

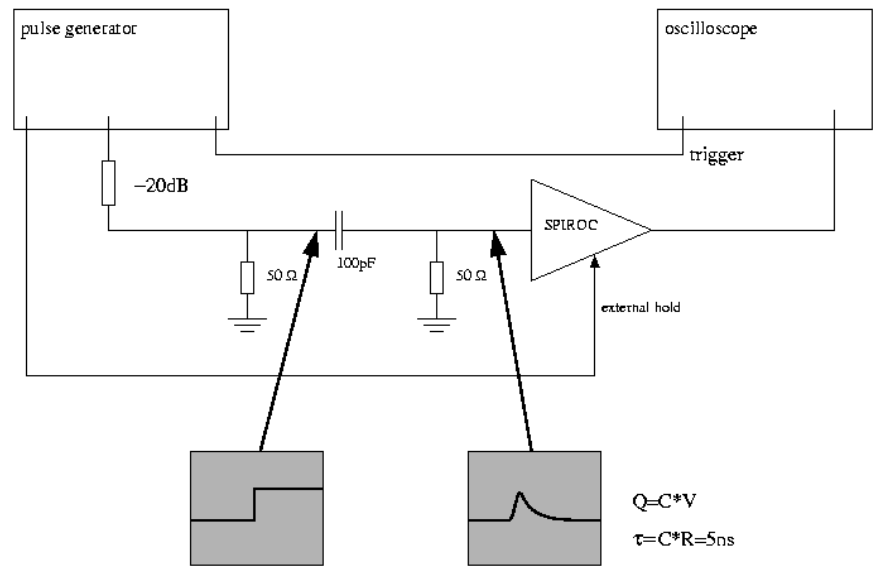
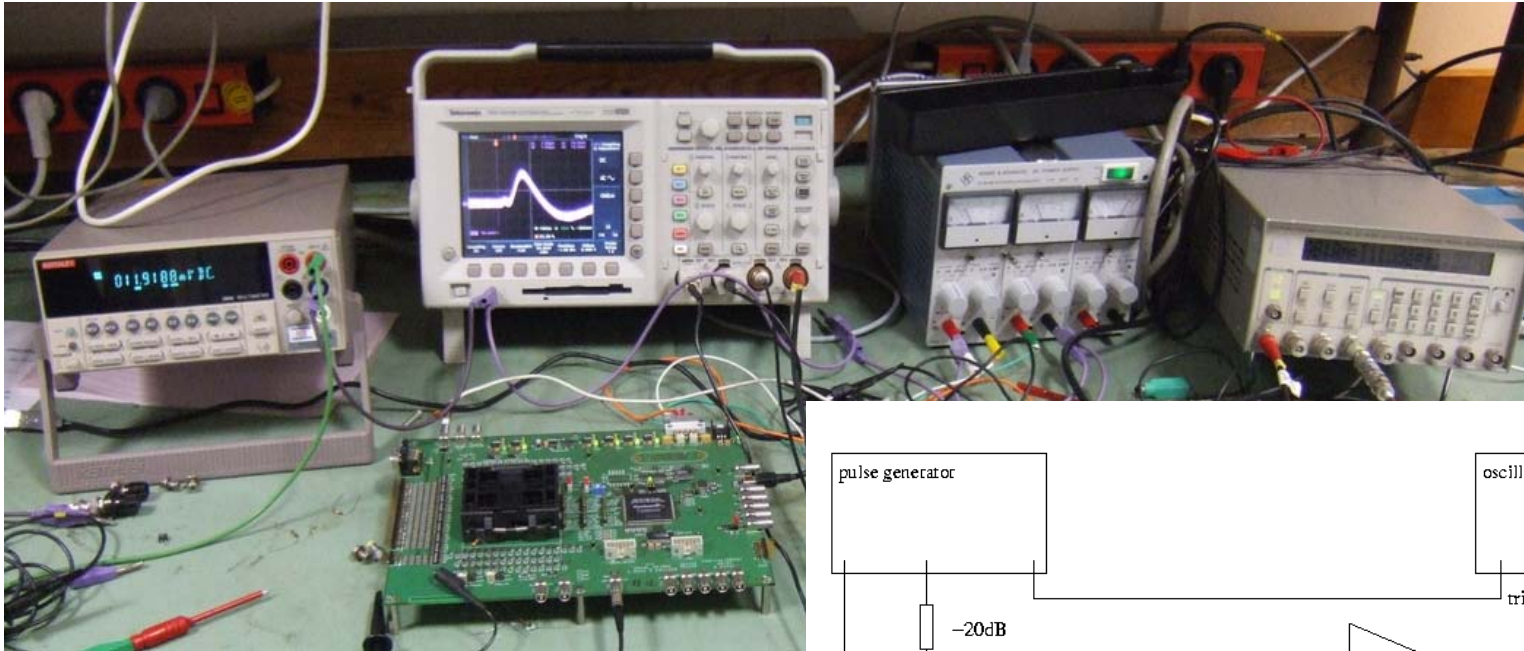
SPIROC tests at DESY



