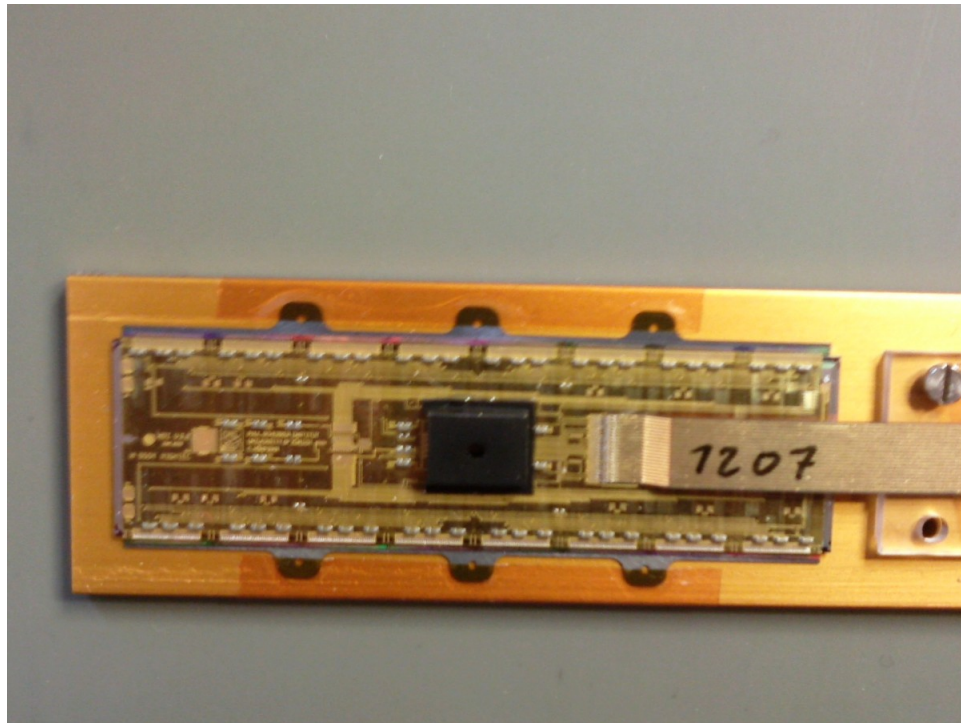


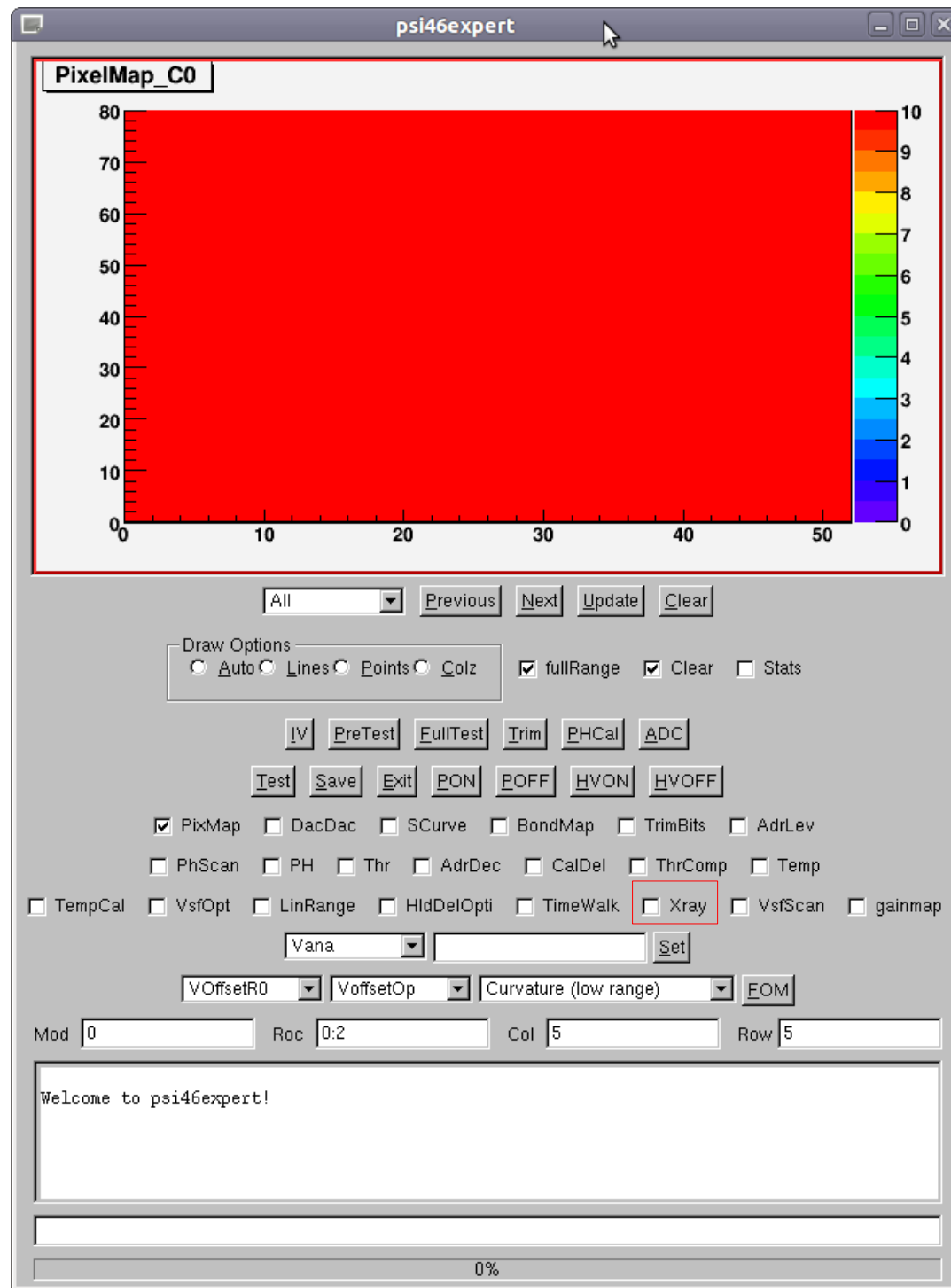
X-ray test

Alexey Petrukhin, DESY
23/03/2012

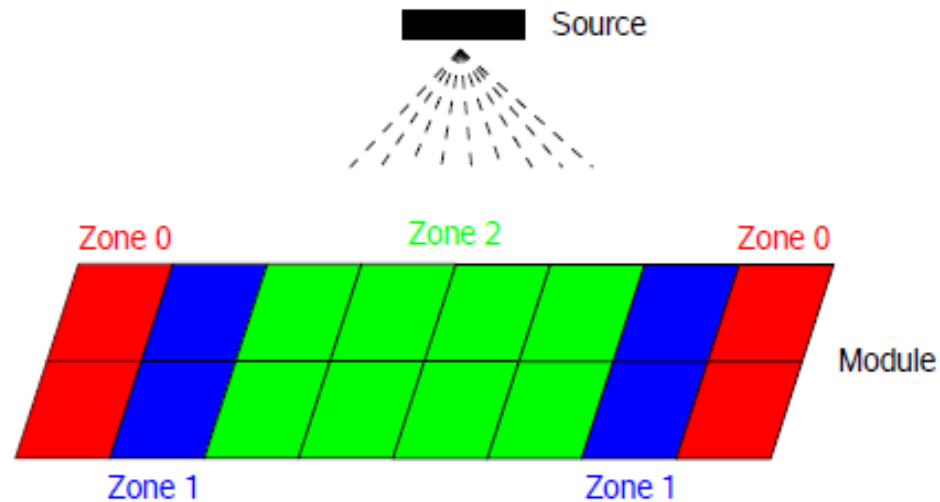


- From the thesis of P. Trueb (ETH/PSI)

