

Prodis GOS X-Ray Detector Characterization for estimation hw capabilities with the aspect of use in CT



ПРОДИС.НДТ
ПРОМЫШЛЕННЫЕ ДИАГНОСТИЧЕСКИЕ СИСТЕМЫ И ТЕХНОЛОГИИ

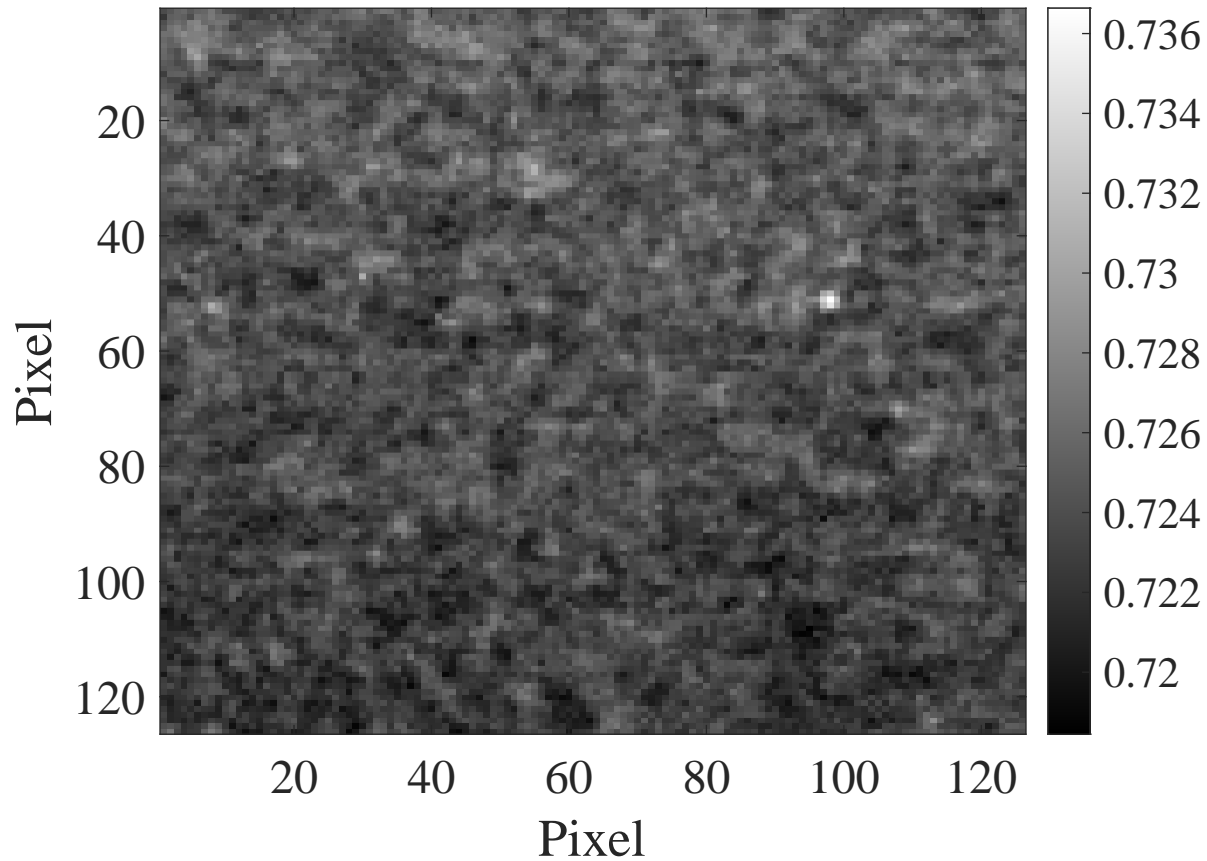
28-Jan-2021

Chapter 1. ROI stat

Table 1.1. Configuration

SDD	448.4 mm
HV	120 kV
Current	50 mA
Exposure	450 ms
ROI shots number	1000
FFC avg	200
ROI size	100x100

