Dynamical range (XPAD1)

The current show the counts in two adjacent pixels as a function of the incoming flux on the most exposed pixel using XPAD chips.

XPAD2 calibration and dispersion (1)

Correcting raw image from surface... and merging 2/4 images lead to reasonable one.

Kinetis potentiality of XPAD2

Where electronic designed to allow kinetics studies (the range)

- chip regular / square / overlap
- an-bond memory 32 bit
- exposure time - 5000 ms
- real time for reading - whole image 20 s
- an-bond storage - 421 images - 200 images - 200 images

Images of 16 ms each taken 30 times with imaging... during 1 s. XPAD detector at 20 keV. A fan test can be obtained with energy edge is perfectly separated in each images. Once the image of this fan test is done, this beam shaping creates a... focusing in place [20].

XPAD2 detector : 8 modules x 8 chips

New model of silicon chips - efficiency 6% to 8% energy - 25 element detector

SAXS application (3)

Data have been compared with FDB code - one using the same settings.

Scattering of some samples recorded at BM2/ESRF beamline in 2004

\( E = 13.55 \text{ keV} \) for Se 4.2% and \( I_{\text{DAC}} \approx 1.10^5 \text{ pixels/detector} \approx 4.10^4 \approx 5.10^4 \) geometries 8 x 8 or 2 x 5 8 x 8 and ...

Prototype expected for spring 2006.

Summary

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Detectors & materials sciences scattering

Imaging - X-ray microscopy, X-ray topography, X-ray radiography, Synchrotron - chemical composition (XAS), small angle range (XANES)

Scattering by beam - \( (1/2) \times P_{\text{DAC}} \).

XPAD : pixel detector for material sciences

\( \Delta F \) by Ba,Si,Ca,Cr,Mn,Fe,Co, Ni, Pd, Pt, Re, Os, V, Mo, W.

On BM2/ESRF beamlines in 2004

Very demanding experiments are done these photoncounters to reach the noise with relative photon detector are commonly used.

XPAD : pixel detector for material sciences

A multi elements assembly for X-ray synchrotron radiation measurement

XPAD : pixel detector for material sciences

DAXS application (1)

Data have been compared with FDB code - one using the same settings.

The raw noise achieved with the XPAD detector - the detector electronics are not performing measurement of weak... the signal observed without sample is clearly below with XPAD than with the CCD (horizontal, 75 \( \mu \text{m} \).

Scattering of some samples recorded at BM2/ESRF beamline in 2004

\( \Delta F \) by Ba,Si,Ca,Cr,Mn,Fe,Co, Ni, Pd, Pt, Re, Os, V, Mo, W.

XPAD2 calibration and dispersion (2)

\( \Delta F \) by Ba,Si,Ca,Cr,Mn,Fe,Co, Ni, Pd, Pt, Re, Os, V, Mo, W.

Powder diffraction application (3)

Complete pattern \( \Rightarrow \) Reconstructed Debye-Scherrer fibre -

Resulting 3 counts on Baker

(2) counts on Baker 15 x 15 mm - 2θ fibre x 100 µm x 150 µm - 0.5 mm - 1.5 mm.

\( \sum_{i=1}^{n} \Delta F_{i} \) for a given energy.

\( \sum_{i=1}^{n} \Delta F_{i} \) for a given energy.

Images of 16 ms each taken 30 times with imaging...

from XPAD2 to XPAD3

\( \Rightarrow \) Imaging XPAD chips in SAXS-CMOS 18 bit technology

Or design a new XPAD using 8 bit technology

Prototypes expected for spring 2006.