



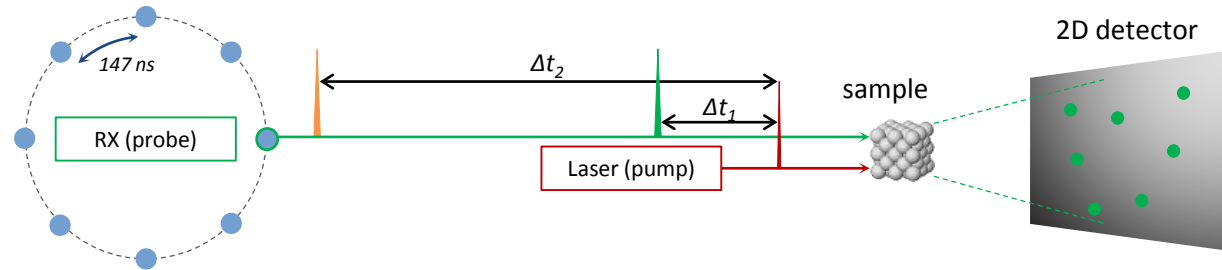
X-ray camera development for time resolved studies at SOLEIL

F. Orsini - IFDEPS 2018 - 12 March 2018



Development of a new camera for time resolved studies

Experiment principle



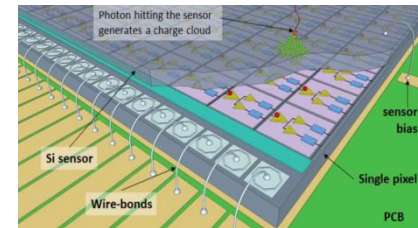
Pump-probe(-probe) experiments

Main requirements for the detector

- Single bunch separation => *min. counting time* ≈ 100 ns
- Synchronization with SR => *gateable*
- 2 probes and 2 images at every probe with 5 kHz laser repetition rate => *20 kfps* (50 μ s)
- Min. working energy 7 keV => *min. threshold* ≈ 3.5 keV
- Detection area : 20×20 mm² min.
- Beamline integration => *Tango controlled*

Hybrid pixels

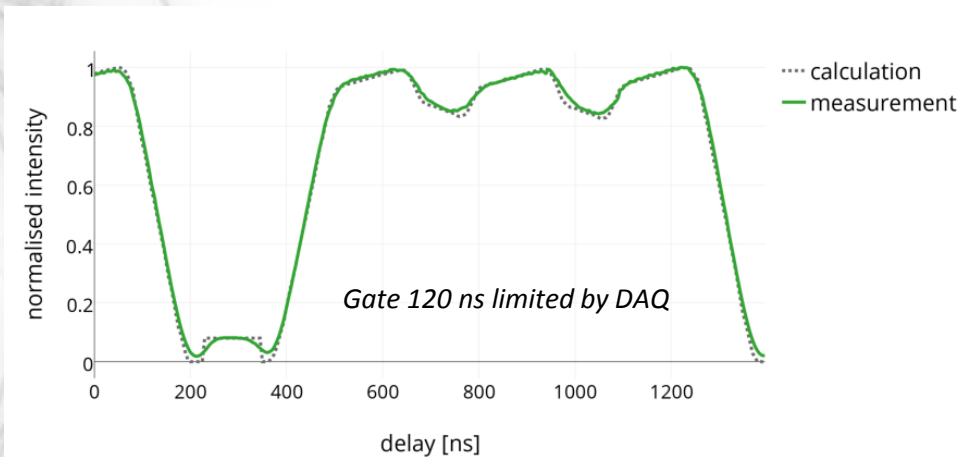
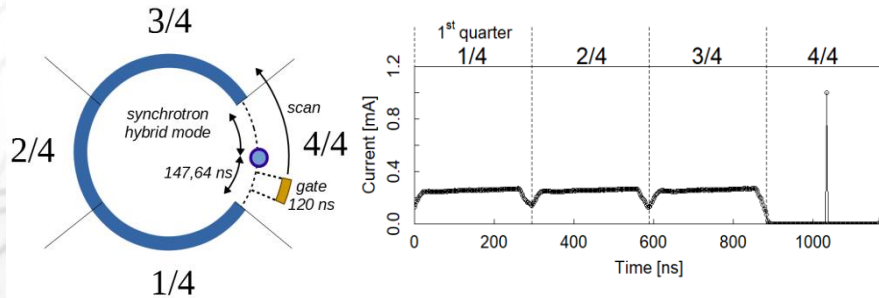
- Chip designed by AGH-USC (Krakow, PL)
- Single photon counting detector
- Pixel pitch = 75 μ m
- 128×256 pixels in a single chip (≈ 32 k)
- Two discriminators
- Two 14 bit counters
- Frames rate up to 50 kHz (2 bit mode)



