サブテーマ名
小型高輝度X線発生装置を用いた X線位相イメージング法の開発

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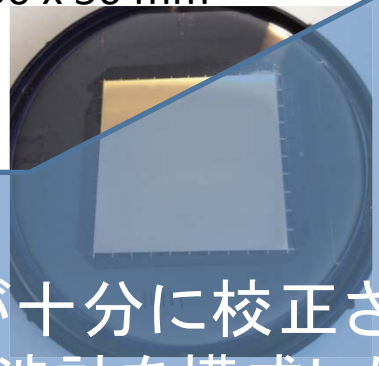
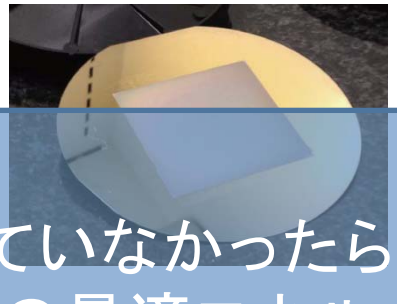
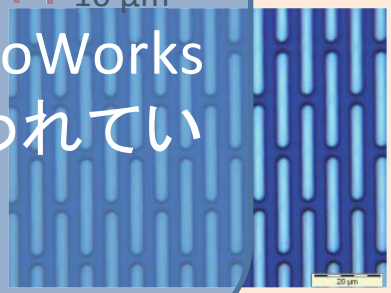
Grating Parameters

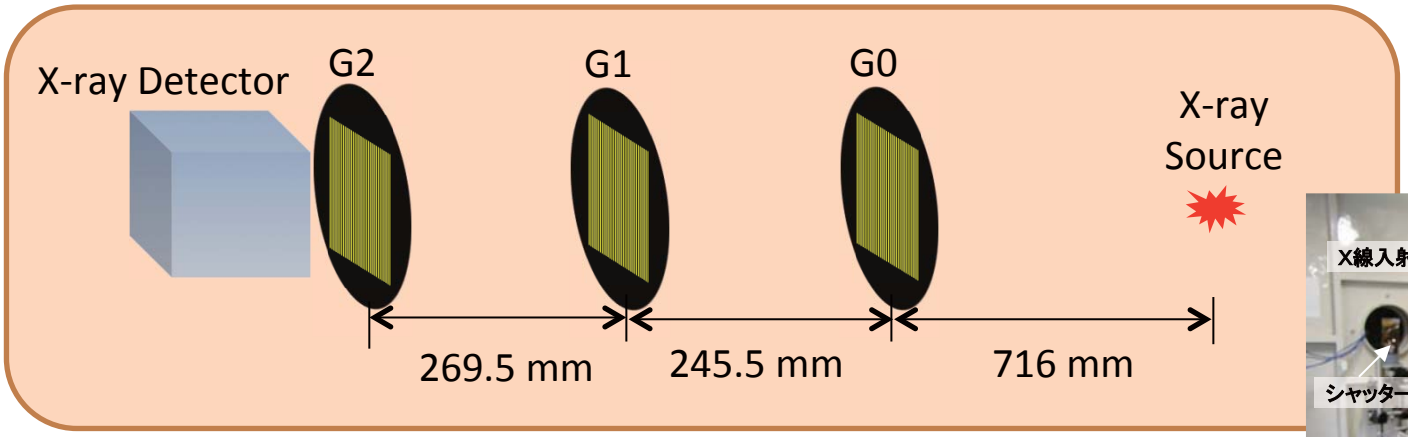
Grating Type	Source Grating, G0	Phase Grating, G1 π/2 phase shift at 30 keV	Analyzer Grating, G2
Material	Au	Ni	Au
Period (μm)	6.82	3.57	7.49
Structure Height (μm)	Design: 70 Measured: >70 +-10%	Design: 5.23 Measured: 5.34 +- 0.35	Design: 100 Measured: 103
Grating on 4-inch Si wafer	50 x 50 mm^2 	50 x 50 mm^2 	Diameter: 70mm 
Structures	 SEM	 SEM	

高さが十分に校正されていなかったらしく、Talbot-Lau干渉計を構成した際の最適エネルギーが25keV近辺であることがわかっている。ドイツ・MicroWorks社では、プロセス改善の上で作り直しが行われている。

X-ray Talbot-Lau Interferometer

X-ray Source	Hamamatsu Photonics Micro-focus Source (Large focus mode) Source size: 300 µm Tube Voltage: 50 kV Tube Current: 300 µA
X-ray Detector	Area Detector: 40 µm GOS scintillator connected to CCD Camera via fiber coupling (Spectral Instruments) Pixel size: 18 µm Sensor Size: 3800 x 3800 pixels^2 (68.4 x 68.4 mm^2)
Design Energy	25 keV

