



FIC-LIC summary results

E. Nebot, B. Dehning, E. Effinger, V. Grishin.

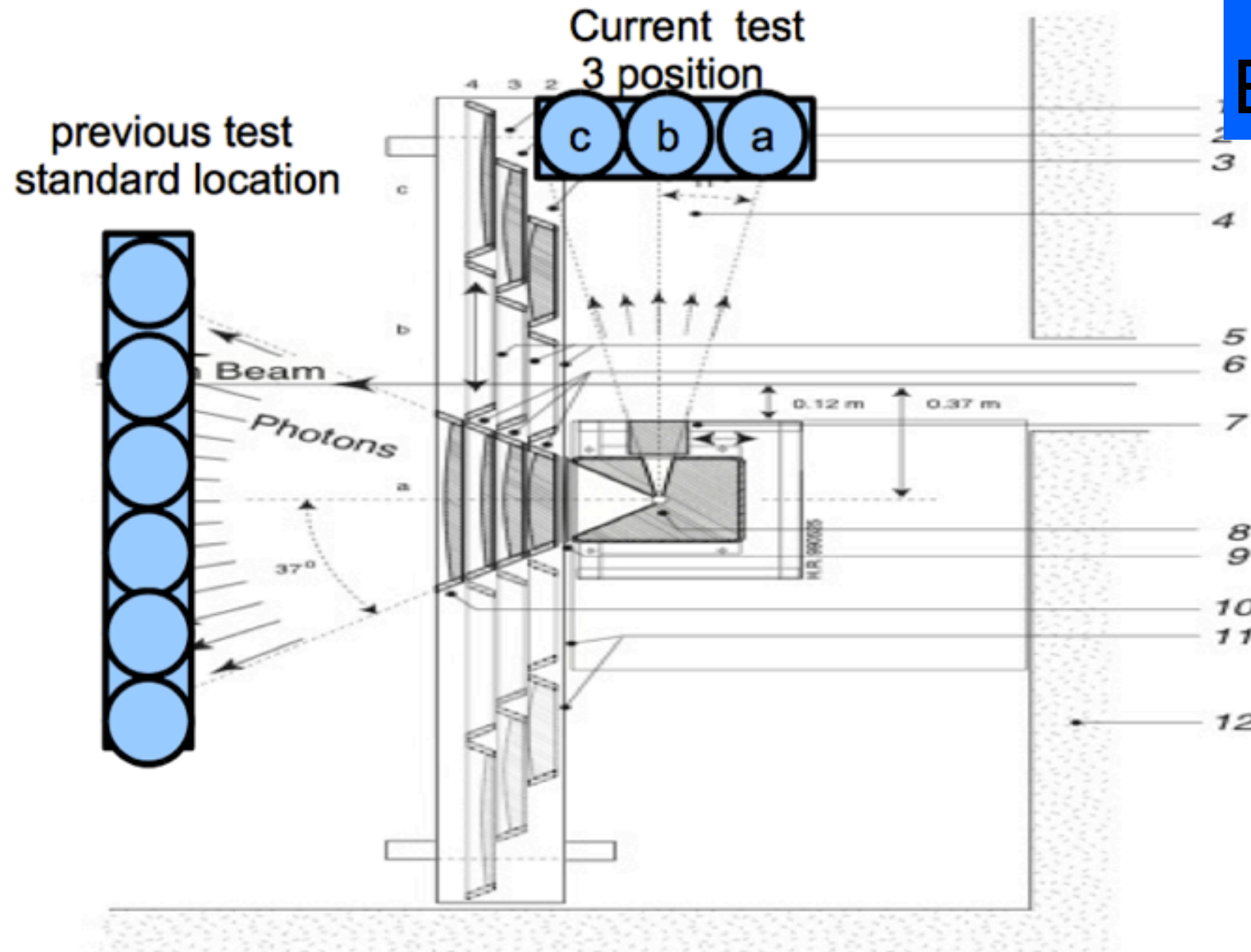
Outlook

- Preliminary results for first test with FIC and LIC (refilled at 1.1 bar). Two independent experiments:
 - Radiation source. GIF. Response against low energy photons (DC irradiation).
 - HiRadMat. Response against pulsed (LHC-like) irradiation.

GIF experiment

- Measurements performed in lateral collimator
- Not standard place for previous calibrations

