**Comparison of CCD and sCMOS detector for submicron resolution in lab-based X-ray Computed tomography.**

Tomas Zikmund1, Dominika Kalasova1, Adam Brinek1, Peter Oberta2, Martin Horvath2, Yoshiro Takeda3, Kazuhiko Omote3, Ladislav Pina2, Jozef Kaiser1

1CEITEC - Central European Institute of Technology, Brno University of Technology, Czech Republic

2Rigaku Innovative Technologies Europe, s.r.o., Czech Republic

3Rigaku Corporation, Japan

tomas.zikmund@ceitec.vutbr.cz

Abstract:

The sensors used in X-ray computed tomography (CT) machines are amorphous silicon (α-Si) flat panels, complementary metal–oxide–semiconductor (CMOS) or charge-coupled device (CCD) sensors. The two last sensors are used in high resolution CT devices for their smaller pixel size and absence of image lag.

Utilization of detectors with pixel sizes of several hundred nanometers significantly improves detectability of CT system at sub-micron resolution even for a laboratory-based CT like Rigaku Nano3DX using the Mo, Cu, Cr rotatory target and being able to reach down to 0.27 µm voxel resolution.

The purpose of this study is to compare the performance of a CMOS-based detector with a CCD-based detector for nano CT measurement at Nano3DX in terms of image quality and scanning time. The feasibility of CMOS detector for 4D scanning will be considered. This is going to be demonstrated on selected samples from material and life sciences.

Acknowledgements:

This research was carried out under the project CEITEC 2020 (LQ1601) with financial support from the Ministry of Education, Youth and Sports of the Czech Republic under the National Sustainability Programme II.