



Physikalisches Kolloquium

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**»MAP's path towards table-top free-electron-lasers
from first steps to the ultimate goal of medical applications«**

Einführung: T. Baumbach

One of the key projects within the Cluster of Excellence "Munich-Centre for Advanced Photonics" (MAP) is the realization of a table-top free-electron-laser (FEL). In general, FELs are the world's most brilliant light sources allowing totally new experiments, such as "4D imaging" in the X-ray range like single molecule imaging. Owing to the immense size and costs, world-wide only a few X-ray FELs are planned and only a few VUV FELs are in operation. These large-scale FELs are based upon conventional electron accelerators. In contrast, we propose to utilize laser-plasma accelerated electrons with their unprecedented high peak currents. In principle this allows to shrink the size of an FEL down to meter-scale instead of tens or hundred of meters. In this talk the principle possibility is discussed as well as the milestones planned on the path towards the first proof-of-principle experiment. The potential of such future table-top FELs is immense as their smaller size and higher photon energies reachable than in case of large-scale XFELs would even allow the usage in hospitals for medical applications (such as phase-contrast imaging for mammography). An overview of medical applications and their requirements is given. We have already started constructive cooperations, including scientists working on conventional FELs, showing that MAP's approach is not isolated but meanwhile embedded in the FEL as well as laser-plasma accelerator community. For defining the requirements of future medical applications we have initiated an experimental campaign at the ESRF synchrotron facility together with the radiology of LMU.

Freitag, 25.01.2008, 17 Uhr c.t.,

**Universität Karlsruhe (TH), Otto-Lehmann-Hörsaal, Physik-Flachbau (Geb. 30.22).
Anschließend Nachsitzung im Gastdozentenhaus „Heinrich Hertz“**