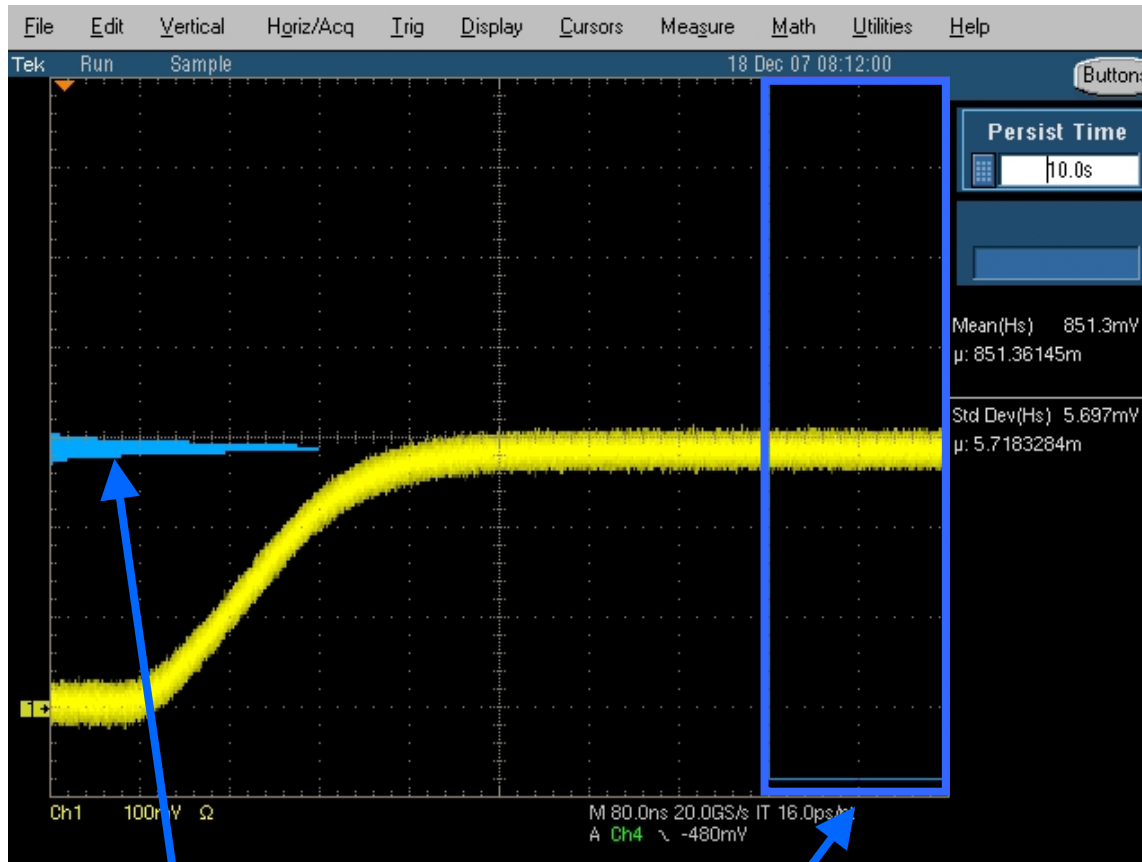
by
Benjamin Lutz

setup & how we measure
results
instable behavior

setup



measurement

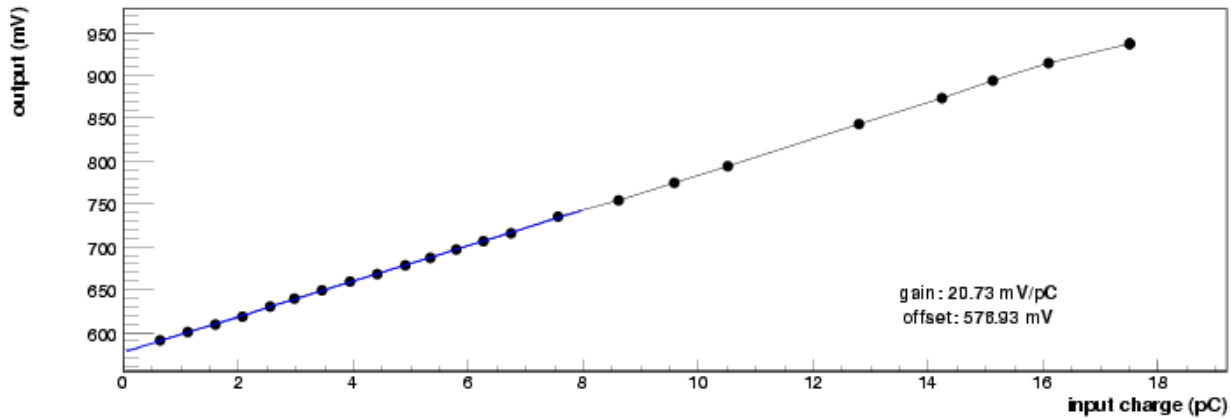


mean of histogram

RMS of histogram