[al-1mm] Flat-Field Corrected projection in att. ratio



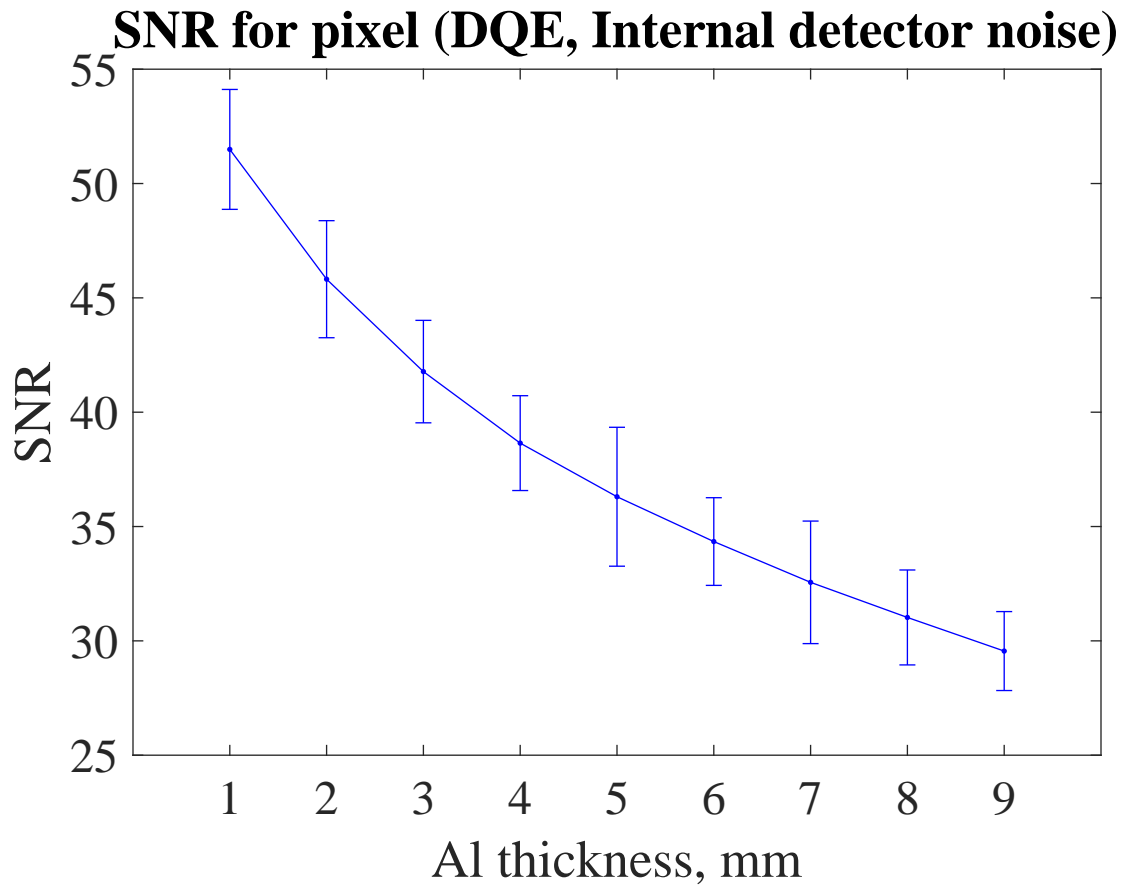


Figure 1.1. SNR is calculated as division of the signal by its deviation. In the same conditions can be compared with other detectors.

