

# COLD MOLECULAR ION SEMINAR

**Title:** Action spectroscopy of cold ions in a radio-frequency trap

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**Time:** Tuesday, February 9 at 14:15-15:00

**Place:** 1520-732

## Abstract:

The low density of ions in mass spectrometers generally precludes direct absorption measurements. The spectrum of an ion can nonetheless be obtained by photodissociation of the ion using resonance two-color photofragmentation or multiphoton dissociation techniques. In Basel an ion-trap instrument has been built to measure the electronic spectra of cations at low vibrational and rotational temperatures (20-40 K), as of relevance to astronomical observations. Ions are produced in an electron-impact ion source and are mass selected with a quadrupole filter before being fed into a 22-pole radio-frequency trap. Typically 3000 ions are held for approximately 70 ms, during which the ions are equilibrated to low temperatures through collisions with cryogenically cooled helium gas. Subsequently an electronic transition is induced through excitation with a tunable nanosecond laser. A second UV photon then initiates photofragmentation of the excited ions. Afterward the trap is opened and the fragment ions are mass selected by a second quadrupole and detected. The recently obtained results of the excited states of some polyacetylene cations, caynogen cation,  $C_4H_3Cl^+$  cation in the gas phase are presented.

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