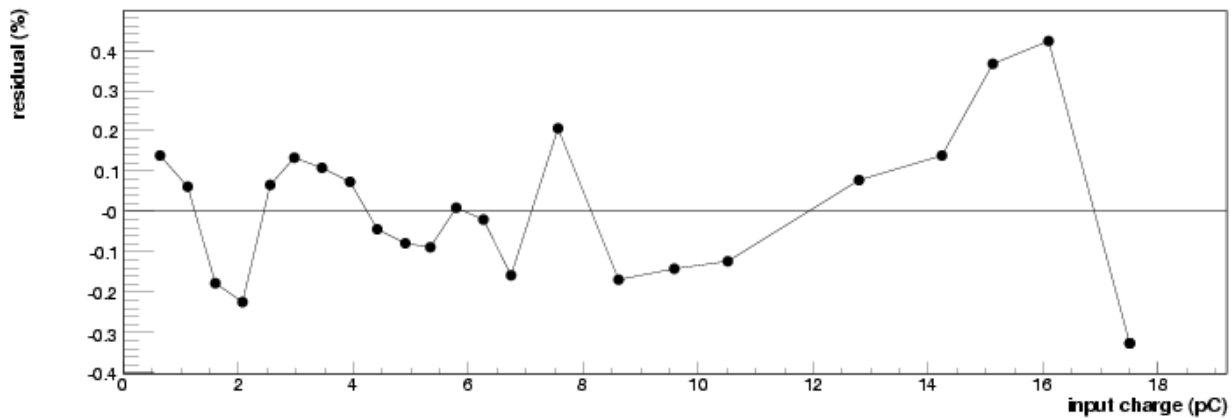
gain & linearity

ASIC response



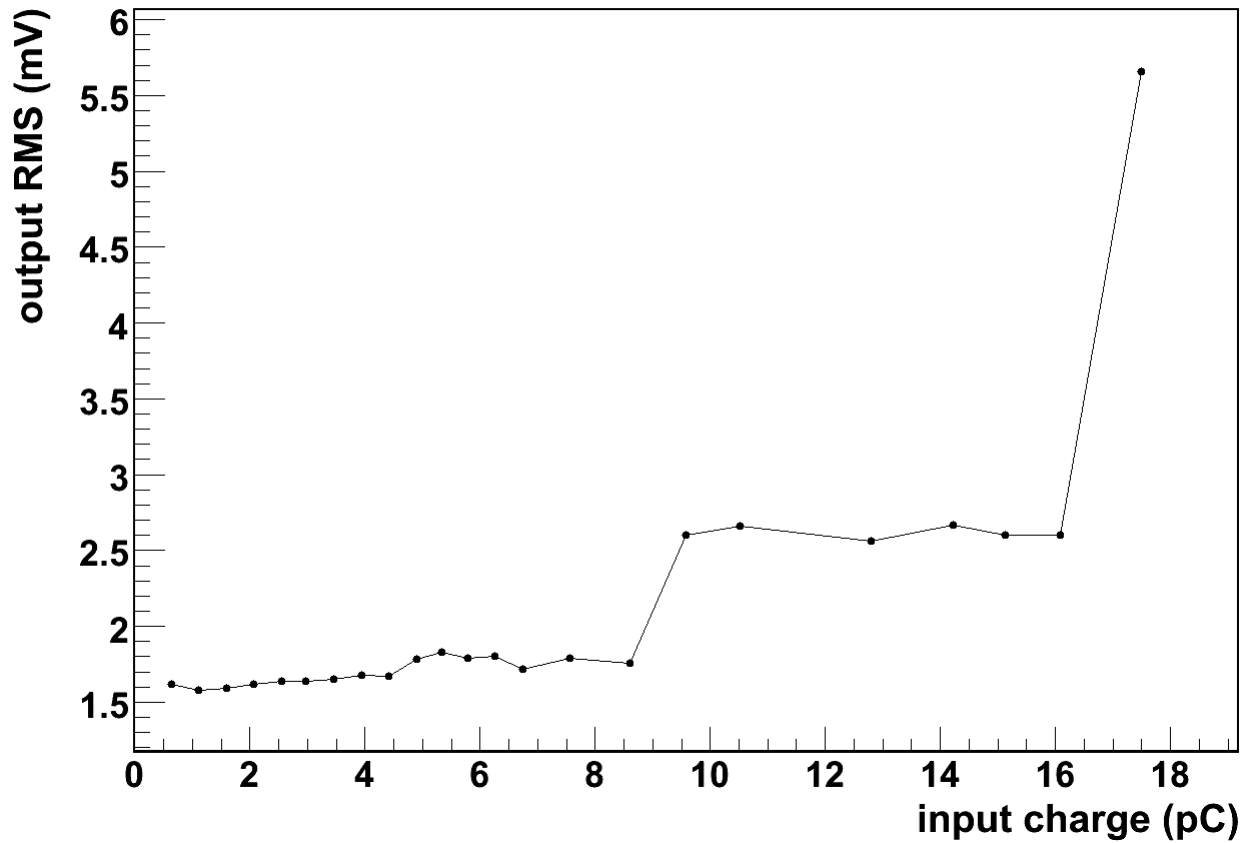
gain: HG & 500fF
shaping: 50 ns

residual of ASIC response



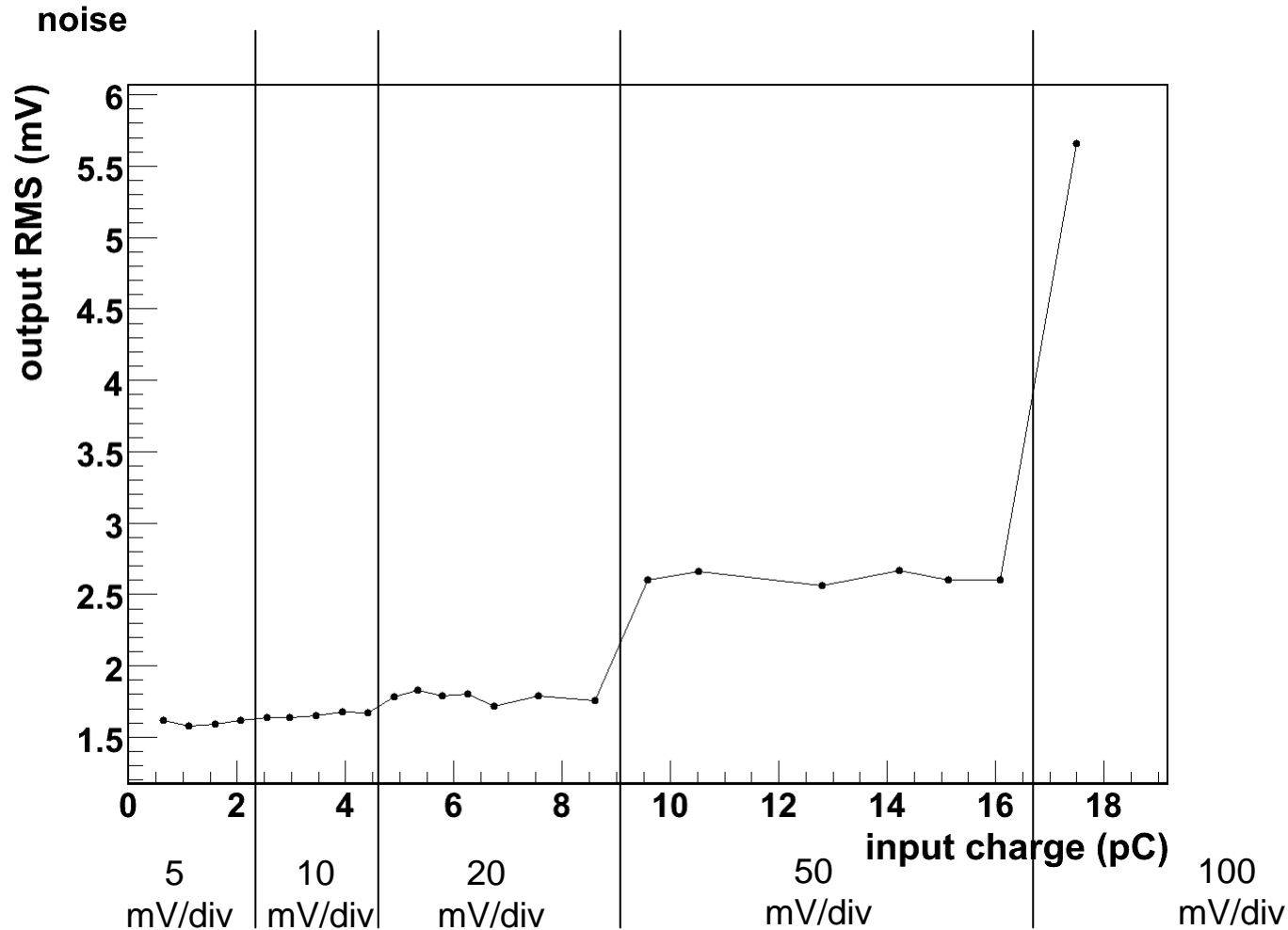
noise

noise

