$ state of ^{39}K^{85}Rb by using experimental spectroscopy of ultracold molecules formed by photoassociation [1]. The separations ($\Delta(E_{\Omega=1} - E_{\Omega=0})$ and $\Delta(E_{\Omega=2} - E_{\Omega=1})$) between Ω components were unequal due to second-order perturbations by other electronic states. In the present work we investigate the spin-orbit coupling effect on the 2 $^3\Pi$ state of ^{39}K^{85}Rb in the framework of 1st and 2nd order non-degenerate perturbation theory based on an *ab initio* method. Required potential energy curves and electronic spin-orbit coupling matrix elements are evaluated over a wide range of internuclear distance in the basis of the spin-averaged wavefunctions corresponding to the pure Hund's case (a) coupling scheme. We compare the experimental spin-orbit splittings of the 2 $^3\Pi$ state with its *ab initio* counterparts, which agree well and elucidate the pronounced 2nd order perturbation effects caused by nearby electronic states.

[1] J. T. Kim *et al.*, New J. of Phys. **11**, 055020 (2009).

Jin-Tae Kim
Department of Photonic Engeering,
Chosun University, Gwangju, 501-759, Korea

Date submitted: 25 Jan 2013 Electronic form version 1.4