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**Observation and Analysis of the  $6^1\Sigma_g^+$  and  $3^1\Pi_g$  states of Rubidium Dimer** ERGIN AHMED, XINHUA PAN, MARJATTA LYYRA, Temple University — Detailed knowledge of the excited electronic states of Rubidium dimer is of significant importance to a number of areas of research such as, the production of ultracold ground state molecules, cold atom-molecule collisions, and the development of new *ab-initio* molecular electronic structure methods. The potential energy curves and transition dipole moments of dozens of electronic states of  $\text{Rb}_2$  have been calculated. However, only few low-lying electronic states have been experimentally studied and assigned. We report our experimental work and analysis of the  $6^1\Sigma_g^+$  and  $3^1\Pi_g$  electronic states. In the experiment large number of ro-vibrational levels of the two states were observed using narrow band *cw* TiSa and dye laser in double resonance cascade configuration. The intermediate states used in the experiment are from the mutually perturbed  $A^1\Sigma_g^+ \sim b^3\Pi_u$  pair of states. Potential energy curve was generated for each state from the term values of the observed levels.

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