

## HIGH RESOLUTION PHOTOELECTRON SPECTROSCOPY OF VIBRATIONALLY EXCITED ANIONS

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The method of slow electron velocity-map imaging of cryogenically cooled anions (cryo-SEVI) is a variant of anion photoelectron spectroscopy with a resolution as high as  $1\text{-}2\text{ cm}^{-1}$ . It has proved invaluable in obtaining well-resolved photoelectron spectra of molecular anions, bare and complexed metal oxide clusters, and anionic precursors to transition states for bimolecular and unimolecular reactions. However, cryo-SEVI is subject to the same selection rules that govern photoelectron spectroscopy, and thus yields frequencies for only a small set of vibrational modes of the neutral species created by photodetachment. We have recently incorporated a tunable infrared laser into our experiment with the goal of vibrationally pre-exciting the anions prior to photodetachment. Results on diatomic and polyatomic anions will be presented that illustrate the capabilities and complexities of this new type of spectroscopy, IR cryo-SEVI.