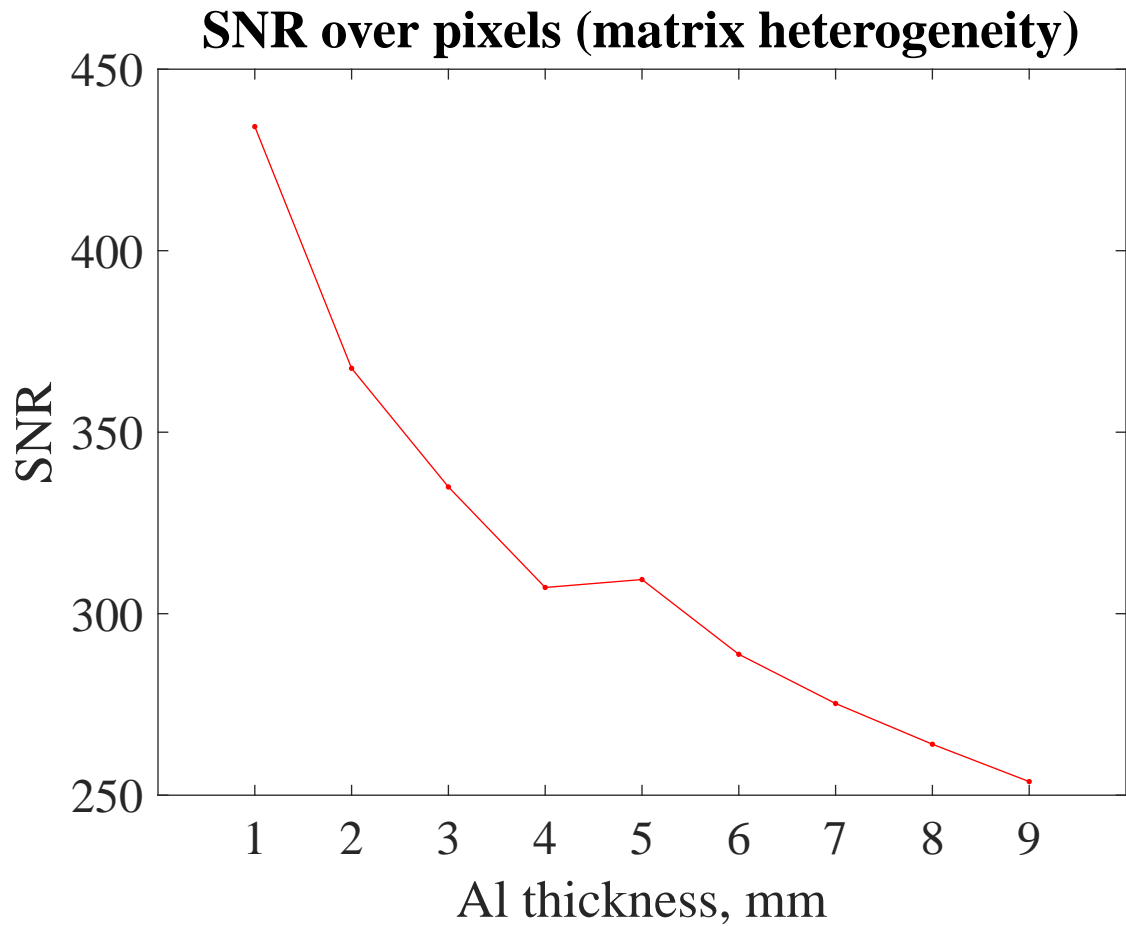


Figure 1.2. One of the most important characteristic for CT. It estimates fundamental detector heterogeneity over pixels. Its impossible to get CT image with noise less than this characteristic, because averaging doesnt effect on it. The calculation process involves gathering huge statistics such that poisson noise implied not affecting the result. Then STD over pixels is calculated using the same spectrum conditions for them.

