# SPIN-ORBIT STATE-SELECTIVE AUTODETACHMENT OF VIBRATIONALLY EXCITED $CCP^-$

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The linear dicarbon phosphide molecule (CCP) has a $^2\Pi$ ground electronic state with a small spin-orbit splitting into $^2\Pi_{1/2}$ and $^2\Pi_{3/2}$ states. It has a reasonably large dipole moment and has been observed in interstellar space. We have studied $CCP^-$ ion using high-resolution photoelectron imaging and observed dipole-bound excited states for $CCP^-$ right below the detachment threshold. Resonant photoelectron spectra have been obtained by exciting the anion to specific vibrational levels of the dipole-bound states. We have observed a dipole-bound state for each spin-orbit state and the vibrational autodetachment is state-selective, providing the first spectroscopic evidence that the dipole-bound electron does not couple to the neutral core.