GUI



Test setup



- Hit rate is highest for zone 2
- Primary source: Americium-241. X-rays from targets:

Si:

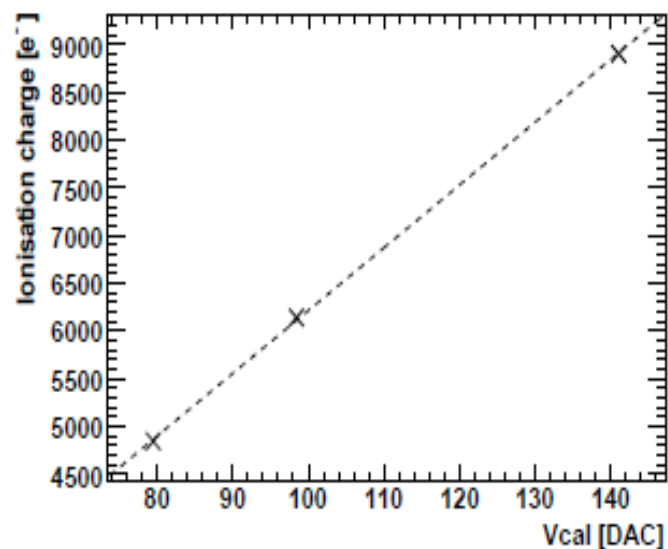
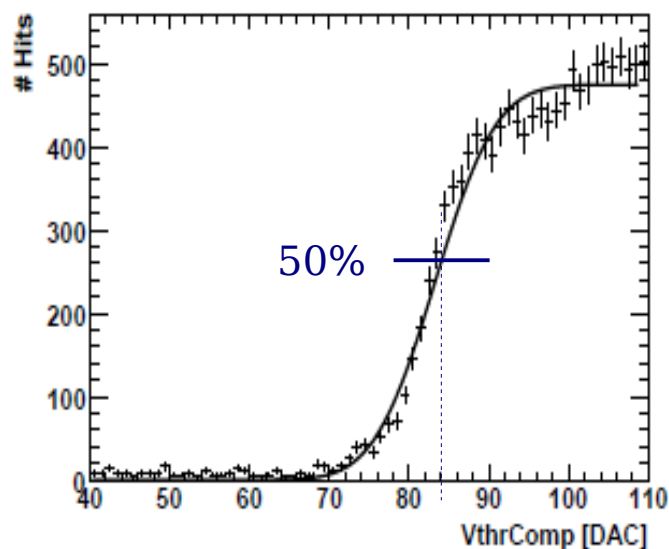
3.6 eV / eh pair

