Physikalisches Institut
Fakultät für Mathematik und Physik
Albert-Ludwigs-Universität Freiburg

QE

Quantum Efficiency Seminar und Colloquium

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Quantum Control based Bioassays

Coherent control approaches have recently shown promising for discriminating bio-molecules with almost identical spectra *(1-3)*, which potentially allows their label-free detection. However, the absorption bands of DNA bases and proteins all lie in the deep UV (250-300 nm) region that is not reachable with standard pulse shaping devices. For this reason we developed a dedicated deep-UV all reflective pulse shaper based on MOEMS (Micro-opto-electromechanical systems). We present the first results of a linear 100-micromirror array capable of modulating phase and amplitude in the UV down to 200 nm *(4)* and, when customized, even in the XUV (down to 30 nm). Very recent experiments on the quantum control of the fluorescence of free aminoacids (Tryptophan and Tyrosin, *(5)*), dipeptides (e.g.Trp-Leu, Trp-Ala, Trp-Gly) and large proteins (antibodies and albumin) using deep-UV pulse shaping will be presented.

(1) M. Roth, L. Guyon, J. Roslund, V. Boutou, F. Courvoisier, J.P. Wolf, H. Rabitz, *Phys.Rev.Lett* **102**, 253001 (2009)
(2) J. Petersen, R. Mitric, V. Bonacic-Koutecky, J.-P. Wolf, J. Roslund, H. Rabitz, *Phys.Rev.Lett.* **105**, 073003 (2010)
(3) J. Roslund, M. Roth, L. Guyon, V. Boutou, F. Courvoisier, J-P Wolf, H. Rabitz, *J.Chem.Phys*. **134**, 034511 (2011)
(4) J. Extermann, S. M.Weber, D. Kiselev, L. Bonacina, S. Lani, F. Jutzi,W. Noell, N. F. de Rooij, J-P Wolf, *Opt Exp* **19**, 7580-7586 (2011)
(5) A. Rondi, L. Bonacina, A. Trisorio, C. Hauri, J.-P. Wolf, *Phys.Chem.Chem.Phys*. 14, 9317-9322 (2012)

Date: **Tuesday, December 11th, 2012 15:45**
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