

STIMULATED EMISSION PUMPING (SEP) SPECTROSCOPY APPLIED TO THE METHOXY RADICAL

JINJUN LIU, *Laser Spectroscopy Facility, Department of Chemistry, The Ohio State University, 120 W. 18th Avenue, Columbus, Ohio 43210 (present address: Laboratory of Physical Chemistry, ETH Zurich, Building HCI, Wolfgang-Pauli-Str. 10, 8093 Zurich, Switzerland)*; MING-WEI CHEN, *Laser Spectroscopy Facility, Department of Chemistry, The Ohio State University, 120 W. 18th Avenue, Columbus, Ohio 43210*; JOHN T. YI, *Laser Spectroscopy Facility, Department of Chemistry, The Ohio State University, 120 W. 18th Avenue, Columbus, Ohio 43210 (present address: Department of Chemistry, Winston-Salem State University, Wilveria B. Atkinson Science Bldg, Room 311, Winston-Salem NC 27110)*; TERRY A. MILLER, *Laser Spectroscopy Facility, Department of Chemistry, The Ohio State University, 120 W. 18th Avenue, Columbus, Ohio 43210*.

Methoxy radical, CH₃O is a widely studied and benchmark molecule, both for its spectroscopy and its role in chemical reactions. It possesses a ground ²E state which is distorted by the Jahn-Teller interaction and split into ²E_{1/2} and ²E_{3/2} components by the spin-orbit interaction. The LIF spectra of the $\tilde{A}^2A_1-\tilde{X}^2E$ transitions is well-known, but under jet expansion conditions the E_{1/2} component is not observed because it is $\sim 60\text{cm}^{-1}$ higher than E_{3/2} and not populated. A feasible way to study the features of the $\tilde{X}^2E_{1/2}$ level is to use the Stimulated Emission Pumping (SEP) technique. We have combined our high-resolution laser-induced fluorescence (LIF) spectroscopic ($\Delta\nu \sim 200\text{MHz}$) with a moderate-resolution laser ($\Delta\nu \sim 0.2\text{cm}^{-1}$). These lasers are controlled by a computer program, which permits both the pump and dump lasers to be fired at specified delays after the photolysis laser producing CH₃O. SEP spectra of CH₃O were recorded with a resolution of $\approx 300\text{MHz}$ linewidth and measured with a precision $< 100\text{MHz}$ and these data were included in a global data (LIF, SEP, microwave) fitting to determine the parameters of the $\tilde{X}^2E_{1/2}$ state. The previous assignment of parity for the ²E_{1/2} state is modified and the value of the spin-orbit splitting revised.