Source
Cs137
 $E_{\gamma}=662\text{KeV}$



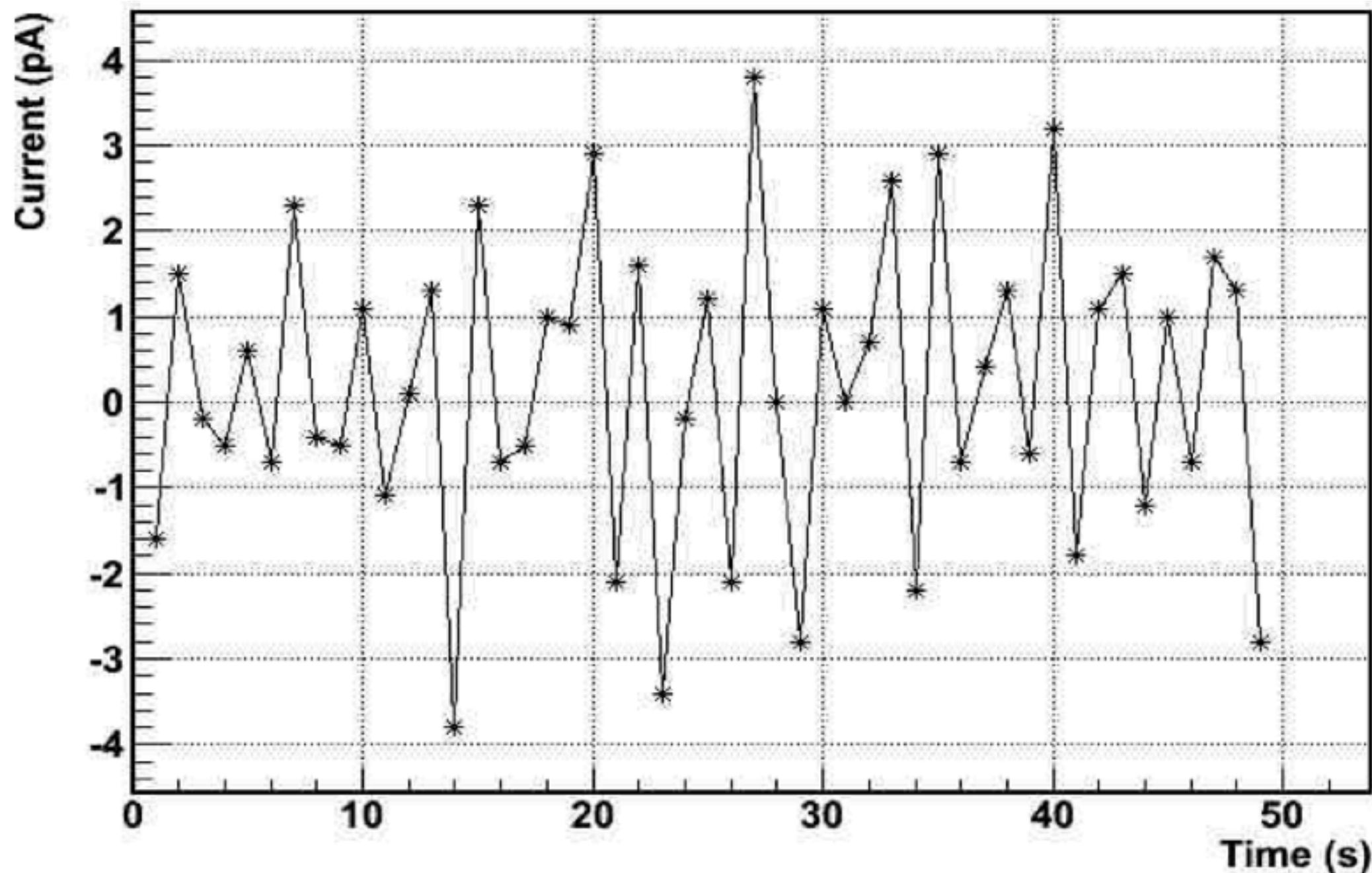
GIF experiment

- View of detector location in lateral collimator.
- Signals integrated over 1 s (50 seconds/measurement)



GIF experiment

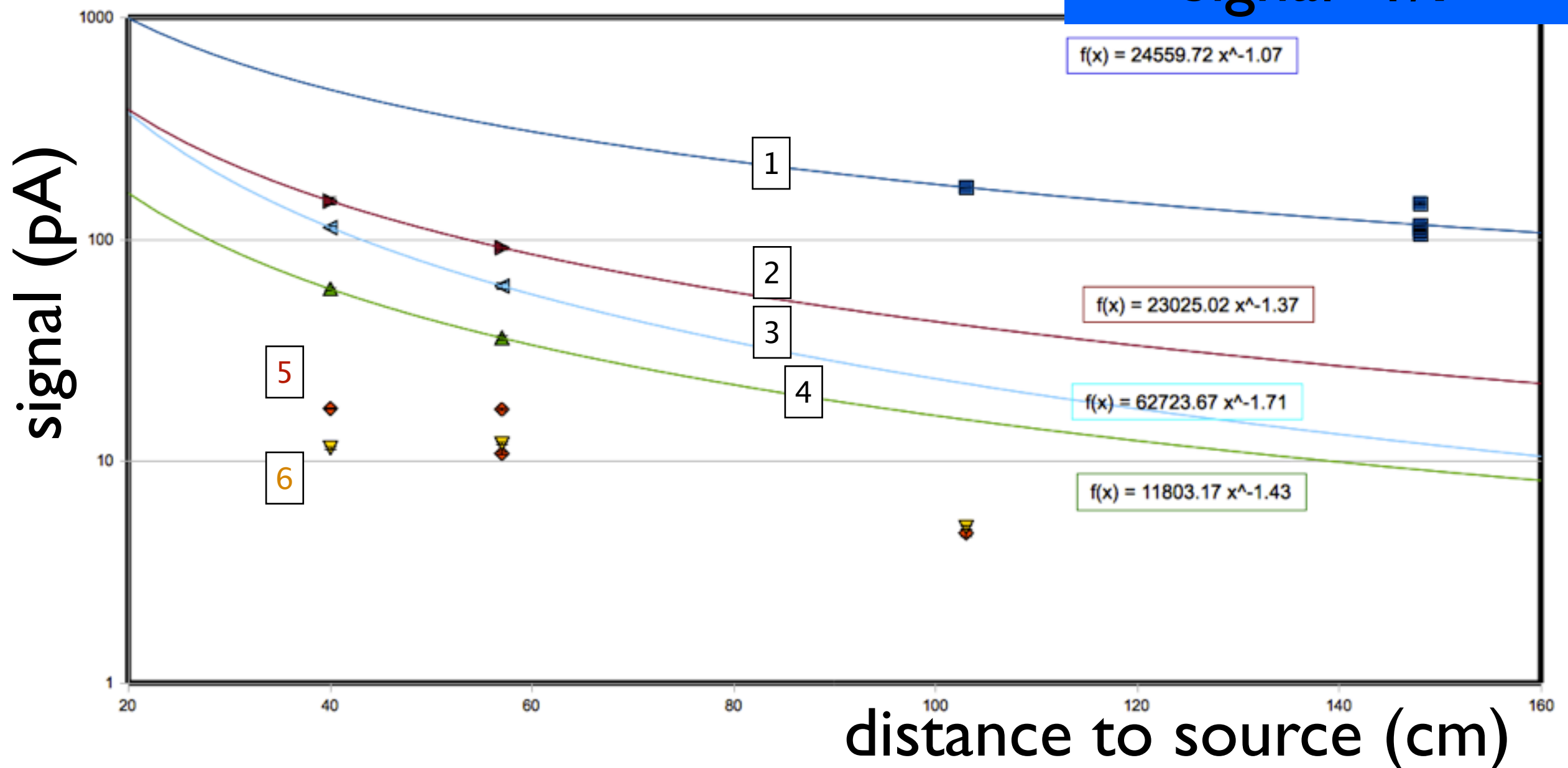
- Several measurements without radiation source.
- High offset current ($-4 - 4$ pA) in FIC detectors