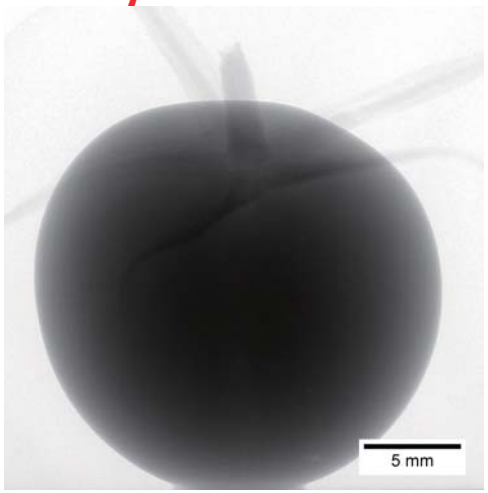
XTLI Set-up



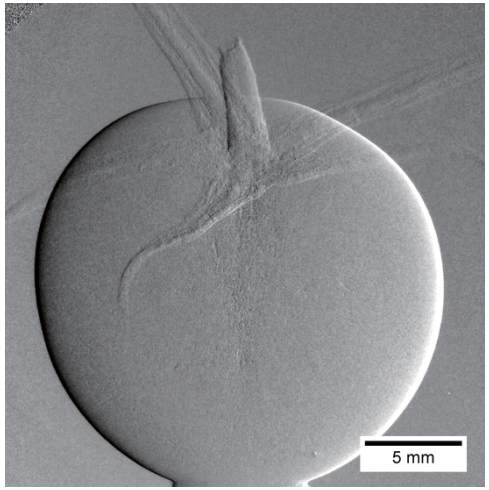
Demonstration Imaging

Total Exposure time : 30 min

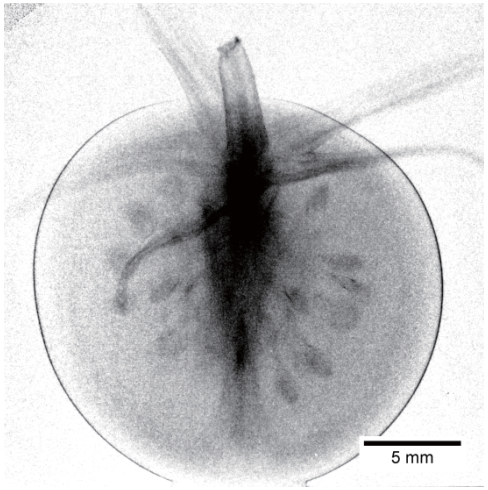
cherry tomato



Transmission
Gray Scale: [0.3, 1]

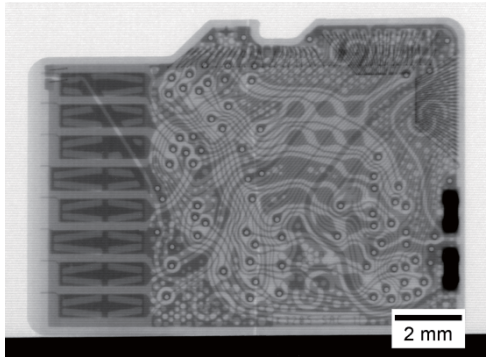


Differential Phase
Gray Scale: [-0.4, 0.4 rad]

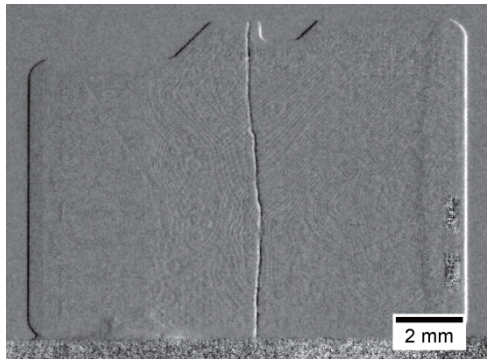


Visibility Reduction
Grayscale: [0.6, 1]

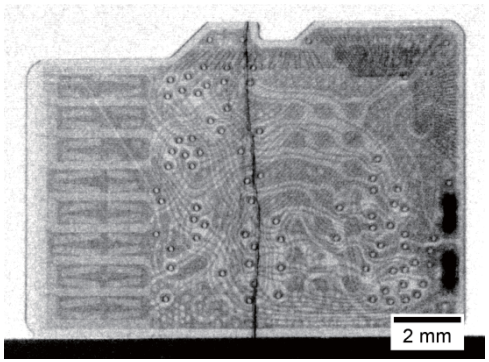
crack in a micro SD card



Transmission
Gray Scale: [0.3, 1]



