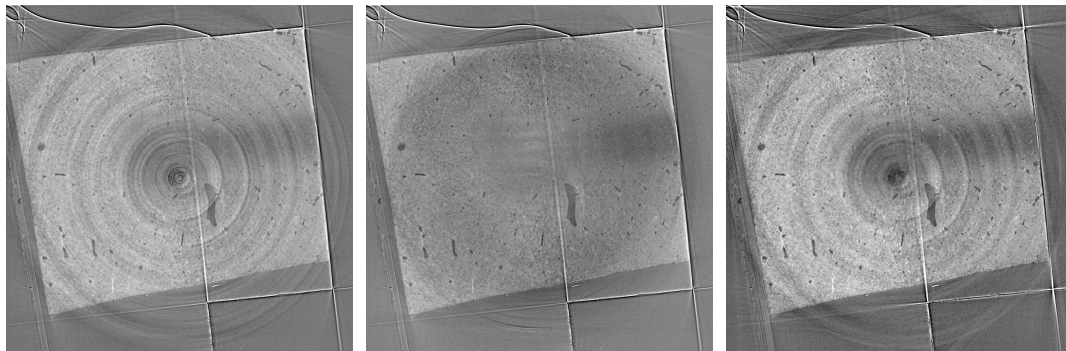# Problem APS05: Tomography with high energy broad X-ray spectrum

| (a) | (b) | (c) |

(a) ring removal off, (b) using (1), (c) using (2) with with nblocks: 0 alpha: 1.5
Sample is APS_2_BM_04

Challenge:

Fast fly scan, CMOS detector, high X-ray flux at high energies allows for tomography of dynamic systems i.e. to collect multiple full size tomographic data sets per second and generate 3D movies of evolving samples. When collecting tomographic data of fast evolving samples the data collection is set the highest speed required to capture the phenomena of interest that is still compatible with sample and its environment and is some cases broad X-ray radiation spectrum is used instead of monochromatic beam leading to hardening artefact.

Motivation:

Perform fast tomographic scan of weakly absorbing sample with broad X-ray energy spectrum and generate good quality reconstruction.

Previous work / relevant literature:

   (1) Optics Express, Vol 17(10), 8567-8591(2009)
   (2) J. Synchrotron Rad. (2014). 21, 1333–1346

Example dataset :

Raw data and tomoPy script location to generate the reconstruction in figure:
        ftp://ftp.xray.aps.anl.gov/pub/tomo-databank/Lorentz/aps/hardening

Projection data details

Data File Name: APS_2_BM_04.h5
Sample Name: Soft tissue
Instrument: APS 2-BM microCT
Energy: wide spectrum 60-70 keV
Scan Range: 180 degree
Scan Type: Fly Scan
Scan Speed: 0.75 deg/s
Shutter Mode: Rolling

Scintillator: 10umLuAG
Number of Projections: 2000
Dark Fields: 10
White Fields: 10 pre-scan
Detector: PCO edge
Exposure Time: 100 ms
Pixel size: 2.2 um/pixel
Magnification: 10x
Sample to detector distance: 90 mm
Rotation axis location: 1275

Note: if using this data set in a publication please contact:
Francesco De Carlo: decarlo@aps.anl.gov
for proper sample owner and facility credits.