FAKULTÄT für PHYSIK
LUDWIG-MAXIMILIANS-UNIVERSITÄT
MÜNCHEN/GARCHING

PHYSIK-DEPARTMENT
TECHNISCHE UNIVERSITÄT MÜNCHEN
MÜNCHEN/GARCHING

MLL-KOLLOQUIUM

Donnerstag, 12.01.2017, 16^{15} Uhr

Hörsaal der LMU in Garching, Am Coulombwall 1
Treffen zum gemeinsamen Kaffee 16 Uhr

Dr. Klaus Achterhold

(Physik Department, TU München)

The Munich Compact Light Source: how it works and first results

X-rays are used for diagnostic and treatment of diseases since the beginning of the year 1896, only a few months after Conrad Roentgen discovered them. Already Roentgen sought after high intensities: '... Judging by my experience up to now, platinum is the best for generating the most powerful X-rays...' [1]. To overcome heating limitations, Philips introduced, already in 1929, a rotating anode tube, the Rotalix Metalix. The trend to even higher flux in the X-ray energy regime led to the first parasitic use of synchrotron radiation in 1964 at the 6-GeV Deutsches Elektronen-Synchrotron (DESY) in Hamburg. Nowadays third generation synchrotrons like APS, ESRF, Spring8 and PETRA III, produce high brilliant X-rays with insertion devices like wigglers and undulators for use in an uncountable number of research areas. Drawbacks of synchrotrons are their running costs of more than 100 million EUR per year and their sizes with circumferences of nearly 1000 m, not feasible for universities, clinics, companies or museums.
The 'Munich Compact Light Source' (MuCLS) is the first commercially sold, lab sized compact synchrotron, which produces monochromatic X-rays by inverse Compton scattering of IR photons at relativistic electrons. With a brilliance of a few orders of magnitude higher than that of rotating anode devices and comparable to that of bending magnets at modern synchrotron sources, it is preferable, because it is available for every days use. The X-ray energy has a monochromaticity of about 3% and is tunable between 15 keV and 35 keV with a field of view of up to 7 cm in 16 m distance, appropriate for small animal models and clinical specimens [2].
In the talk, the physics and technical aspects of MuCLS are discussed. First results of biomedical imaging experiments obtained at TUM are presented.

[1] W.C. Roentgen, A new form of radiation, Science (1896) 72, 726-729
[2] E. Eggl, M. Dierolf, K. Achterhold, C. Jud, B. Guenther, E. Braig, B. Gleich and F. Pfeiffer, The Munich Compact Light Source: initial performance measures, J. Synchrotron Rad. (2016) 23, 1137-1142, http:dx.doi.org10.1107S160057751600967X

gez. Peter Thirolf
Tel. 289-14064

gez. Norbert Kaiser
Tel. 289-12367