About camera gain and EmCont software.

Old investigations.

Prosilica problems.

Discussion.

EmCont: to be or not to be…

Grygorii Vashchenko
Zeuthen, 12.09.2013

HELMHOLTZ ASSOCIATION

UH

PITZ Photo Injector Test Facility Zeuthen

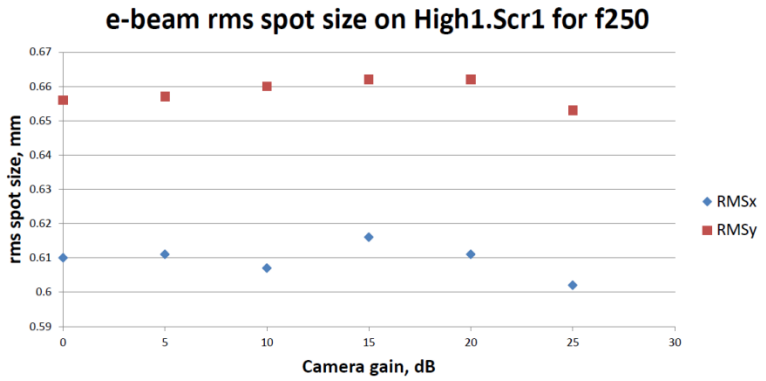
DESY

Old investigations.

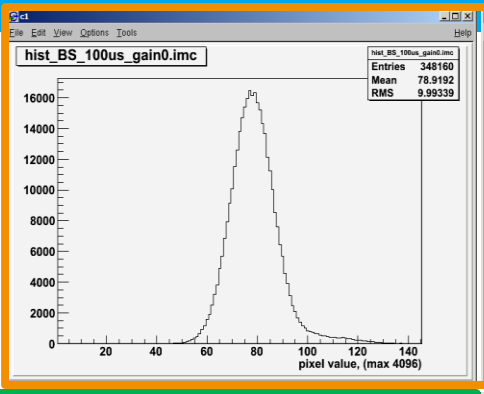
Y. Ivanisenko, PPS 10.06.2008, Camera Comparison Stand at PITZ. Recent results:
“Prosilica - internal matching of dynamical ranges is not ideal for the tested piece as a result it is recommended not to exceed gain value 11 in order not to cut signal.”

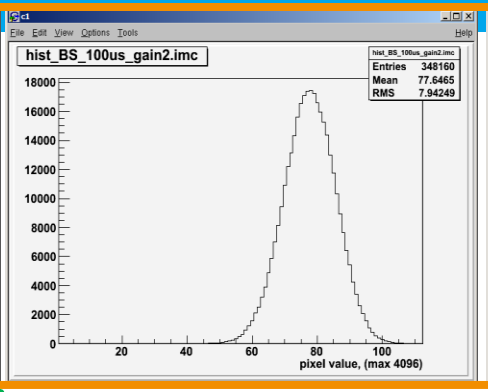
G.Vashchenko, PPS 31.05.2012, Beam size vs. camera gain:

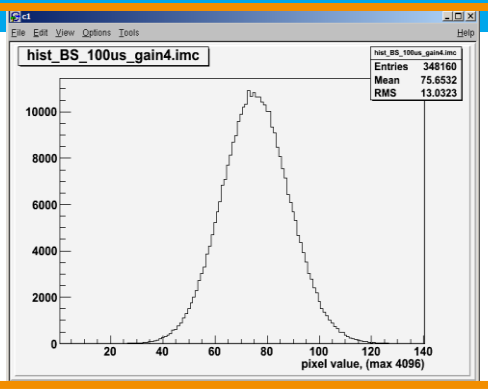
Gain	RMSx	RMSy
0	0.61	0.656
5	0.611	0.657
10	0.607	0.66
15	0.616	0.662
20	0.611	0.662
25	0.602	0.653

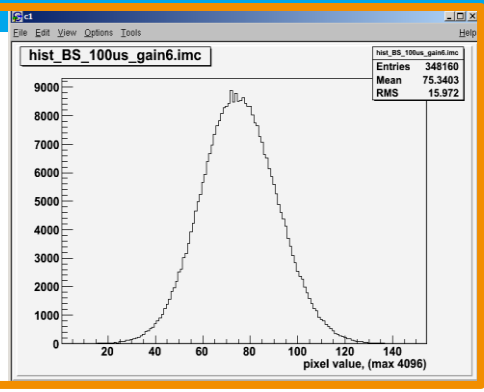


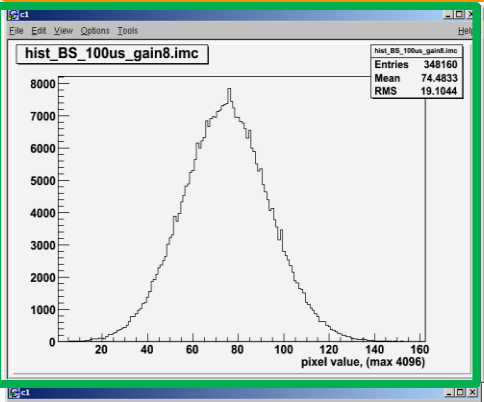
Prosilica problems.