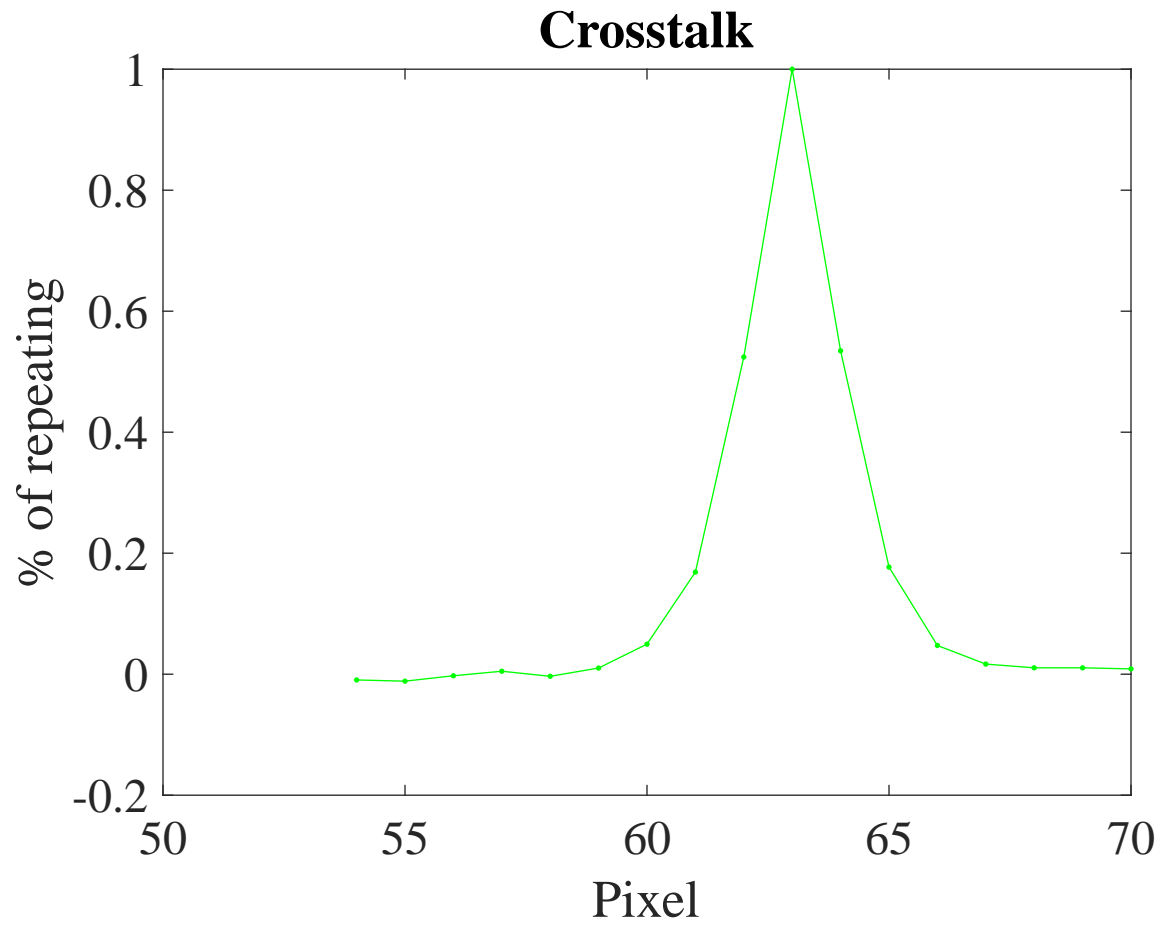


Figure 1.3. Crosstalk is calculated by stat analyse. It effects on binning effeciency as well as on spatial resolution.

Chapter 2. Full frame stat

Table 2.1. Configuration

SDD	448.4 mm
HV	120 kV
Current	50 mA
Exposure	450 ms
Shots	30 for stability, 5 for "x2 current test"
Avg	100
FFC avg	200

