HIGH-RESOLUTION IR ACTION SPECTRUM OF C$_2$H$_2^+$

SABRINA GÄRTNER, JÜRGEN KRIEG, OSKAR ASVANY and STEPHAN SCHLEMMER, I. Physikalisches Institut, Universität zu Köln.

The method of Laser-Induced-Reactions (LIR), which is described in detail in Schlemmer et al. 2002, is used to obtain high-resolution infrared spectra of molecular ions. Here, the endothermic reaction C$_2$H$_2^+$ + H$_2$ → C$_2$H$_3^+$ + H is promoted by ro-vibrational excitation of the parent ion. A spectrum of the $\nu_3$ stretching vibration of C$_2$H$_2^+$ is recorded by variation of the wavelength of a home-built OPO (Optical Parametric Oscillator) operating in the 3 micron region. The experiments are carried out in a low temperature 22-pole ion trap where several hundred cold, mass selected parent ions are stored. Typical linewidths of the action spectra are $3 \times 10^{-3}$ cm$^{-1}$. First spectra for C$_2$H$_2^+$ and their analysis will be presented. Other possible applications of LIR spectroscopy will be discussed.

---