GIF experiment

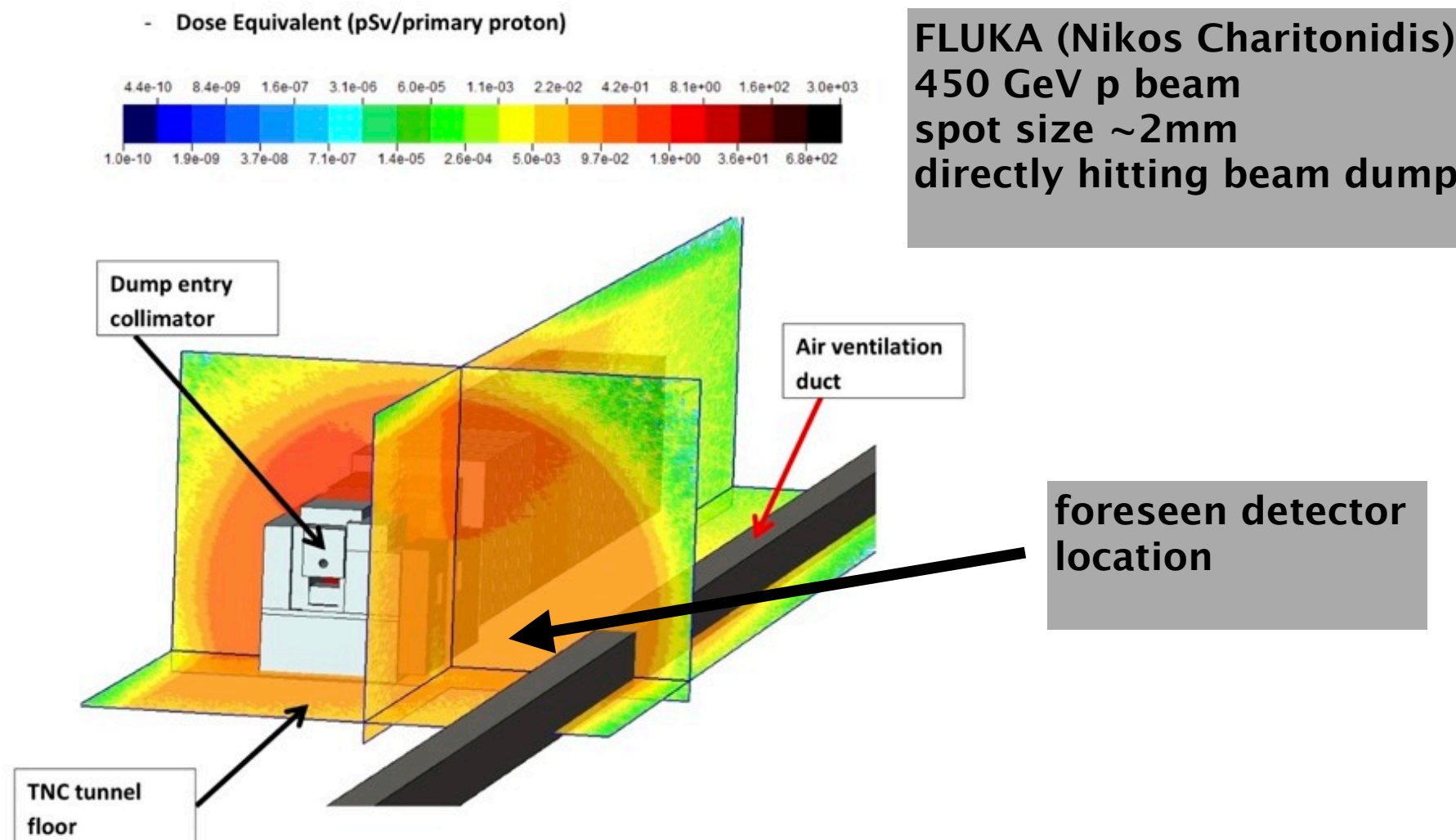
- 1) LHC-IC (position a)
- 2) FIC (position b) electrode perpendicular to source axis
- 3) FIC (position b) electrode parallel to source axis
- 4) refilled LIC (position b)
- 5) LIC 0.4 bar (position b)
- 6) LIC 0.4 bar (position c)