Table 2.2. Full frame stats

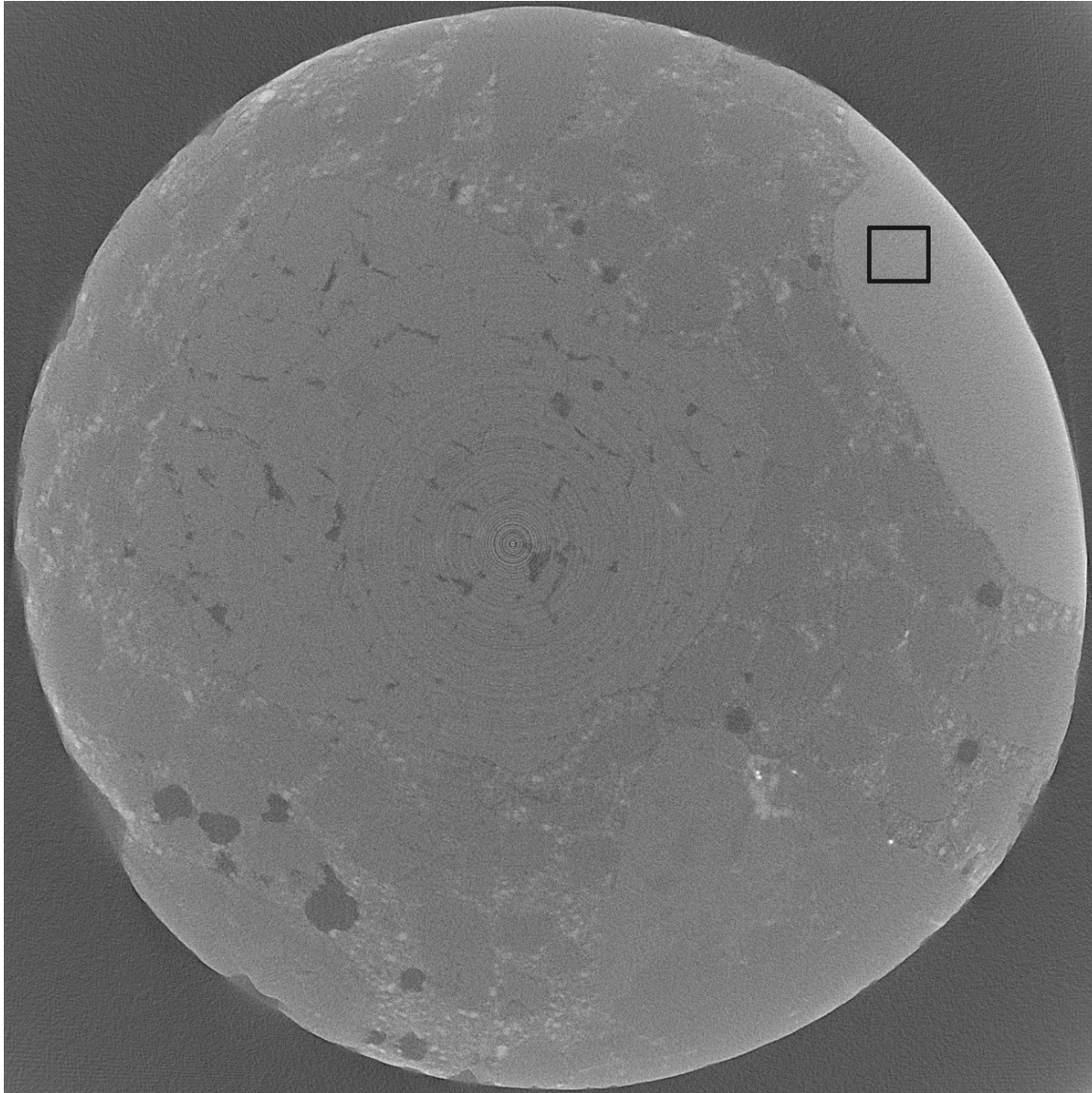
Dead pixels (<0.5mean)	1521 (0.0056 %)
Hot pixels (>1.5mean)	298 (0.0011 %)
Heterogeneous pixels (>0.1meanR)	426 (0.0016 %)
Instability pixels (>0.03range/mean for 50 shots, 70s each)	319093 (1.1824 %)
Instability pixels x2 current test (>0.01 change)	527685 (1.9554 %)

