Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Radiative and rovibrational collisional relaxation of sodium dimer

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Radiative and rovibrational collisional relaxation of sodium dimer of the $A^1\Sigma_u^+$ (8,30) state have been measured by direct observation of the decay fluorescence. Sodium molecular vapor is created in a heatpipe oven at 600 K and excited using a 6-ns pulsed dye laser pumped by a Nd:YAG, operating at 532 nm. The preliminary lifetime measurement was done by directly acquiring lifetime data through boxcar averager from the stored oscilloscope trace of the fluorescence. Analysis of the exponential decay of the fluorescence allows us to obtain the radiative lifetime. By introducing the argon buffer gas and varying the pressure of the heatpipe, a collisional cross section between excited sodium dimer and ground state argon atom collision can be extracted using Stern-Volmer relation.

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Date submitted: 07 Apr 2016 Electronic form version 1.4