

Femtosecond laser enhanced thermionic emission in barium vapor

G. Pichler^{1,2}, Y. Makdisi¹, J. Kokaj¹, K. Afrousheh¹, J. Mathew¹, and R. Nair¹

¹*Physics Department, Kuwait University, P.O.Box 5969, 13060 – Safat, Kuwait*

²*Institute of Physics, Bijenicka cesta 46, Zagreb, Croatia*
pichler@ifs.hr

We were interested in the thermionic detection of the barium ions [1] produced by femtosecond laser excitation in a special heated oven. The thermionic signal was measured when femtosecond laser beam was spatially overlapped by excimer pumped dye laser beam. The nanosecond laser was scanned in the same spectral region while the broadband ultrashort laser light was centered at 427 nm. The bias voltage between the cell body and the tungsten rod (either 9 or 0 Volts) was used to collect electrons, after the barium ions have been created by multiphoton ionization [2]. We did not find any extra resonances, but the overall background was appreciably elevated due to the two photon ionization of the broadband femtosecond laser. The effect was enhanced in the presence of different noble gases at pressure of 50 mbar, where additional broad spectral features were found.

References:

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[2] Y. Makdisi, J. Kokaj, K. Afrousheh, J. Mathew, R. Nair, G. Pichler, Optics Comm. **290**, 95 (2013).