Expected
Signal $\sim 1/r^2$



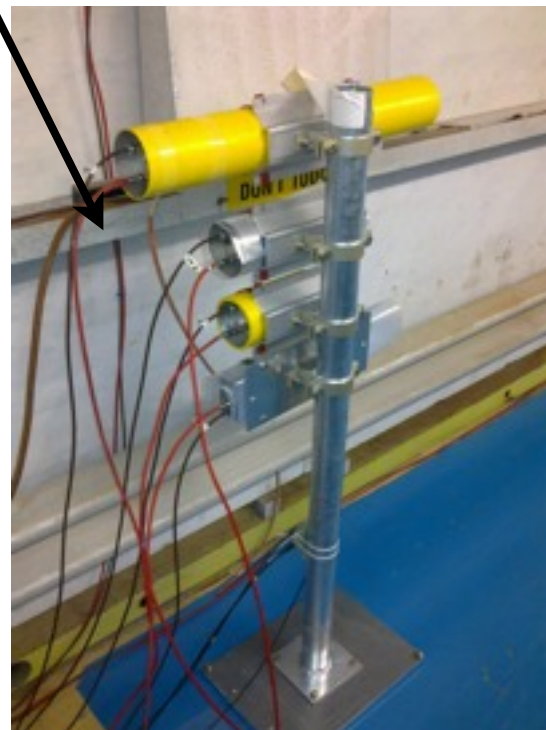
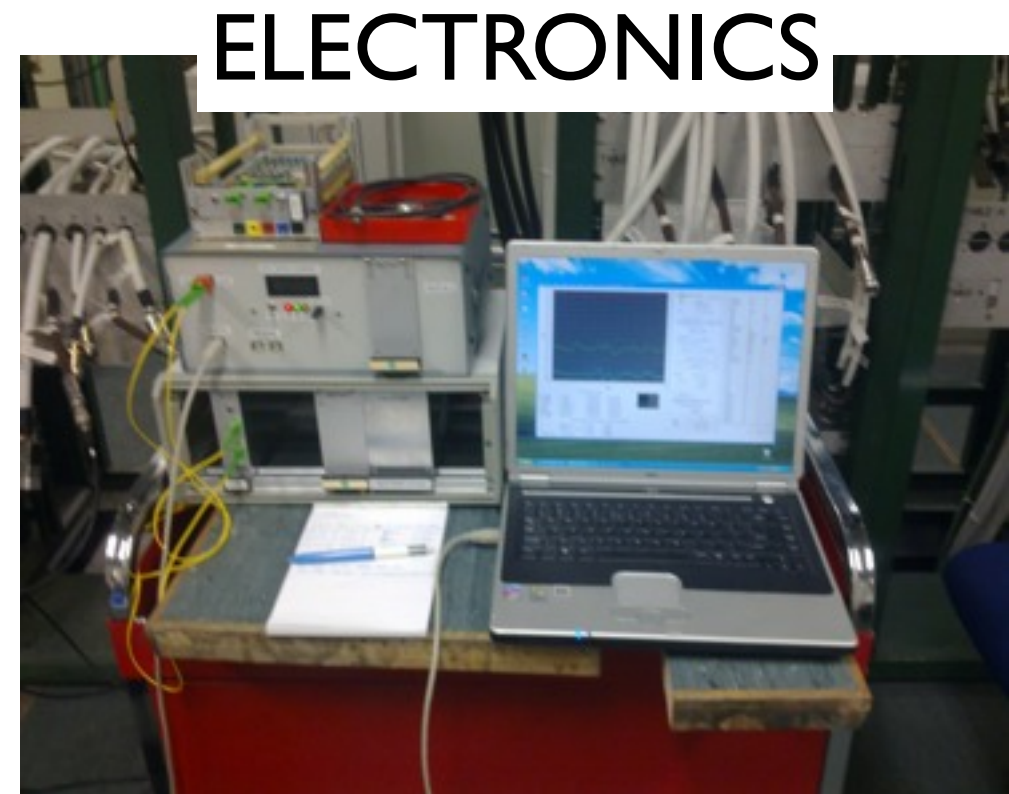
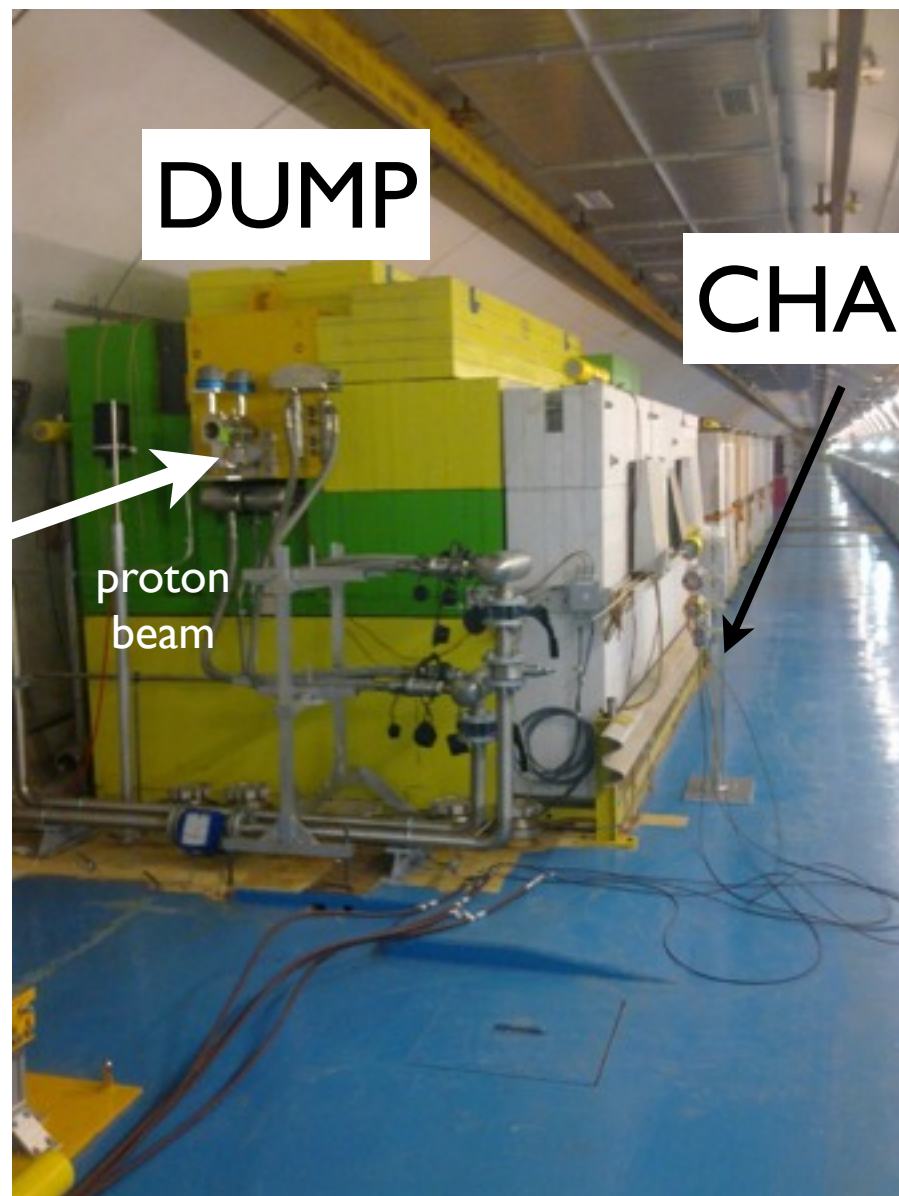
HiRadMat Experiment

- High Radiation for Materials. SPS extraction line.
- Beam conditions: 450GeV, 1.5×10^{11} p/bunch. Up to 144 bunches with 50ns bunch spacing.
- Detectors located to see secondary showers. Full beam impacting on dump (iron block).



