The Munich Compact Light Source:

Performance upgrades and biomedical research

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In recent years, many concepts for compact synchrotron sources have been proposed. One of them is the Munich Compact Light Source (MuCLS), developed by Lyncean Technologies [1] and installed at the Munich School for BioEngineering. With brilliance in the gap between x-ray tubes and classical synchrotrons [2], the parameters of the MuCLS make it well-suited for various applications in biomedical imaging [3-6].

Here we present the aspects addressed during a recent upgrade of the source in order to increase stability, as well as x-ray flux and discuss the resulting new source parameters. X-ray production at the MuCLS is based on inverse Compton scattering, thus one key component of the upgrade is a new laser amplifier which has been integrated into the laser system, in combination with additional active thermal stabilization pushing x-ray flux to >3e10 ph/s, i.e. more than double the initial value [2].

The x-rays are guided to two end-stations equipped with set-ups for imaging which apply complementary techniques adapted for different time scales, sample sizes and spatial resolution. This enables us to study many topics of biomedical interest. Since installation of the source, we performed studies on angiography [5], detection of micro-fractures, phase-contrast imaging applied to mammography, as well as small animal respiratory imaging [6]. We will introduce the different experimental set-ups available at the MuCLS and present our research in aforementioned areas.

References:
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