DECIPHERING THE DYNAMICS AND VECTOR CORRELATIONS OF VACUUM ULTRAVIOLET (VUV) PHOTODISSOCIATION OF CO_2 AT 155 NM

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The Vacuum Ultraviolet (VUV) photodissociation of CO_2 via the dominant O(^{1}D) channel near 155 nm were studied using Velocity Map Imaging (VMI) technique. Speed dependent vector correlations (the correlations among the transition dipole moment μ of the parent molecule, the recoil velocity vector **v** and rotational angular momentum vector **j** of the photofragments) were extracted. This was made possible via the application of a set of equations first developed by Grubb *et al*. And in combination with a Monte Carlo style simulation program and necessary approximations, full vector correlation information were extracted from the anisotropic angular distributions of the images. Our results indicated a picture of photodissociation dynamics mainly via the excited 2^1A' (A) state. The transition dipole moment lies in the bent molecular plane. It was not parallel, but pointing away from the dissociating C-O bond. In addition, speed dependent μ -**v** correlation showed a clear trend, with higher rotationally excited CO correlating to larger angle between μ and the recoil direction. Such clear trend was successfully explained with a mathematical model (first developed by Reisler and coworkers) considering non-axial recoil effect. Although 1^1A" (B) state was also energetically available, we do not believe it was involved in this case.