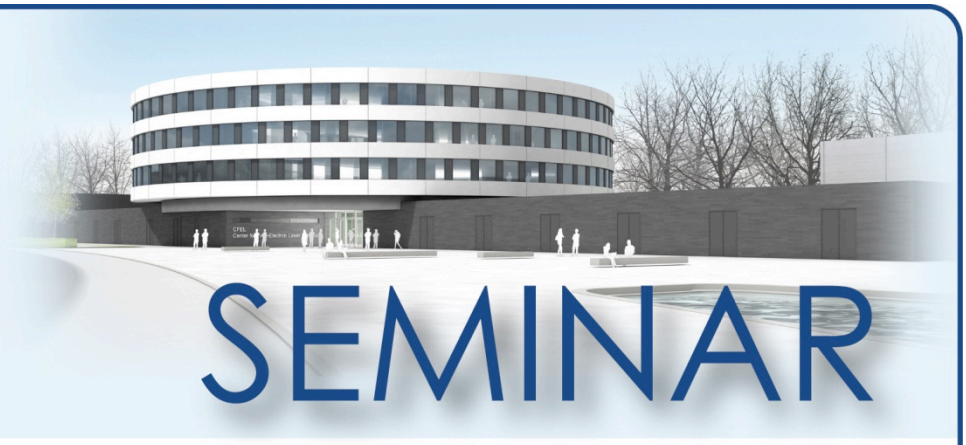
CFEL SCIENCE



SEMINAR

05th August 2013 - 14:00

Building 99, Seminar Room I (EG)

Sandra Eibenberger

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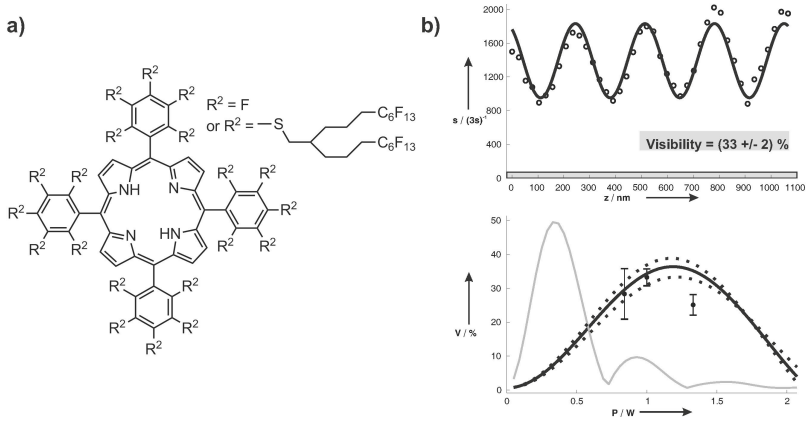
Quantum Interference Experiments with Complex Organic Molecules

One fundamental predication of quantum physics is the superposition principle. Matter-wave interferometers are powerful devices to study the delocalization of complex objects. I will present recent matter-wave experiments with complex organic molecules in a near-field interferometer of the Kapitza-Dirac-Talbot-Lau type [1]. I will discuss the current mass and complexity regime in which the delocalization of tailor-made molecules could be shown [2, 3]. A recent approach towards synthesizing libraries of fluorous porphyrins exhibiting convenient properties for their use in molecule interferometry facilitates matter-wave experiments with compounds consisting of 810 atoms and masses up to 10 123 amu [2] as shown in Figure 1.

KDTL quantum interferometry in combination with electric deflection methods is a powerful tool to investigate electric moments of molecules [4ñ6]. Therefore I will furthermore consider the role of internal molecular properties such as electric polarizabilities or dipole moments, as well as molecular dynamics for quantum coherence experiments.



References: 1. S. Gerlich, et al., Nature Phys. 3, 711 (2007). 2. S. Eibenberger, et al., Phys. Chem. Chem. Phys. accepted (2013). 3. S. Gerlich, et al. Nature Comm. 2, 263 (2011). 4. M. Gring, et al., Phys. Rev. A 81, 031 604 (2010). 5. J. Tüxen et al. Chem. Commun. 46, 4145 (2010). 6. S. Eibenberger et al. New Journal of Physics 13, 043 033 (2011). 7. K. Hornberger et al., New J. Phys. 11, 043 032 (2009).

Host: Melanie Schnell - CFEL Molecular Physics seminar