High temperature source of pulsed supersonic beam of vdW complexes: from principle of operation to rotational structurein CdAr

T. Urbanczyk[a] and J.Koperski[a]

[a]Smoluchowski Institute of Physics, Jagiellonian University
Reymonta 4, 30-059 Krakow, Poland, Tel: 48 12 663 5556, Fax: 48 12 663 8494,
E-mail: tomek_urbanczyk@op.pl

Recently, in the Group of Molecular Spectroscopy and Quantum Information at Jagiellonian University a new improved version of high temperature source of pulsed supersonic molecular beam of van der Waals complexes has been developed [1]. It can operate at temperatures up to 1000K and 10bar carrier gas stagnation pressure.Comparing to the prototype, the source is significantly easier to maintain due to its ability in disassemblingfor inspection and cleaning.We present principle of operation of the source, anunique method of data acquisition that allowssubsequent separation of spectra generatedby different complexesin the beam (*e.g.*, Cd_2or CdAr) as well as newest experimental results: a resolved rotational structure of vibrational components (including v'=0,1,2,3,4) of the$B^3 1(5^3P1) \leftarrow X^1 0^+(5^1S_0)$ transition in CdAr.

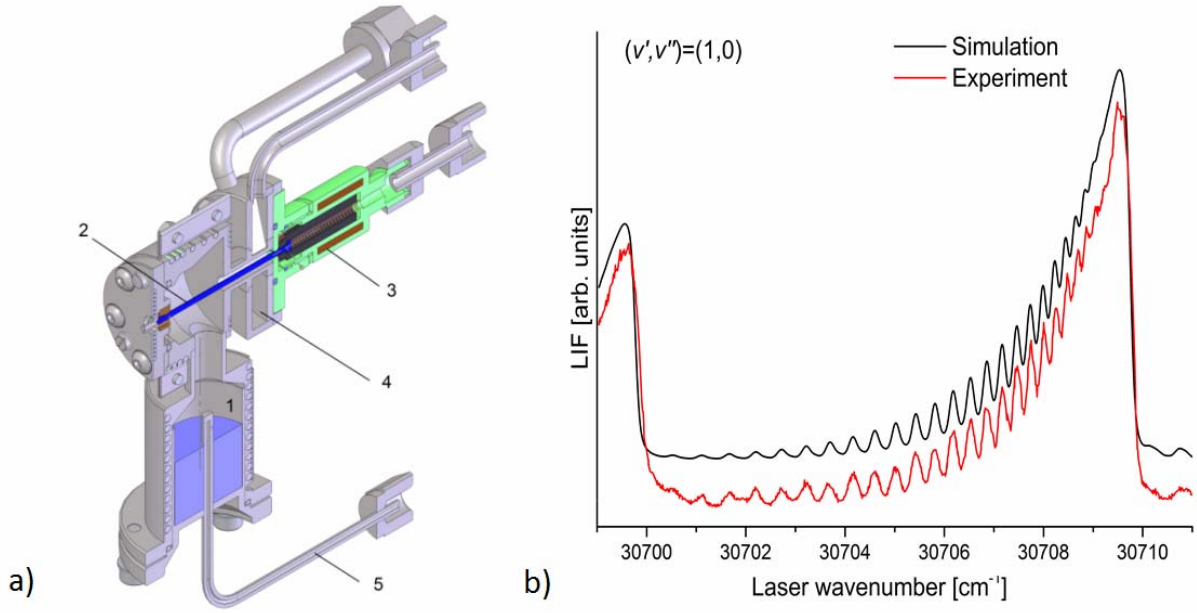

Fig. 1. a) Cross section of the source: 1-reservoirof cadmium, 2-titanium plunger, 3-electrically driver solenoid valve, 4-water shield,5-carrier gas supply. b) Partially resolved rotational structure of the (v'=1, v''=0) vibrational component of the $B^3 1 \leftarrow X^1 0^+$ transition in CdAr.

The project is financed by the National Science Centre according to contract no. UMO-2011/01/B/ST2/00495.

[1]T. Urbanczyk, J. Koperski, *Eur.Phys. J. - Special Topics***2013**, to be published.
[2]T. Urbańczyk, J. Koperski, *Rev. Sci. Instrum.* **2012**, *83*, 083114.