SINGLET-TRIPLET COUPLING IN ACETYLENE REVEALED IN DETAIL BY SURFACE ELECTRON EJECTION BY LASER EXCITED METASTABLES SPECTROSCOPY

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We present here a new rotational analysis of the surface electron ejection by laser excited metastables (SEELEM) spectrum of acetylene in the energy region of the $3\nu_3$ vibrational level of the $\tilde{A}\,^1A_u$ excited electronic state of C_2H_2. Experimental conditions have allowed for the first time the assignment of rotational quantum numbers to the long-lived, largely triplet-character SEELEM eigenstates, after which the doorway-mediated coupling of the triplet manifold to the singlet level can be fitted to a spin-orbit effective Hamiltonian. The results of this model concerning the vibronic identities of the triplet states, the magnitude of the spin-orbit interaction, and relative singlet/triplet SEELEM detectivities, will be discussed.