Dream Beams Symposium

to be held at Max-Planck-Institute for Quantum Optics, Garching, February 26 – 28, 2007
local organizers: J. Meyer-ter-Vehn , M. Geissler, F. Gruener
international board : S. Bulanov, J. Hajdu, T. Mendonca, K. Mima, W. Mori, P. Mora, A. Pukhov, H. Ruhl, C. Schroeder, Y. Sentoku, Zh.M. Sheng, T. Tajima, M. Zepf.

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The ***Dream Beams Symposium*** is to discuss the physics (theory and simulation) of ultra-bright table-top particle and photon sources, driven by a new generation of few-cycle laser pulses with TW - PW power. Recent achievements[1,2] in generating e.g. GeV-range electron beams[3] and keV-range laser harmonics from solid surfaces[4] were anticipated by theoretical predictions[5-8]. Here we invite leading theorists to assess the relativistic laser matter interaction and the required simulational tools for the next steps aiming at

(1) brilliant multi-GeV electron beams to drive table-top XFELs for coherent X-ray sources and new medical diagnostics,

(2) sub-MeV few-fs electron pulses for diffraction imaging of bio-molecules,

(3) ion beams adequate for radiation therapy,

(4) attosecond light flashes from relativistic mirrors for ultrafast control and high-field physics (Schwinger limit[9,10], Unruh radiation, etc.)

(5) and corresponding high laser harmonics far in the X-ray regime.

At MPQ the primary lasers are presently developed by F. Krausz and his group to serve a user community mainly located at Munich universities, Max-Planck Institutes and Industry, forming the new Munich Center of Advanced Photonics (MAP). The envisioned secondary beams go beyond the present state of the art, and it is acknowledged that broad theoretical support is needed. The symposium wants to initialize a network of cooperations and new local theoretical activities. Experimental overview talks will be also included.

J. Meyer-ter-Vehn

For participation and contributions please contact meyer-ter-vehn@mpq.mpg.de .

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4. B. Dromey, M. Zepf, et al., Nature Phys. 2, 698 (2006): High harmonic generation in the relativistic limit.
5. T. Tajima, J. Dawson, Phys. Rev. Lett. 43, 267 (1979): Laser electron accelerator.
6. E. Esarey et al., IEEE Trans. Plasma Sci. 24, 252 (1996) : Overview of pasma-based accelerator concepts
7. A.Pukhov, J.Meyer-ter-Vehn, Appl. Phys. B74,355(2002): Laser wakefield acceleration etc.
8. T. Baeva, S. Gordienko, A. Pukhov, PRE 74, 046404 (2006): Theory of high-order harmonic generation etc.
9. S.Bulanov, T.Esirkepov, T. Tajima,PRL 91, 085001 (2003): Light intensification towards the Schwinger limit.
10. S. Gordienko, A. Pukhov et al., PRL94,103903 (2005): Coherent focussing of high harmonics.