# OPTICAL-OPTICAL DOUBLE RESONANCE SPECTROSCOPY OF SrOH: THE $\widetilde{C}\ ^2\Pi(000) - \widetilde{A}\ ^2\Pi(000)$ AND THE $\widetilde{B}'\ ^2\Sigma^+(000) - \widetilde{A}\ ^2\Pi(000)$ TRANSITIONS

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The $\widetilde{C}\ ^2\Pi(000) - \widetilde{A}\ ^2\Pi(000)$ transition of SrOH has been rotationally analyzed using optical-optical double resonance (OODR) spectroscopy. SrOH was synthesized in a Broida-type oven by the reaction of $H_2O_2$ and strontium vapor. The OODR spectrum was measured using a broad band dye laser ($\sim$1 cm$^{-1}$ bandwidth) and a single mode Ti:Sapphire laser as the pump ($\widetilde{A}\ ^2\Pi - \widetilde{X}\ ^2\Sigma^+$) and probe ($\widetilde{C}\ ^2\Pi - \widetilde{A}\ ^2\Pi$) lasers, respectively. Rotational and fine structure parameters have been determined through a combined least-squares fit with the $\widetilde{A}\ ^2\Pi - \widetilde{X}\ ^2\Sigma^+$ optical transition data and the millimeter-wave pure rotational data of the $\widetilde{X}\ ^2\Sigma^+$ state. A significant decrease in the spin-orbit constant from the $\widetilde{A}\ ^2\Pi$ to the $\widetilde{C}\ ^2\Pi$ state has been observed and can be rationalized by the different atomic orbital character of the two states. The $\Lambda$-doubling constants of the $\widetilde{C}\ ^2\Pi$ state have been examined using the pure procession model and suggest that this state forms a unique perturber pair with the nearby $\widetilde{D}\ ^2\Sigma^+$ state. In addition, the rotationally-resolved spectrum of the $\widetilde{B}'\ ^2\Sigma^+(000) - \widetilde{A}\ ^2\Pi(000)$ transition has been recorded using the OODR technique. Assignment and analysis of this spectrum is in progress and preliminary results will also be presented.