HiRadMat Experiment

- Main parts of the experiment in photos



LHC-IC
LIC 1.1 bar
LIC 0.4 bar
FIC

HiRadMat Experiment

- Detectors under investigation:

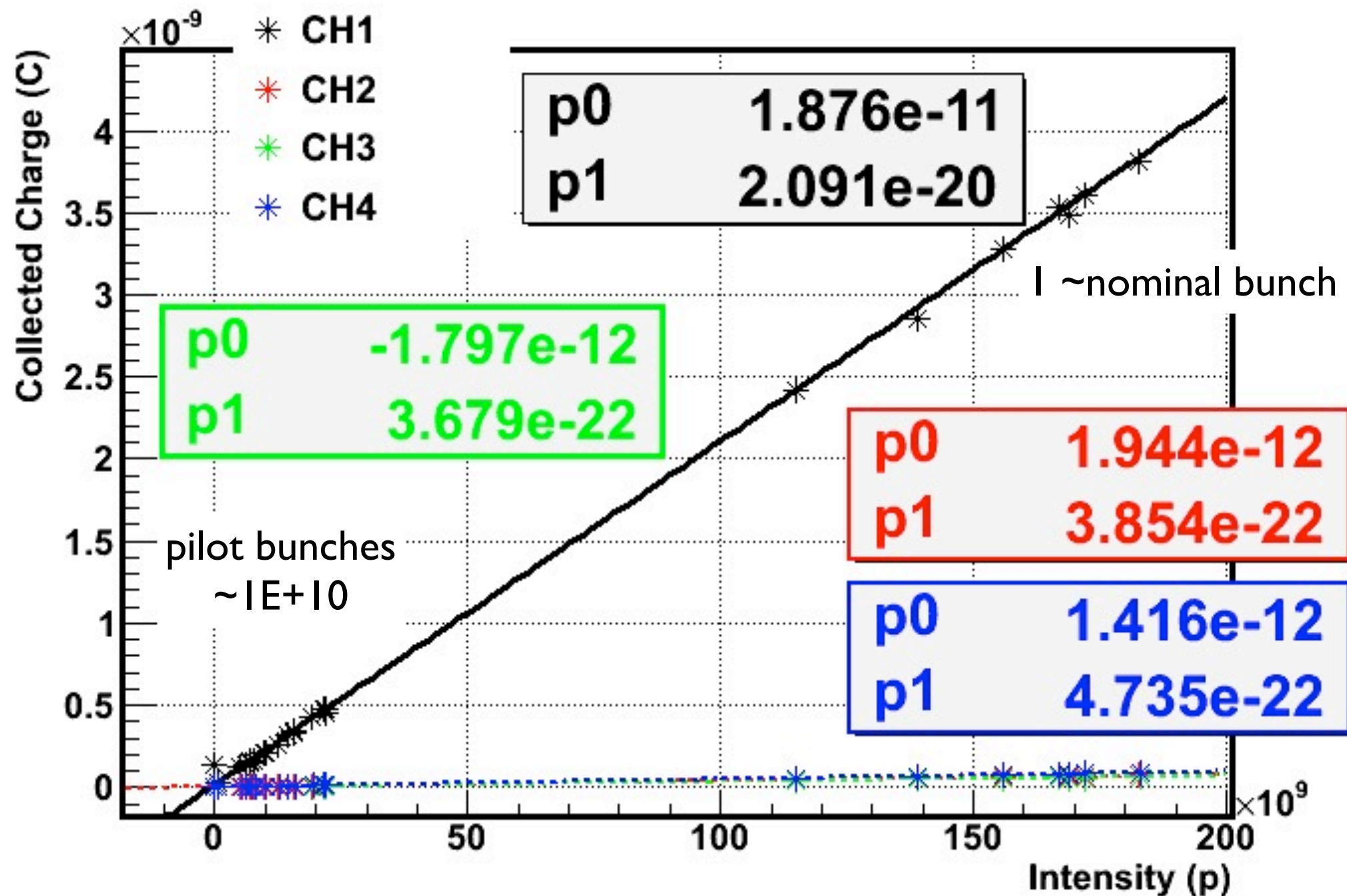
CH1 = IC

