FACHBEREICH CHEMIE

PTC^2 - Das physikalisch-theoretisch-chemische Colloquium

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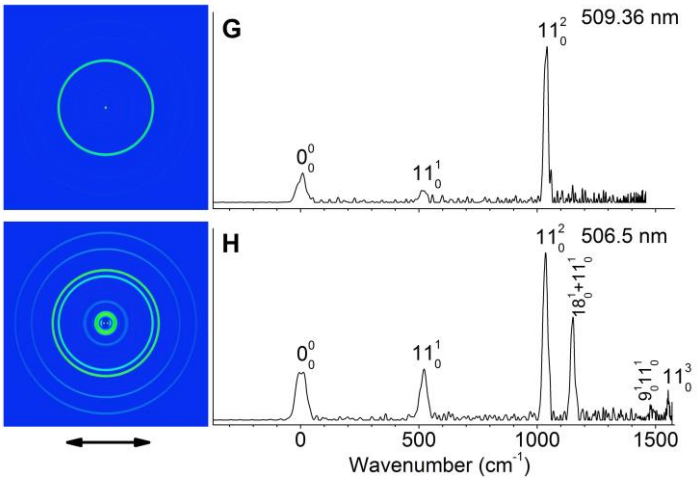
Dienstag, den 30.05.2017— 17.15 Uhr
Gebäude 52 — Hörsaal 207

Electrospray Photoelectron Spectroscopy: From Multiply-Charged Anions to Ultracold Anions

We have developed an experimental apparatus integrating an electrospray ionization source with photoelectron spectroscopy, which allows negatively-charged ions present in solution to be studied in the gas phase, including multiply-charged anions, solvated anions, organic and inorganic anions, and biological molecules. In this talk, I will briefly review our early effort in the studies of multiply-charged anions, followed by our development of a cryogenic ion trap to create vibrationally-cold anions, which are important to obtain high-resolution photoelectron spectra free of vibrational hot bands. I will also briefly discuss our photoelectron imaging studies of multiply-charged anions to probe the influence of the intramolecular electrostatic effects on the photoemission angular distributions. The main focus of the talk will concern our recent effort in high-resolution photoelectron imaging of cryogenically-cooled anions using a tunable laser, leading to the observations of dipole-bound excited states and vibrational autodetachment. I will present resonantly-enhanced photoelectron imaging via vibrational levels of the dipole-bound states that yields highly non-Franck-Condon photoelectron spectra and rich vibrational information (including conformation-selective spectroscopy).



Resonantly-enhanced photoelectron images and spectra of cryogenically-cooled phenoxide anion ($C_6H_5O^-$) via two different vibrational levels of its dipole-bound excited state. The spectra are plotted by referencing to the vibrational ground state (0_0^0) of the C_6H_5O! radical at a binding energy of 18,173 cm^{-1}.

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gez. Markus Gerhards
Gereon Niedner-Schatteburg
Christoph Riehn
Christoph van Wüllen