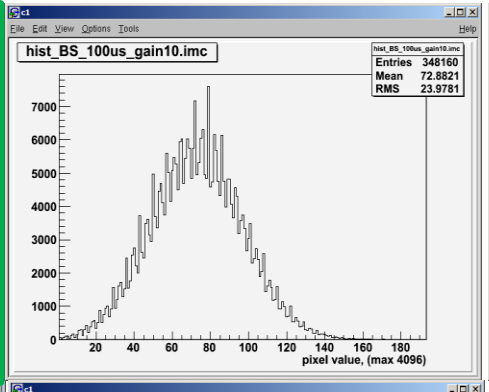


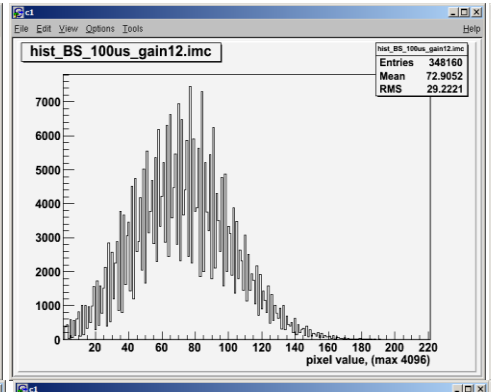


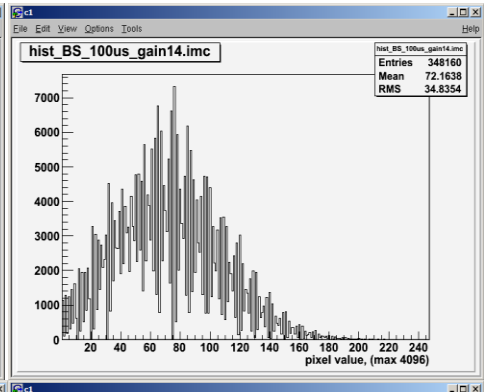


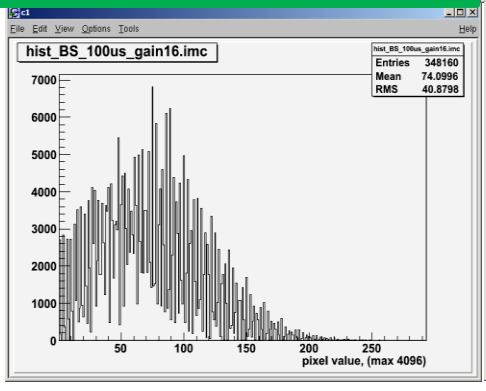


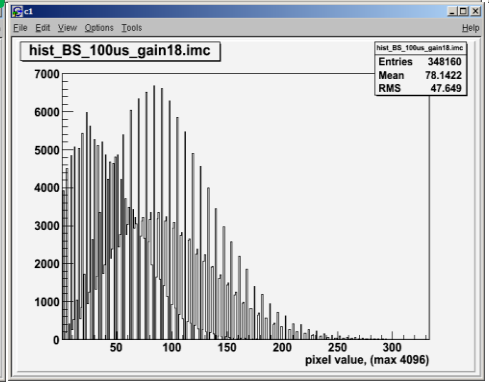


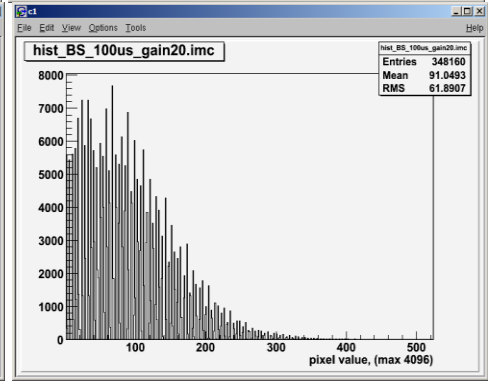


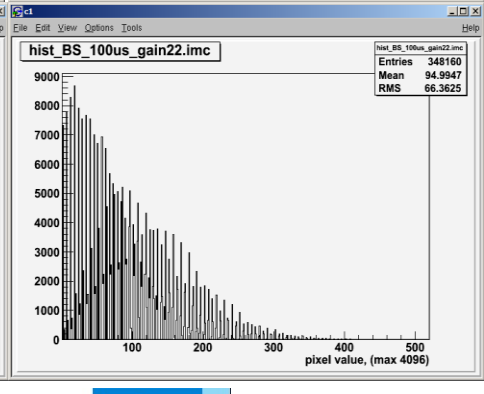












Discussion

- Gain 8 is the best choice for prosilica as it has only automatic black level control.
- Due to radiation damage optimum gain may be changed ➔ regular check is needed (can be done without camera dismounting, but tunnel access required).
- Low gain ➔ Low signal ➔ Small dynamic range ➔ unpredictable influence on the rms values of the original signal due to discretization (strong dependence on the original signal distribution) ➔ Increase amount of laser pulses ➔ Maximum dynamic range ➔ laser properties change from pulse to pulse ➔ May be even worse than high camera gain ➔ Reliability of new ellipsoidal laser?
- To be checked once more:
  - RMS EMSY vs Gain.
  - RMS beamlet vs Gain.

EmCont: to be or not to be…

Where automatization should stops…

Current status:
EMSY measurements, controlling saturation
MOI measurements, controlling saturation
Beamlet measurements, controlling saturation

EmCont: fully automatic control

- Grains on the screen, how to take into account (emsy, moi, beamlets)
- X-rays – continues spectrum ends at 2000, but significant amount of pixels have maximum value 4095 (usual for low charge measurements), what to do?
- Time consumption (assuming fixed camera gain, varied amount of laser pulses): where to start? 1 pulse? ➔ not enough ➔ 2 pulses ➔ not enough ➔ 4 pulses ➔ not enough……. 32 pulses ➔ not enough ➔ 64 pulses ➔ too much ➔ 48 pulses ➔ too much ➔ 40 pulses ➔ too much…….. 34 pulses ➔ too much ➔ 33 pulses ➔ Got it!
  - In total 12 fast scans, each at least 1 min.
  - In total with manual adjustment by operator: usually 2, sometimes 3 fast scans – about 5 times less time (money for electricity) consumption.
  - What if optimum amount of pulses about 200? More than 30 fastscans may be needed
- Other issues?

EmCont: to be???