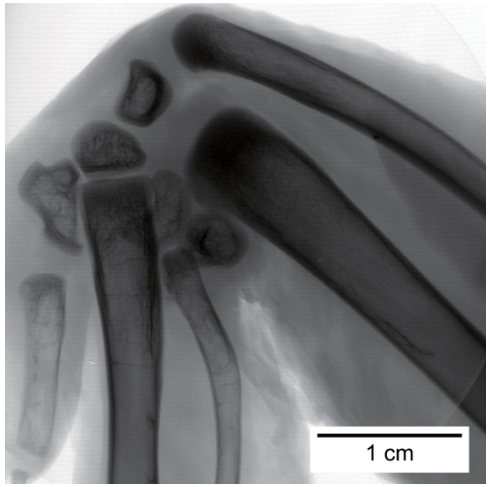
Differential Phase
Gray Scale: [-0.4, 0.4 rad]



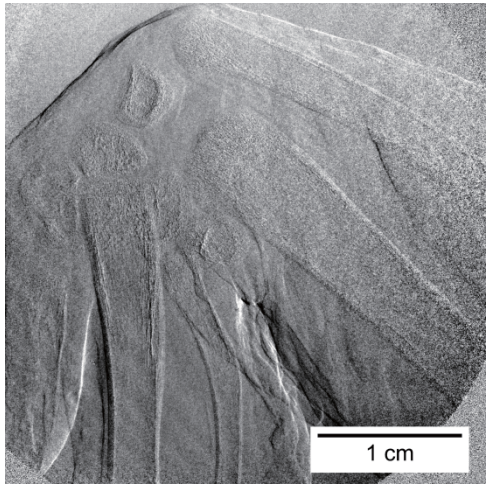
Visibility Reduction
Grayscale: [0.6, 1]

Demonstration Imaging

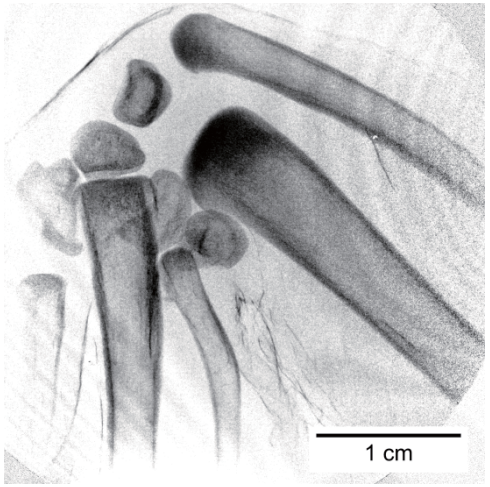
chicken wing



Transmission
Gray Scale: [0.3, 1]



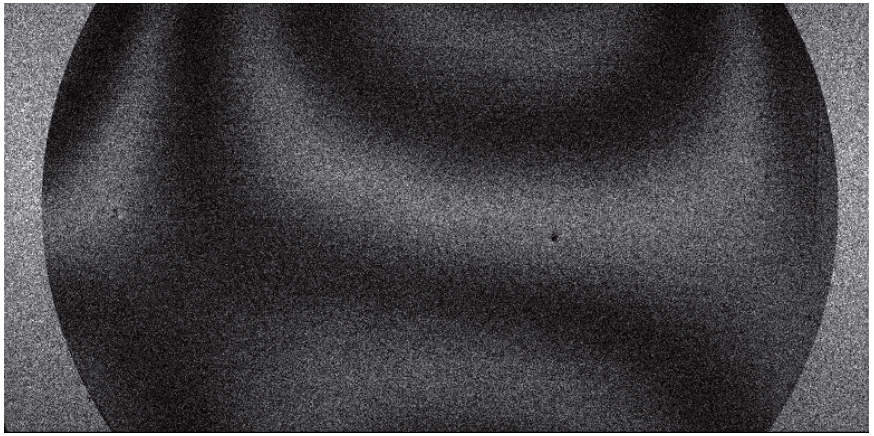
Differential Phase
Gray Scale: [-0.4, 0.4 rad]



Visibility Reduction
Grayscale: [0.6, 1]

位相敏感スキャナ実証機（JST-SENTAN）への装着実験

- 管電圧40kV、管電流40mA
- 30keV最適格子配置



10 ms/frame (100 fps)

6 mm/sで動く試料のモアレ動画像