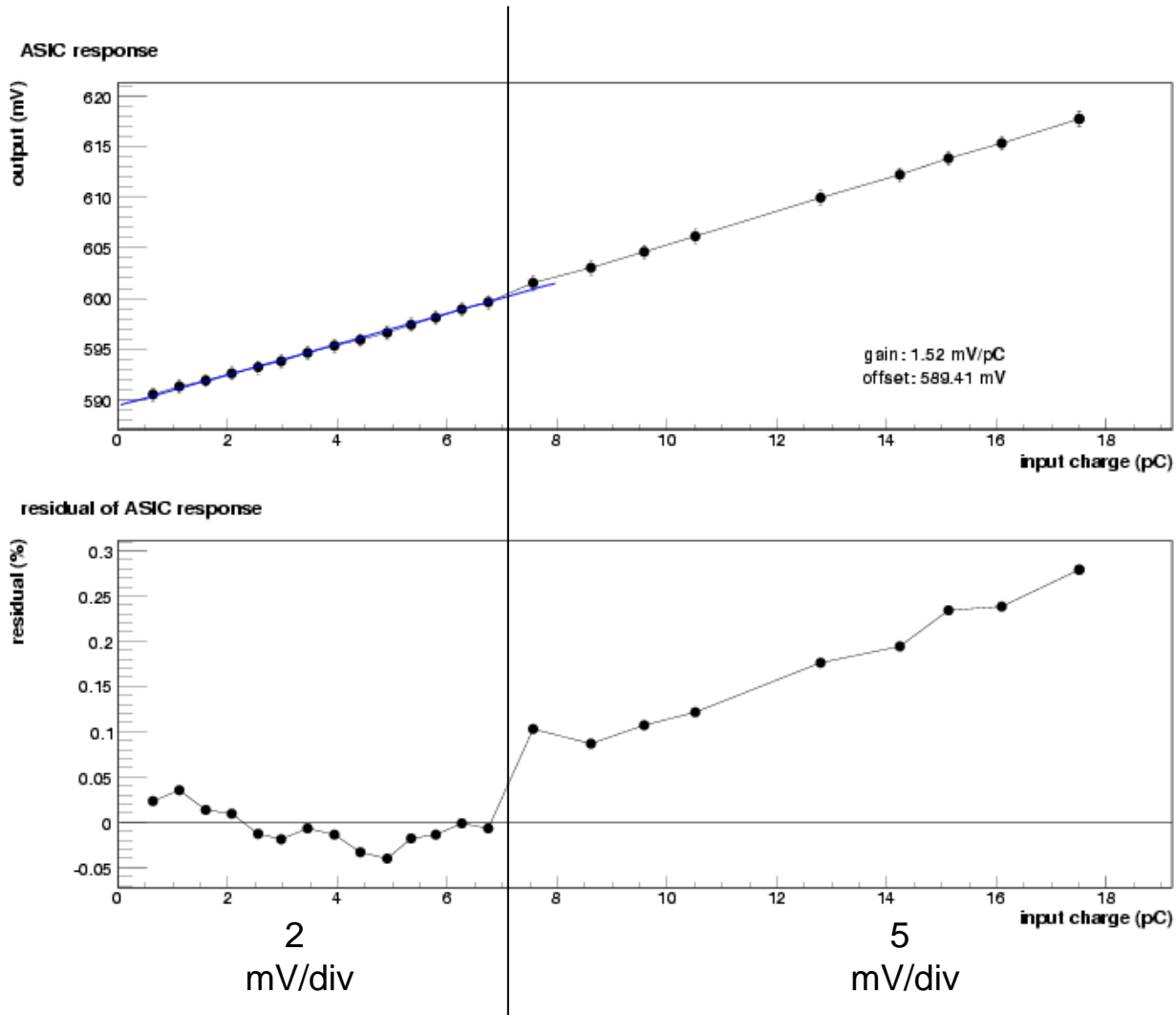


?

noise



other scope effects



gain: LG & 400fF
shaping: 50 ns

SPIROC
is more linear
than the
20k € scope

mode	Cgain	shaping	gain	nonlinearity < 1%	noise	LAL gain	LAL noise
	fF	ns	mV/pC	for signals	mV RMS	mV/pC	mV RMS
HG	400	50	24,5		< 2.0		
HG	500	50	20,7	< 18 pC	< 1.6		
HG	600	50	17,7	< 16 pC	< 1.4		
LG	400	50	1,5	< 18 pC	< 0.7		
HG	200	25	43,1	< 8 pC	< 2.0	62,6	2,2
HG	400	25	29,3	< 12 pC	< 1.5	38,7	1,3

Ration HG/LG @ 400 fF & 50 ns: 16

Question:

Which is the default mode to use?

Our actual understanding:

design goal was 50ns in both high gain (HG) and low gain (LG) path

Reference measurements from LAL:

25ns & 125ns

first conclusions

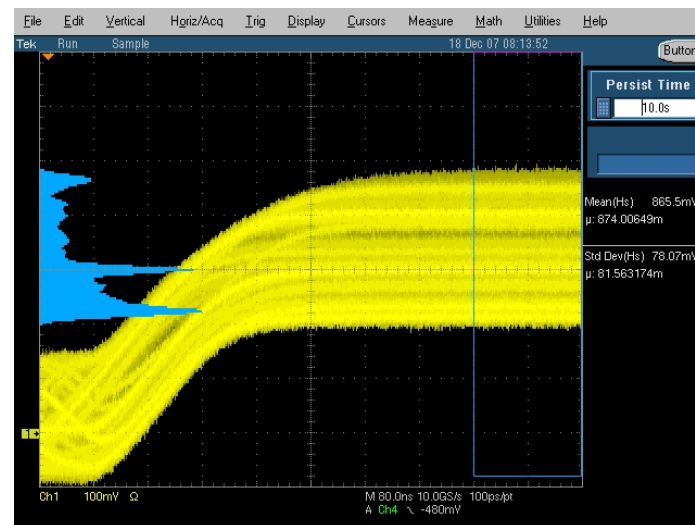
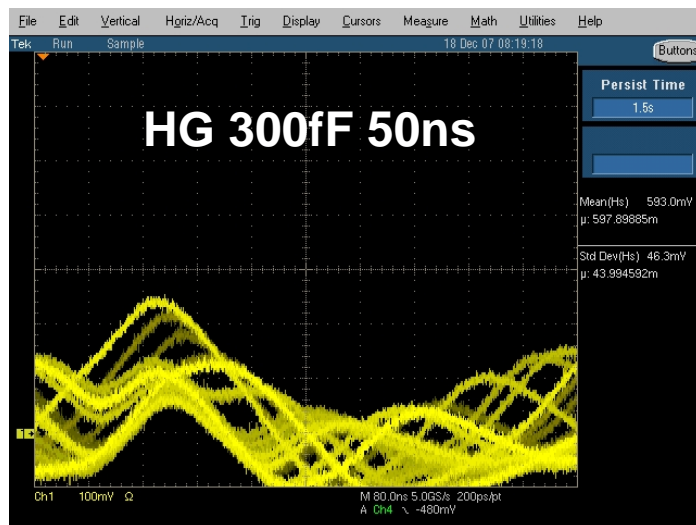
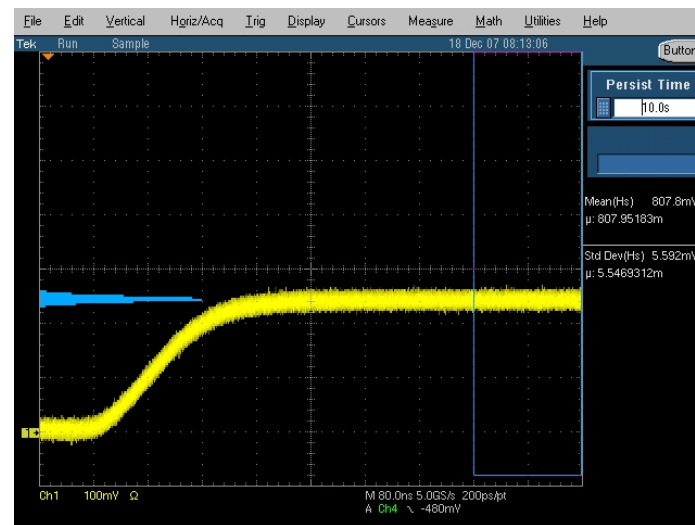
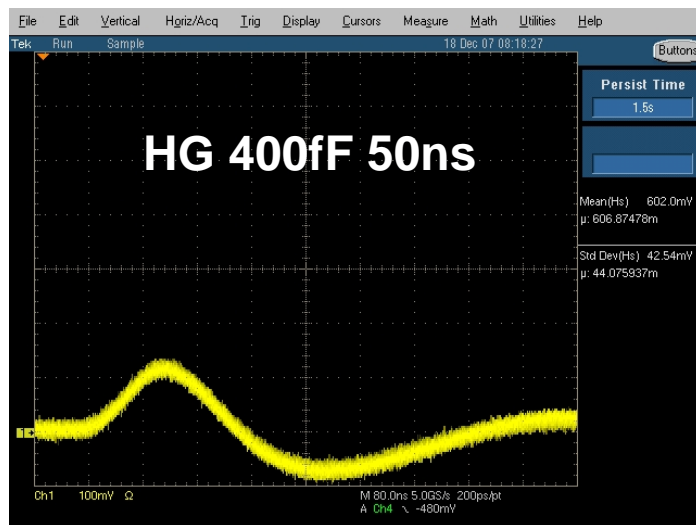


- we understand to operate the SPIROC
- first gain measurements agree with LAL results
- first linearity measurements indicate good linearity