CH2 = LIC 1.1 bar

CH3 = LIC 0.4 bar

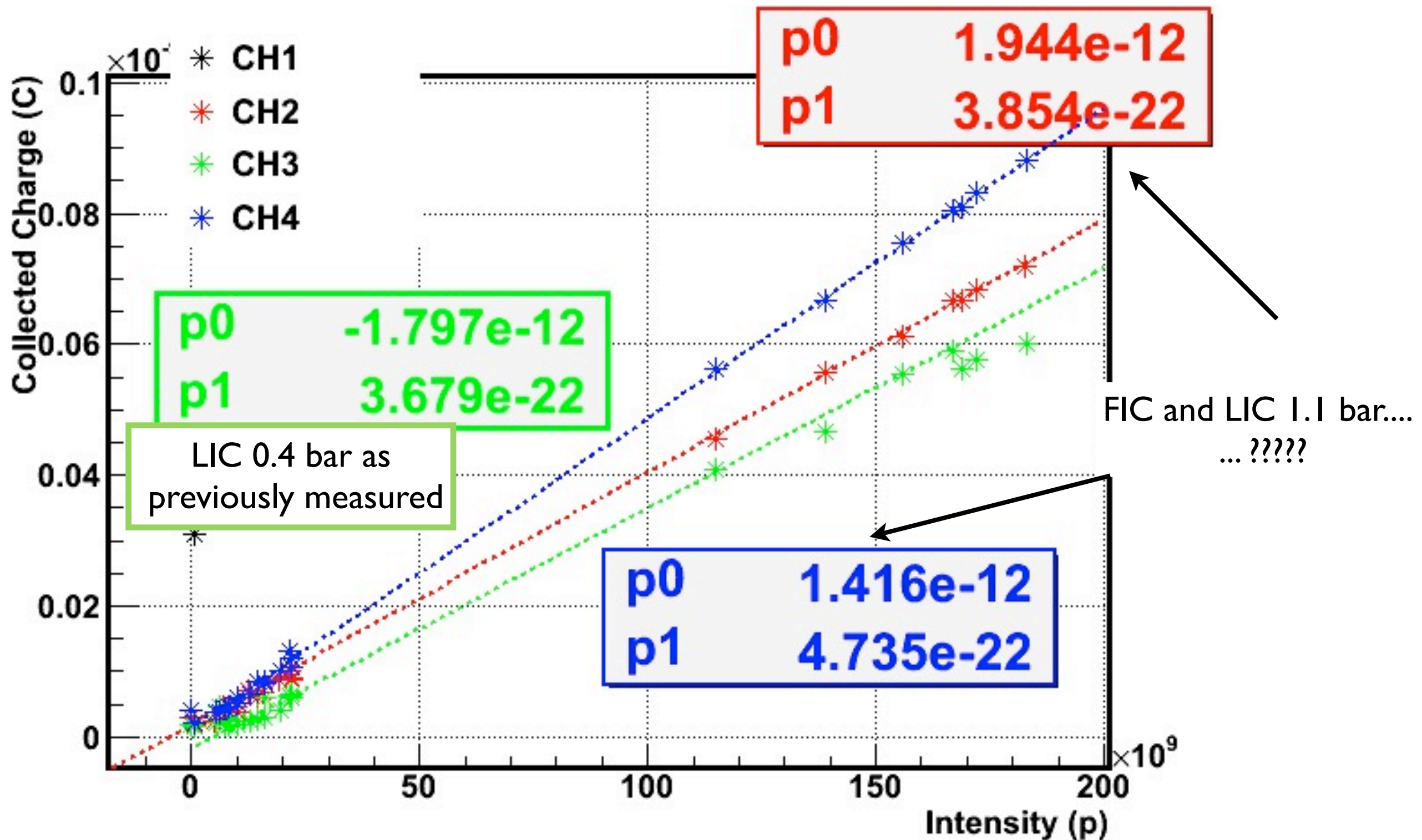
CH4 = FIC

Signal (40us) vs Intensity



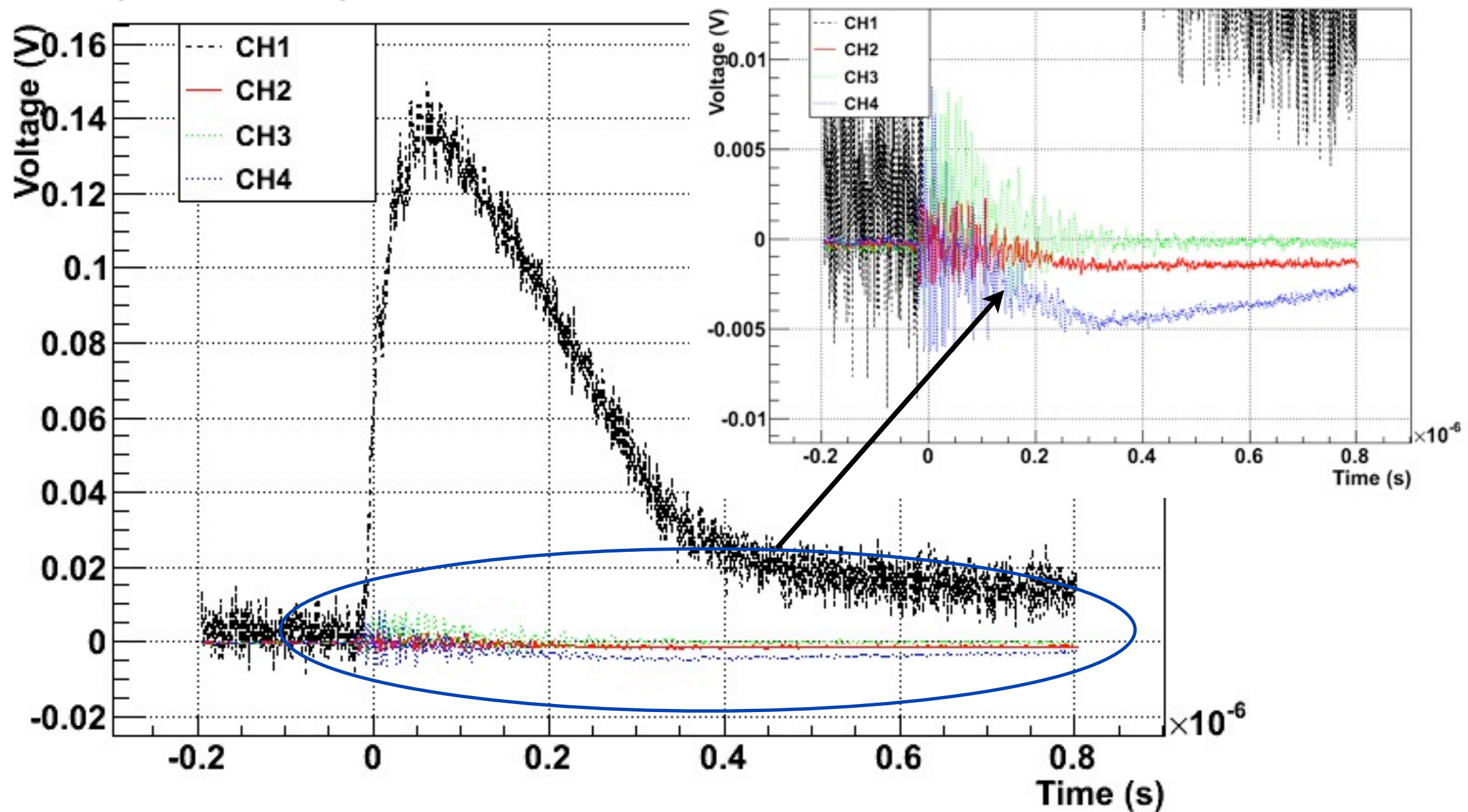
- Looks like a nice linear behaviour but.....