Target	Energy [keV]	Ion. charge in Si [e^-]	Photon yield [$s^{-1}sr^{-1}$]
Mo	17.44	4844	$2.43 \cdot 10^4$
Ag	22.10	6139	$3.85 \cdot 10^4$
Ba	32.06	8906	$4.65 \cdot 10^4$

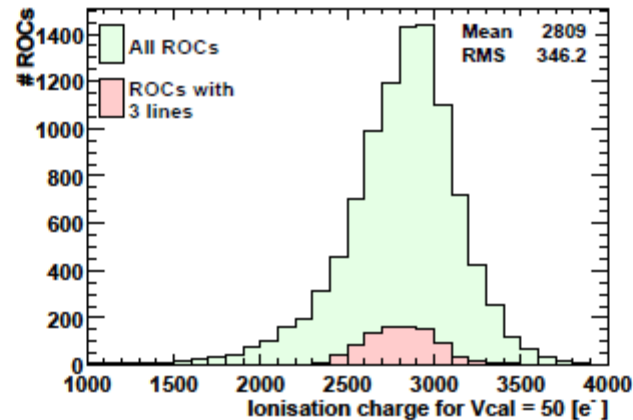
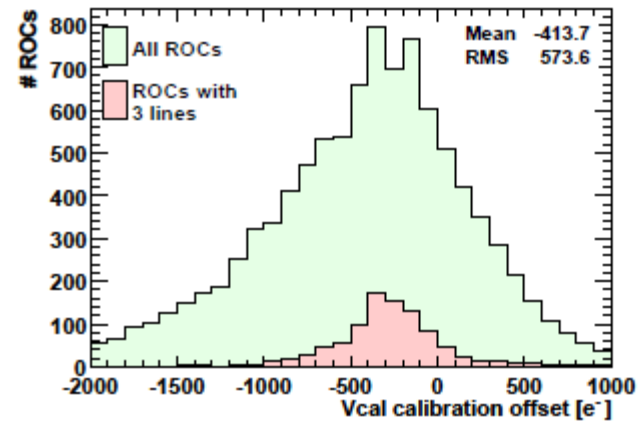
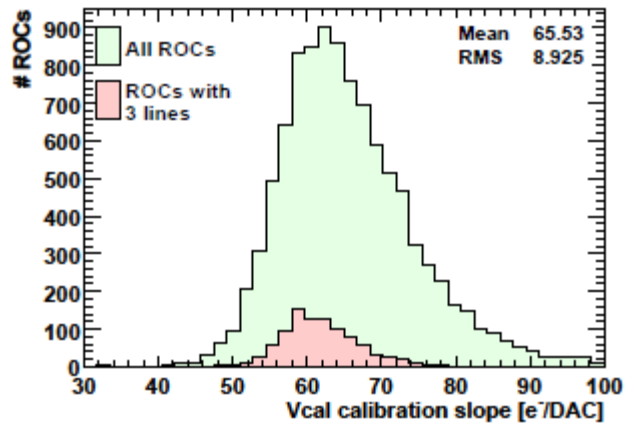
- Find the corresponding Vcal values to the ionisation charges

PSI test procedure

- Measure the threshold curves for each ROC :
 - For each value of VthrComp DAC, the fully enabled module is randomly read out several thousand times and the number of hits in each ROC is determined
 - stretch the clock sent to module by up to 65'536 BC to increase the probability of hit finding
 - Fit with error function, set VthrComp and measure Vcal threshold for each pixel. The mean Vcal is taken as a required threshold
 - Fit 3 target measurements with a straight line