Chapter 3. Tomography

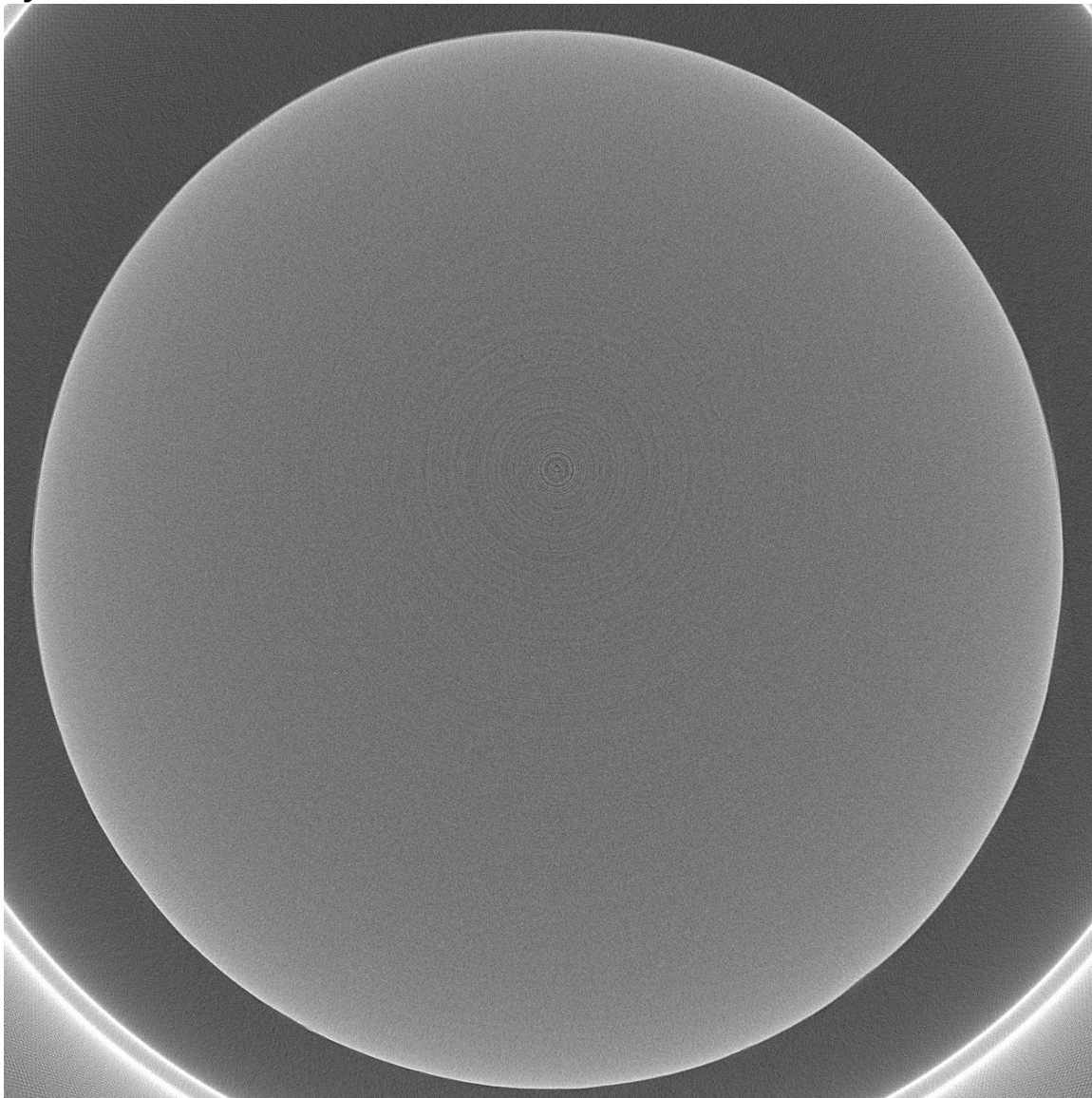
Table 3.1. Medium quality configuration

SDD	448.4 mm
SID	32.49 mm
M	13.8
Vox Size	3.57 um
HV	120 kV
Current	50 mkA
Focus size	Small (8 um)
Exposure	450 ms
Shots	720
Rotation Step (deg)	0.5
Avg	10
FFC avg	200
Preprocessing	ffc

Concrete. mean 0.2572 STD 0.0621 (24.16 %)



Cylinder. mean 0.2081 STD 0.0558 (26.82 %)



Implants. mean 0.3426 STD 0.0855 (24.96 %)