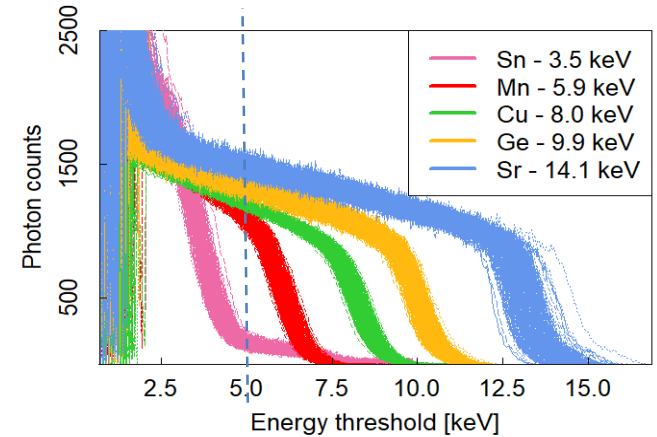
Feasibility tests with 1-chip prototype (2×1 cm²). Tests performed in 2017 on CRISTAL beamline

Single bunch separation capability

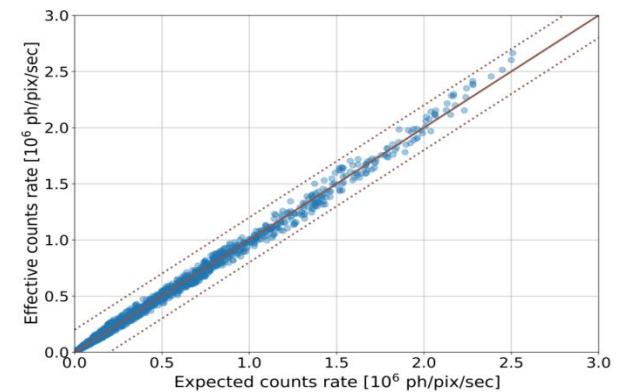
No cooling



Energy scan



Count rate linearity



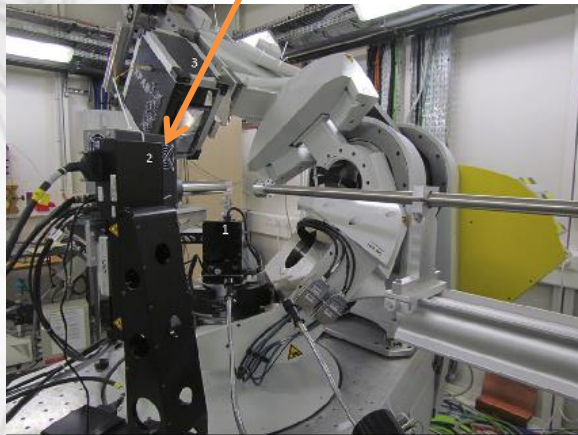
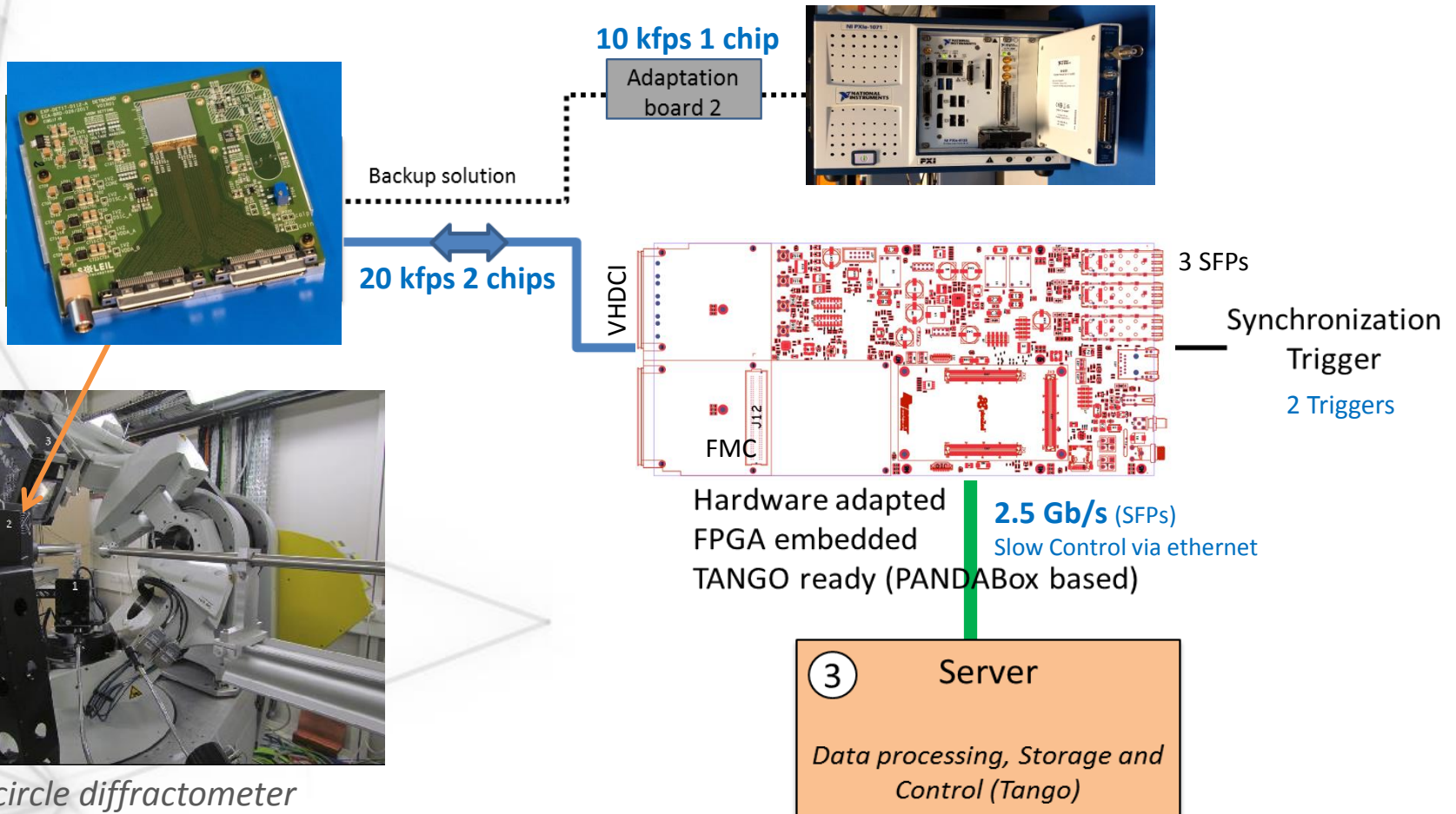
Good linearity up to 2.5×10^6 ph/pix/s

- Temporal resolution ~ 50 ns
- Confirmation of precise isolation of 1 bunch

[A. Dawiec et al., JINST 12 C03057, March 2017]

[A. Koziol et al., JSR 25, february 2018]

2-chip camera prototype under development at SOLEIL



6-circle diffractometer
(CRISTAL)

Installation and Commissioning on CRISTAL → **expected from September 2018**
 Other beamlines interested by the project : **SIXS, ODE** (feasibility tests before summer 2018)

Thank you for your attention