

New X-ray CCD detector for very low dose fluoroscopy imaging

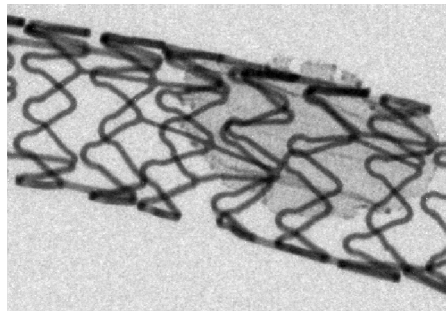
Photonic Science delivers a new generation of X-ray EMCCD detectors with built in photonic amplification for low dose X-ray radiography and fluoroscopy imaging

When indirect detection is used, fibre optic coupling is the most efficient way of collecting light emitted from the absorption of X-rays into a scintillator.

Using a structured scintillator allows to keep good resolution > 10 lp/mm whilst covering a good energy range from 50 up to 130 kV typically.

The signal contribution from each absorbed quantum is often buried in the quantisation noise of the detector. Addressing this problem requires built in on chip signal amplification, which allows to lift the signal contribution above the read out noise of the detector. A moderate gain of > 20 makes the detector shot noise limited as opposed to read noise limited.

Good frame rate can be achieved by multiplexing sensors and data output in order to cut the scanning time. There is no dead period associated with read out time, 100% duty cycle operation.



Display of asymmetric stent, which consists of a stainless steel mesh laser welded onto a Guidant TriStar stent (abbott Vascular), 66 kVp

Courtesy Toshiba Stroke Center

Gated respiratory experiments, pre clinical imaging

Photonic Science delivers a new generation of detectors for gated respiratory experiments with enhanced dynamic range.

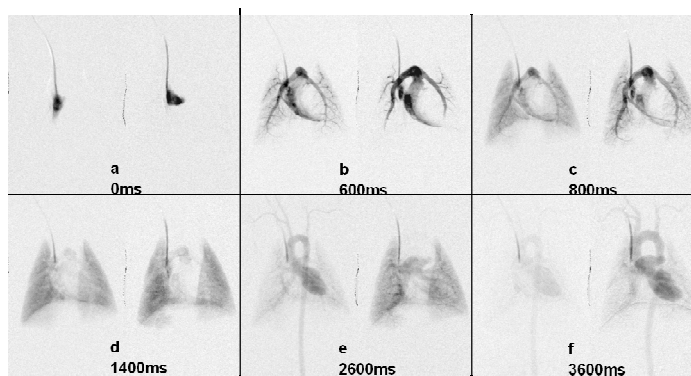
Contrast agents are used in order to monitor cardiac activity of a mouse undergoing various drug injections.

In order to quantify the changes over time, it is important to be able to detect both small as well as large variations without saturation artefacts. Binning, which allows to sum the signal collected between each neighbouring pixels is then used.

This increases the read out speed as well as the overall dynamic range of the detector which can then be used with a pulsed source: typical gating time down to 10ms.

Two detectors can be synchronised together in order to generate stereoscopic view of lungs and heart.

Gated sequences are recorded using a multi thread acquisition routine that allows multiple detector synchronisation with other hardware equipment.



100 micron source 90kV

Courtesy Duke University,
Centre for In vivo Microscopy

Recommended Detectors

X-ray VHR detector

X-ray EM detector

X-ray FDI