CARS AND INFRARED STUDIES OF THE ν_1, ν_2 AND ν_4 BANDS OF $^{34}S^{18}O_3$

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We are engaged in a comprehensive investigation of the spectroscopic properties of sulfur trioxide, an important participant in reactions in the upper atmosphere. The fundamental modes and several hot bands of the isotopic variants ($^{32}S^{18}O_3$, $^{34}S^{16}O_3$, and $^{34}S^{18}O_3$) have been investigated using high resolution infrared spectroscopy and coherent anti-Stokes Raman scattering. For all isotopic variants, the Raman-active symmetric stretching mode ν_1 shows complex Q-branch patterns due to indirect Coriolis couplings, *l*-resonances, and Fermi resonances with dark ν_2, ν_4 combination/overtone levels. Essential to modeling the interactions of these levels with ν_1 is the understanding of the fundamental vibrations that make up these levels. The analysis of the ν_2, ν_4 infrared active fundamental vibrations of $^{34}S^{18}O_3$ will be presented, along with efforts to model the complex ν_1 CARS spectrum using information derived from studies of hot bands involving ν_2 and ν_4.