Max-Born-Institut

Institutskolloquium

Am Mittwoch, **12. Mai 2004 um 16:00 Uhr** spricht:

Dr. Pierre Agostini
CEA, Saclay, z.Zt. MBI

über

„Attosecond pulses from high harmonics“

Attosecond light pulses can be synthesized by superposing several high harmonics of an intense laser pulse. At first glance, increasing their number, or the total bandwidth, should result in shorter pulses with no limit. The harmonic phases[1] and the timing[2] of the XUV emission can be obtained from a measurement based on two-photon, three-color ionization. Instead of a purely linear spectral phase, a recent experiment [3] found that the high harmonics have a small quadratic term. In other words harmonics are not synchronized on an attosecond time scale but emitted, with respect to the pump laser optical cycle, with a delay which increases with the order. Systematic investigations of the quality of the phase-locking versus the experimental conditions and the region of the spectrum in which harmonics are selected have been carried out [4]. They show that the optimized conditions for the production of a clean attosecond pulse train with the shortest pulse duration are: generation at high enough laser intensity, but below the saturation intensity, selection of a group of harmonics at the end of the plateau and in the cutoff region due to the rapidly decreasing amplitudes, selection of only the cutoff harmonics does not give the shortest pulses. Moreover, spatial selection of the short quantum path provides robust experimental conditions with respect to the laser focus/gas jet relative position. It is shown that after optimisation a train of pulses as short as 130 as can be obtained.
[1]P M Paul et al Science 2001 ; [2] C. Dinu et al PRL 2003 ; [3]Y. Mairesse et al Science 2003 ; [4] Y. Mairesse et al. in preparation

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Interessenten sind herzlich eingeladen.

Prof. Dr. W. Sandner

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