PSI results



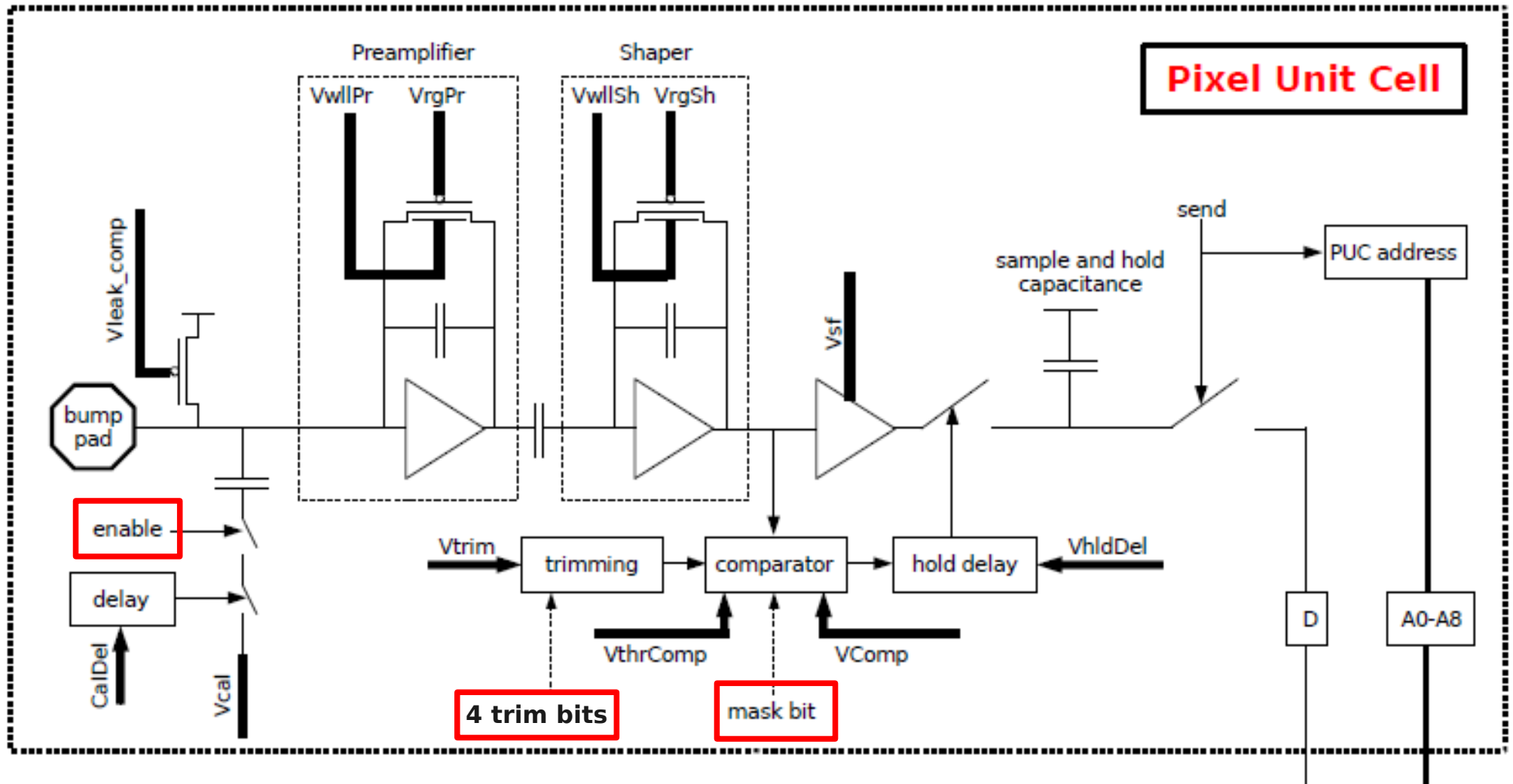
- Slope and offset of the calibration curve. Mean slope = 65 e-/DAC
- The ionisation charge, which corresponds to a Vcal value of 50
- Some measurements are done with 2 targets only due to limited testing time

Back up

psi46 DACs, Pretest

1	Vdig	6	13	VIBias_Bus	30
2	Vana	150	14	Vbias_sf	10
3	Vsf	160	15	Voffset0p	55
4	Vcomp	10	16	VIbias0p	115
5	Vleak_comp	0	17	VOffsetR0	120
6	VrgPr	0	18	VIon	115
7	VwllPr	35	19	VIbias_PH	130
8	VrgSh	0	20	Ibias_DAC	122
9	VwllSh	35	21	VIbias_roc	220
10	VhldDel	130	22	VIColOr	100
11	Vtrim	7	23	Vnpix	0
12	VthrComp	124	24	VSumCol	0
253	CtrlReg	0	25	Vcal	200
254	WBC	20	26	CalDel	125
			27	RangeTemp	0

psi46 pixel readout chip



— adjustable by programmable DAC, per ROC

□ programmable register, per pixel

psi46 pixel readout chip

