ROTATIONAL SPECTROSCOPY OF MOLECULAR IONS USING A NOVEL DOUBLE RESONANCE APPROACH

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A novel method of rotational spectroscopy of trapped, cold molecular ions is presented. It is a double resonance scheme combining rotational excitation (in the mm-wave region) with rovibrational excitation (in the IR). The rovibrational excitation is detected by the recently developed leak-out spectroscopy (LOS) approach[1,2]. LOS is based on the vibrational-translational energy transfer process occuring during the collision of the IR excited ion with a noble gas atom, after which the ion may escape the trap ("leak out") so that it can be counted by a detector. LOS and the rotational scheme based on it are very sensitive and generally applicable to any cation or anion. This poster presents rotational spectra for HC_3O^+, c-$C_3H_2D^+$ and H_2CCCH^+.

[1] doi:10.1021/acs.jpca.2c05767, P. C. Schmid, O. Asvany, T. Salomon, S. Thorwirth, and S. Schlemmer, *J. Phys. Chem. A*, **126**, 8111-8117, (2022).

[2] see also talk of P. C. Schmid in Minisymposium "Spectroscopy of ions in traps"