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Experimental Study of the $4^3\Sigma_g^+$ and $3^3\Pi_g$ States of Rubidium Dimer[1] PHILLIP ARNDT, Temple University, VLADIMIR SOVKOV, St. Petersburg State University, REBECCA LIVINGSTON, BRENDAN ROWE, MARJATTA LYYRA, ERGIN AHMED, Temple University — We reports a high-resolution experimental study and a numerical analysis of the $4^3\Sigma_g^+$ and $3^3\Pi_g$ electronic states of rubidium dimer. In the experiment the Rb_2 molecules were initially excited from the ground $X^1\Sigma_g^+$ state to an intermediate level of the mixed $A^1\Sigma_u^+$~$b^3\Pi_u$ manifold using a narrow band tunable TiSa laser. In the next step the probe laser, a narrow band dye laser tunable in the 13000-14000cm^{-1} range, excited the molecules further to the target states. The resonances of the probe laser were observed by detecting the total fluorescence from the excited states to the $a^3\Sigma_u^+$ state in the 500nm range. Large number of ro-vibrational term values spanning a wide range of the rotational and vibrational quantum numbers were measured using the optical-optical double resonance technique. Besides the term values, we observed the resolved fluorescence intensities with Condon structures from many of the levels. The Rydberg–Klein–Rees (RKR) potential energy curves were constructed and optimized to reproduce the experimental data reliably.

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