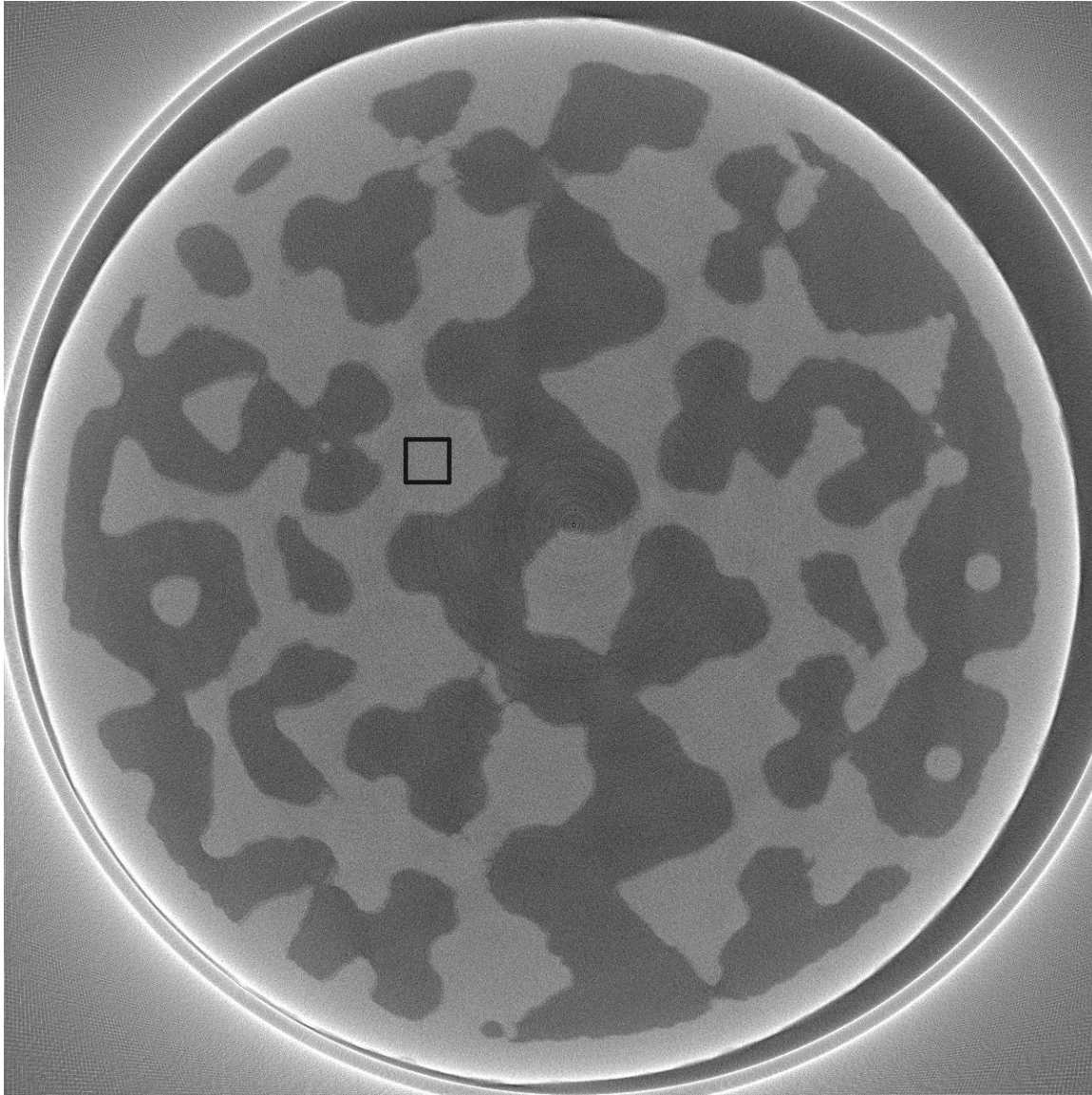


Table 3.2. High quality configuration

SDD	448.4 mm
SID	20.13 mm
M	22.27
Vox Size	2.22 μm
HV	70 kV
Current	50 mA
Focus size	Small (5 μm)
Exposure	3000 ms
Shots	1200
Rotation Step (deg)	0.3
Avg	5
FFC avg	200
Preprocessing	ffc

Concrete. mean 0.3364 STD 0.0667 (19.84 %)

