

Abstract Submitted  
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**Experimental Study of the  $3^1\Pi_g$ ,  $5^1\Sigma_g^+$ , and  $6^1\Sigma_g^+$  States of Rubidium Dimer**<sup>1</sup> PHILLIP ARNDT, Temple University, VLADIMIR SOVKOV, St. Petersburg State University, JIE MA, Shanxi University, XINHUA PAN, DAVID BEECHER, JENG TSAI, YAFEI GUAN, MARJATTA LYYRA, ERGIN AHMED, Temple University — The structure of the excited electronic states of Rubidium dimer is important to a number of areas of research including the production of ultracold ground state molecules, cold atom-molecule collisions, and the development of new *ab initio* molecular electronic structure methods. In the experiment we used optical double resonance technique to observe large number of ro-vibrational levels of the  $3^1\Pi_g$ ,  $5^1\Sigma_g^+$ , and  $6^1\Sigma_g^+$  electronic states in the 24000-26000  $\text{cm}^{-1}$  range. The set of term values for each state were simulated within a model of a piecewise multi-parameter potential energy function based on the generalized splines. This function reproduces the experimental data for each state with reasonable accuracy and in addition allows us to incorporate in the potential function the non-trivial features at longer internuclear range, such as multiple wells, predicted by the *ab initio* calculations.

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