FEMTOSECOND SPECTROSCOPY OF ALKALI TRIMERS ON HELIUM NANODROPLETS

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Superfliud helium nanodroplets offer the opportunity to study dopant molecules in the sub-Kelvin range with only weak matrix perturbations. Femtosecond wave packet spectroscopy has been shown to be well suited to obtain high resolution vibrational spectra of cold alkali molecules in weakly bound high-spin states[a]. In a pump-probe scheme a first laser pulse excites a vibrational wave packet that evolves on the molecular potential and is probed by a second ionizing pulse. We present spectroscopic data on Rb_3 and K_3 showing different vibronic progressions. These are assigned with the help of high level *ab initio* calculations of the electronic structure of the bare trimers[b].

[a]M. Mudrich, P. Heister, T. Hippler, C. Giese, O. Dulieu and F. Stienkemeier, Phys. Rev. A 80, 042512 (2009)

[b]J. Nagl, G. Auböck, A.W. Hauser, O. Allard, C. Callegari and W.E. Ernst, Phys. Rev. Lett. 100, 063001 (2008)