III-F Chemical Reaction Dynamics

The research group of Dr. Toshinori Suzuki has moved from IMS to RIKEN (Institute of physical and chemical research) in March 2003.

III-F-1 One- and Two-Color Photoelectron Imaging of the CO Molecule *via* the $B^1\Sigma^+$ State

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This paper is concerned with photoelectron imaging following one-color (2+1) and two-color (2+1') resonance enhanced multiphoton ionization (REMPI) in the CO molecule. After the two-photon absorption step $B^1\Sigma^+$ (v' = 0) ←← $X^1\Sigma^+$ (v" = 0) or $B^1\Sigma^+$ (v' = 1) ←← $X^1\Sigma^+$ (v" = 0), the subsequent one-photon ionization $X^2\Sigma^+(v^+)$ ← $B^1\Sigma^+$ (v' = 0,1) shows deviations from the expected Δv = 0 Franck-Condon propensity rule. The results are in good agreement with a previous study using time-of-flight photoelectron spectroscopy (Sha *et al.*, *J. Chem. Phys.* **99**, 4334 (1993)). The experimental photoelectron kinetic energy spectra and their angular distributions are analyzed, and the essential role played by 'superexcited' Rydberg states with an $A^2\Pi$ ion core in this process is examined. Moreover, photoelectron imaging methods appear to be useful in extracting information about superexcited states.