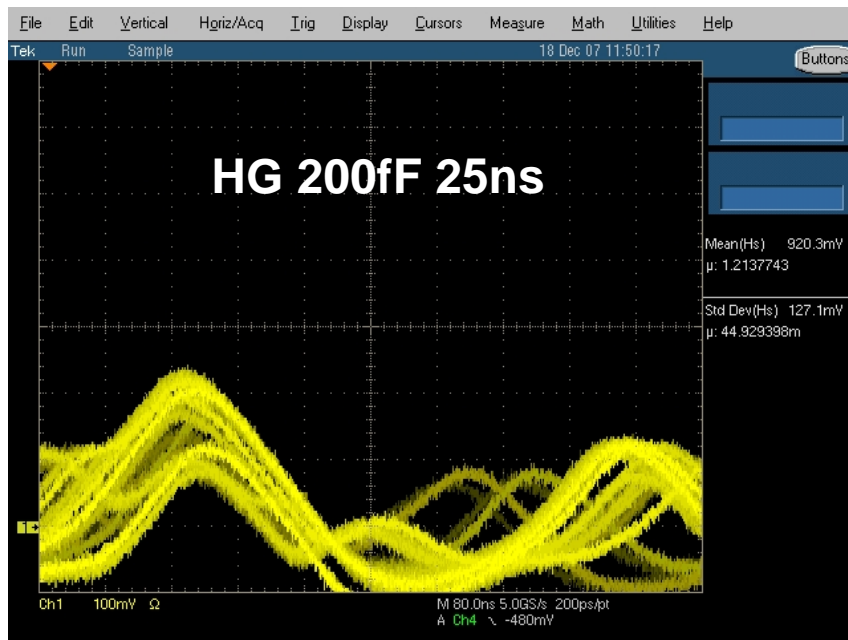
- current setup has systematic uncertainties
- noise measurement dominated by systematics
→ can only guess signal to noise
- observed non stable gain settings (see next slides)

unstable settings

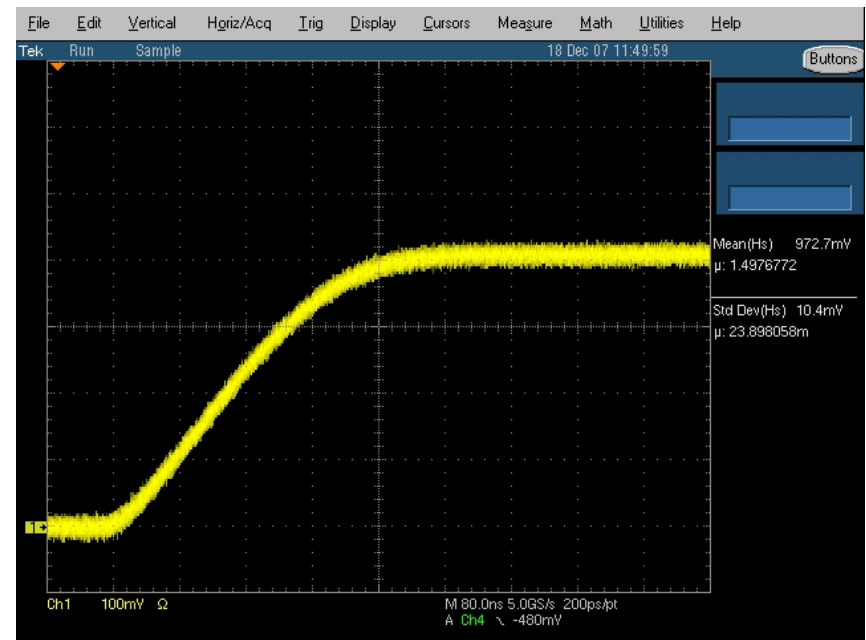


stability – track & hold

pure tracking



track & hold



➔ track and hold influences stability (at least for 200fF 25ns)

instability observations (so far)

- HG 50 ns
 - all settings $< 400\text{fF}$ instable without compensation
 - with compensation: effective gain is smaller than gain @ 400fF without compensation
- HG 25 ns
 - 100fF instable
 - 200fF stable while hold is used
 - 200fF instable without hold

summary & outlook

summary:

- first set of gain & linearity measurements available
- signal to noise not yet established (systematic errors)
- different results for LAL & DESY measurements
- observed instabilities in the amplifier

outlook:

- expecting VME DAQ system second week of January
→ should significantly reduce systematics
- we are eager to explore the new features of the chip
 - depends on commissioning of slow control