Innovation with Integrity

BRUKER MICRO-CT ACADEMY

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Welcome

Welcome to the second issue of the Bruker microCT Academy Newsletter in 2015. This edition will focus on the relationship between a sample diameter and the resulting image pixel size. Another dimension is added to this by the two cameras in the multi-scale laboratory SkyScan 2211. The attached method note explains the important consequences of truncated scanning and what that means for your microCT data.

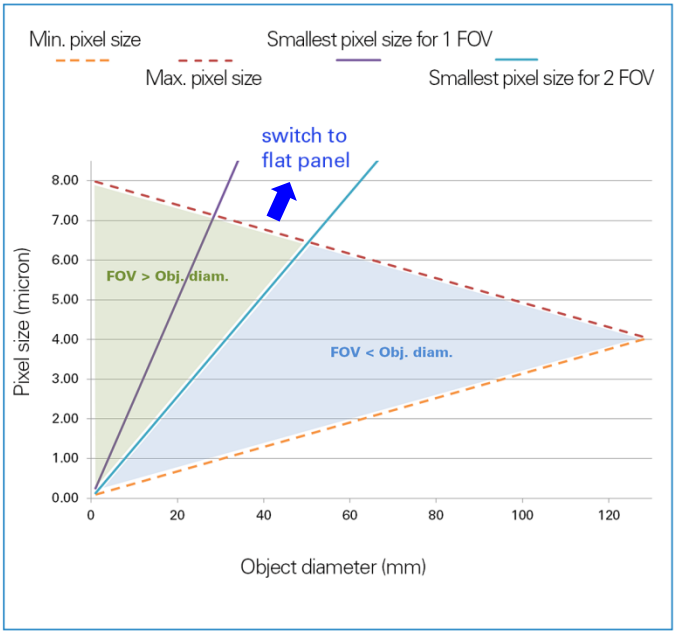
The deadline for paper submission for the Bruker microCT User Meeting 2015 in Bruges is approaching, only two more weeks until 2 March 2015! Find out more in the news section!

What image pixel size can I scan my sample?

For any sample with a given dimension, the resulting image pixel size depends on the system geometry, as well as the application. The attached method note '*MN066_What image pixel size can I scan my sample*' explains both concepts in more detail.

The principle of computed tomography relies on accounting for all attenuation coefficients of all the material in the beam path. When material is outside the field of view (=truncated scanning), it contributes to the attenuation only in certain angles and not others. This leads to a misrepresentation of the greyscale value in the CT image. While you can do this to gather qualitative information, an important consequence is that in a truncated scan there is no quantitative measure of the amount of absorbed X-rays, and hence no density information. While morphometric analysis can also be performed on truncated scans, density measurements require scanning within the field of view of the camera.

The resulting image pixel size then further depends on the system geometry: camera pixel size, and the distances between camera, object and source,… A smaller pixel size can be achieved by moving the sample closer to the source. Zooming in even more can be done by means of offset scanning, where the camera moves horizontally in two positions and resulting images are stitched together automatically. The highest resolution can be achieved by eventually moving into the region of truncated scanning. Even more, the concept of adaptive geometry is explained which is facilitated in the SkyScan 1172, 1272 and 2211.



How to achieve the highest possible resolution? Image pixel size versus object diameter for the CCD in the multi-scale laboratory Skyscan 2211.

Bruker microCT News

First Installation of Grating Phase-Contrast Micro-CT: The SkyScan-1294 desk-top phase-contrast X-ray microtomograph includes a specially designed microfocus X-ray source, an 11 megapixel cooled X-ray camera and a precise three-grating Talbot-Lau X-ray interferometer for simultaneous extraction of absorption contrast, differential phase contrast and dark-field (scattering) images. It can obtain co-registered 3D reconstructions of all these listed modalities using provided software for both GPU-accelerated reconstruction and the worlds' fastest hierarchical InstaRecon® reconstruction (reconstruction time for full volume in 1K format is 10-20 seconds or several minutes for full volume in 2K and 4K formats).

Paper submission deadline for the Bruker microCT User Meeting 2015 is approaching! The deadline for abstract submission is March 2nd. Download the abstract template.

Authors of the abstracts which will be selected for oral presentations are rewarded with three nights of hotel accommodation by Bruker microCT. Selected poster presentations receive one night!

Upcoming Events

Bruker microCT will participate with an exhibit in the forthcoming conferences. Please click the links for more information. We hope to see you there!

AADR	Mar. 11-14	Boston, USA
EMIM	Mar. 18-20	Tübingen, Germany
ORS	Mar. 28-31	Las Vegas, USA
AACR	Apr. 18-22	Philadelphia, USA
ECTS + IBMS	Apr. 25-28	Rotterdam, the Netherlands
ISBM	Apr. 27-29	Tokyo, Japan
ATS	May 15-20	Denver, USA
INTERPORE	May 18-21	Padova, Italy

Image of the Month

Volume rendering (left) image of a mouse lung visualizing the vasculature. A tumor in the center of lung is clearly visible and necrotic areas inside the tumors as well as neovasculature can be observed using Maximum Intensity Projection images (MIP) (right) in CTVox. The mouse lung was fixed and chemically dried using HMDS; scanned using the SkyScan 1272 at 10µm pixel size.