SURFACE ELECTRON EJECTION BY LASER-EXCITED METASTABLE SPECTROSCOPY OF C_2H_2

SELEN ALTUNATA, KEVIN L. CUNNINGHAM, STEPHEN DRUCKER, CHRISTOPHER G. MORGAN, and ROBERT W. FIELD, *Department of Chemistry, Massachusetts Institute of Technology, Cambridge MA 02139-4307*.

The triplet states of C_2H_2 reported in *J. Chem. Phys.* **107**, 49 (1997) have been recorded at higher resolution, providing new insight into intersystem crossing in C_2H_2. LIF is combined with Surface Electron Ejection by Laser-Excited Metastables (SEELEM or LEM for short) to provide complementary information about the these states. In SEELEM spectroscopy, a metastable molecule in a molecular beam is detected by the observation of an electron ejected as the excited molecule impacts a metal surface. For an electron to be ejected, the excited state must have a lifetime on the order of the flight time ($\sim$100 μs) and must have an electronic energy that exceeds the work function of the surface. LIF detects states with short lifetimes due to large amounts of singlet character. SEELEM detects states with long lifetimes due to large amounts of triplet character. Further, SEELEM only detects the portion of the triplet character from triplet basis states w! ith more excitation energy than the work function of the metal. The simultaneously recorded spectra are used to determine the electronic character of eigenstates.