

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Autler-Townes splitting in a sodium molecular-ladder scheme<sup>1</sup>**

CHIN-CHUN TSAI, RAY-YUAN CHANG, Department of Physics, National Cheng-Kung University, Tainan, 70101, Taiwan, THOU-JEN WHANG, CHUEN-PING CHENG, Department of Chemistry, National Cheng-Kung University, Tainan 70101, Taiwan — We report results from studies of the Autler-Townes (AT) splitting observed in sodium dimer using optical-optical double resonance spectroscopy. In our experiment, a single line Ar<sup>+</sup> laser at 4727 Å pumps the thermally populated ground state level  $X^1\Sigma_g^+(v'' = 1, J'' = 37)$  of Na<sub>2</sub> to the intermediate  $B^1\Pi_u(v' = 9, J' = 38)$  level. Then, a single mode cw Ti:sapphire or dye laser couples to the higher Rydberg states. The signals are detected by monitoring the UV fluorescence from the triplet *gerade* states back to the  $a^3\Sigma_u^+$  state via collision energy transfer. Unlike all the other intermediate levels pumped by different Ar<sup>+</sup> laser lines, this strong transition populated the  $B^1\Pi_u(v' = 9, J' = 38)$  level leads to an AT splitting on all the levels observed in the higher Rydberg states, for example, 3, 5, 6, 7  $^1\Pi_g$  states and 3, 5, 6  $^1\Delta_g$ , states.

<sup>1</sup>We greatly acknowledge the support of the National Science Council, Taiwan.

Chin-Chun Tsai  
Dept. of Physics, National Cheng-Kung University

Date submitted: 30 Nov 2005

Electronic form version 1.4