Signal (40us) vs Intensity (ZOOM FIC/LIC)



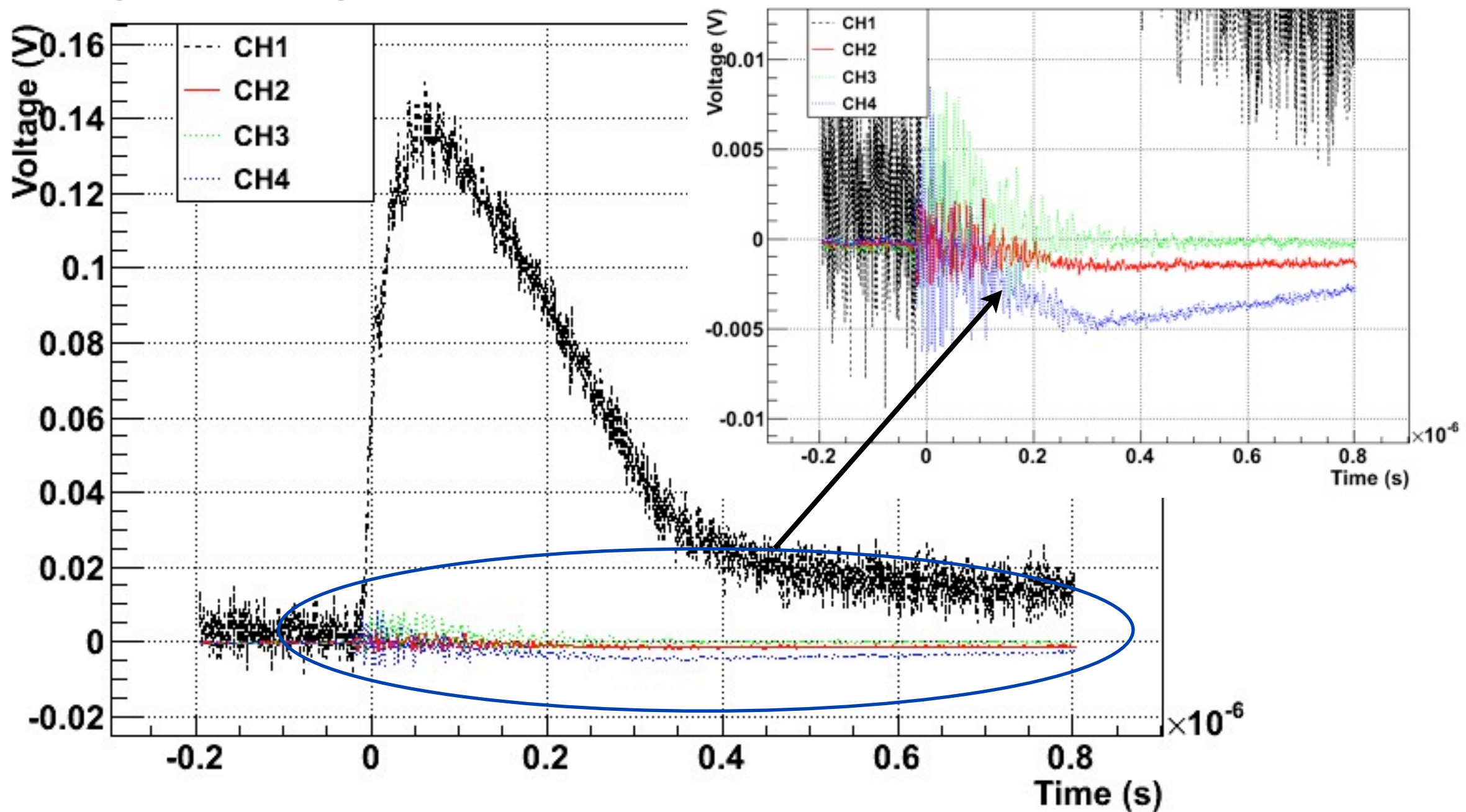
Wave pulses. 1 pilot bunch

Negative signals in FIC and LIC I.I bar



Wave pulses. 1 pilot bunch

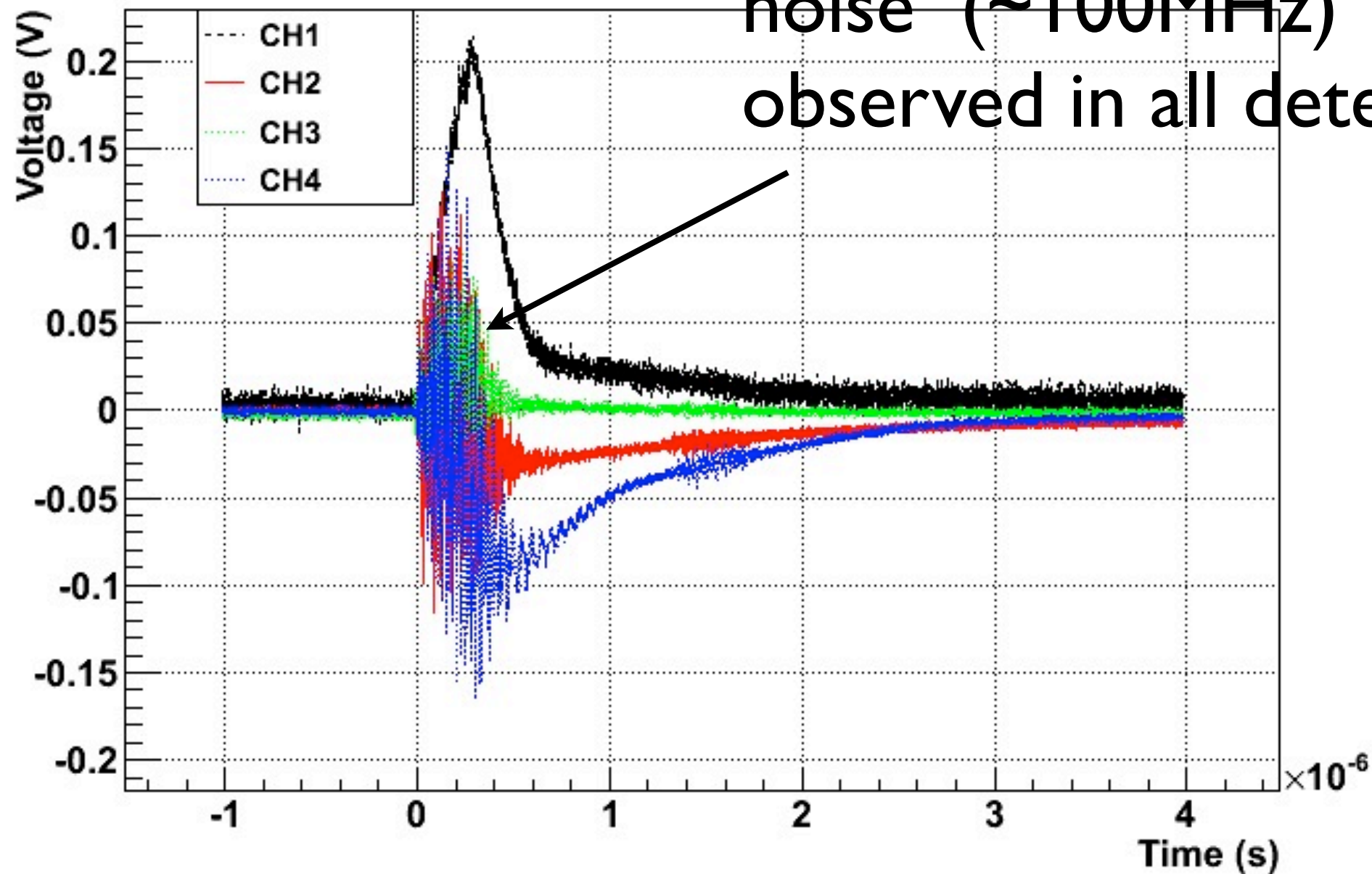
Negative signals in FIC and LIC I.I bar



Wave pulses. 6 nominal bunch

20dB attenuation in IC

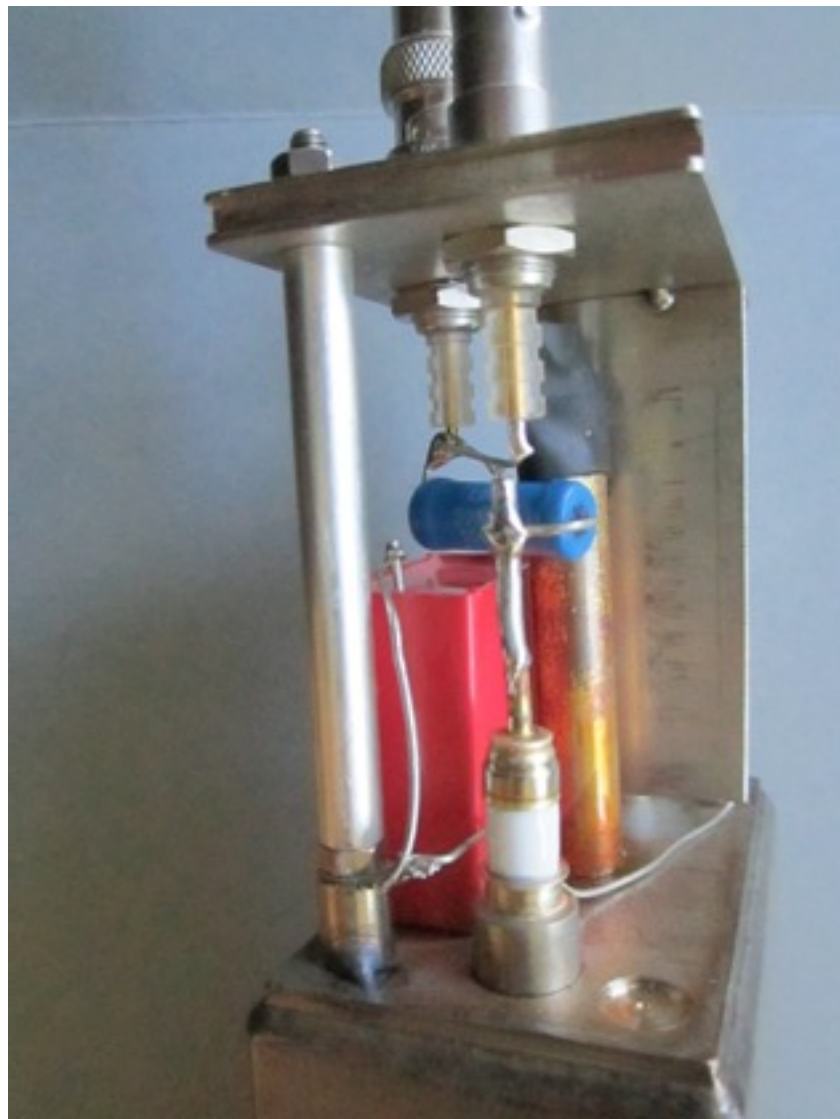
High frequency
noise ($\sim 100\text{MHz}$)
observed in all detectors



Post-hiradmat lab test

- Under modulation test, SEM and LIC detectors present the same behaviour.
- Modulation test showed that both LIC-FIC behaved as SEM without filter.
- Electrical box was open to find a wrong connection of Capacitor and resistance in both detectors.

Some photos of the opened FIC



Conclusions and work plan

- Chambers were tested in two different conditions:
 - Showed reasonable signals for DC irradiation.
 - Showed inverted signals.
- Problem found to be wrong connection of filter capacitor.
- Test to be performed in the dump line of the PSB (similar experiment conducted last year) to verify the proper functioning of the chambers.
- Possibly, repeat HiradMat experiment for LHC-like irradiation conditions.