Update on Bari activities

Fabio

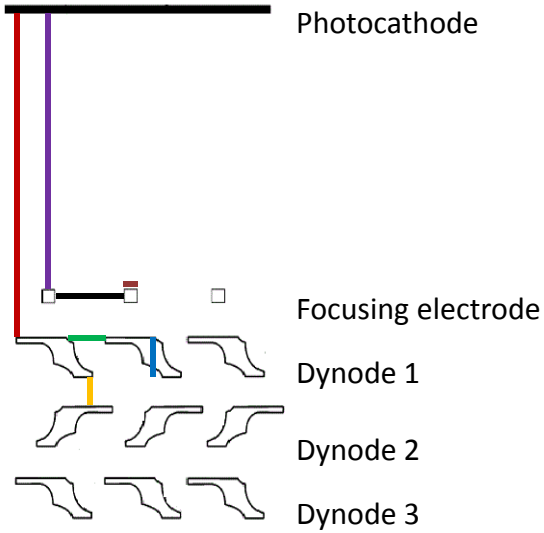
INFN Bari

Outline

- Scan of a central pixel
- Time distribution
- Charge distribution
- Maps
- Outlook

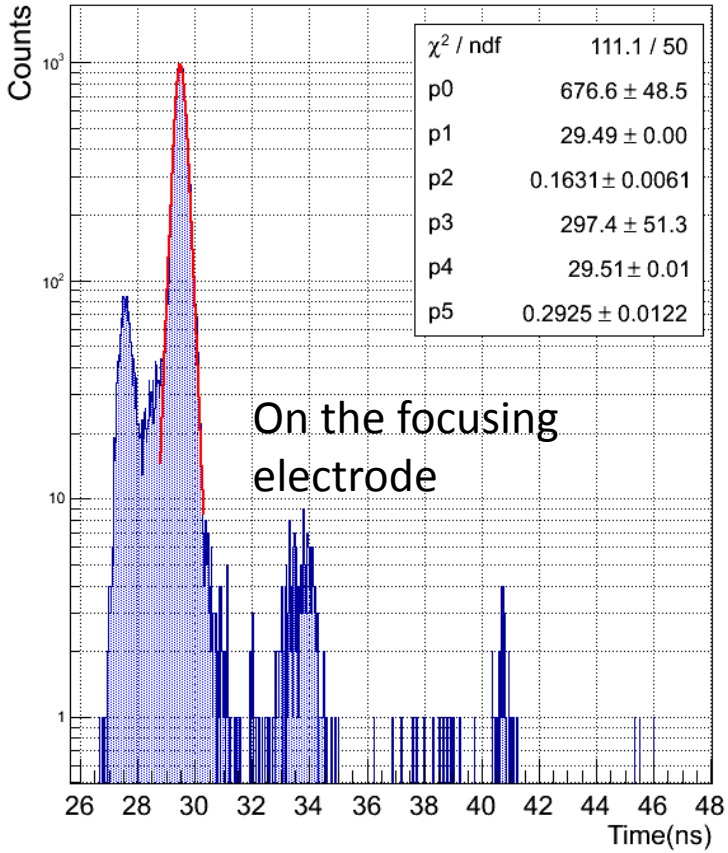
Central Pixel

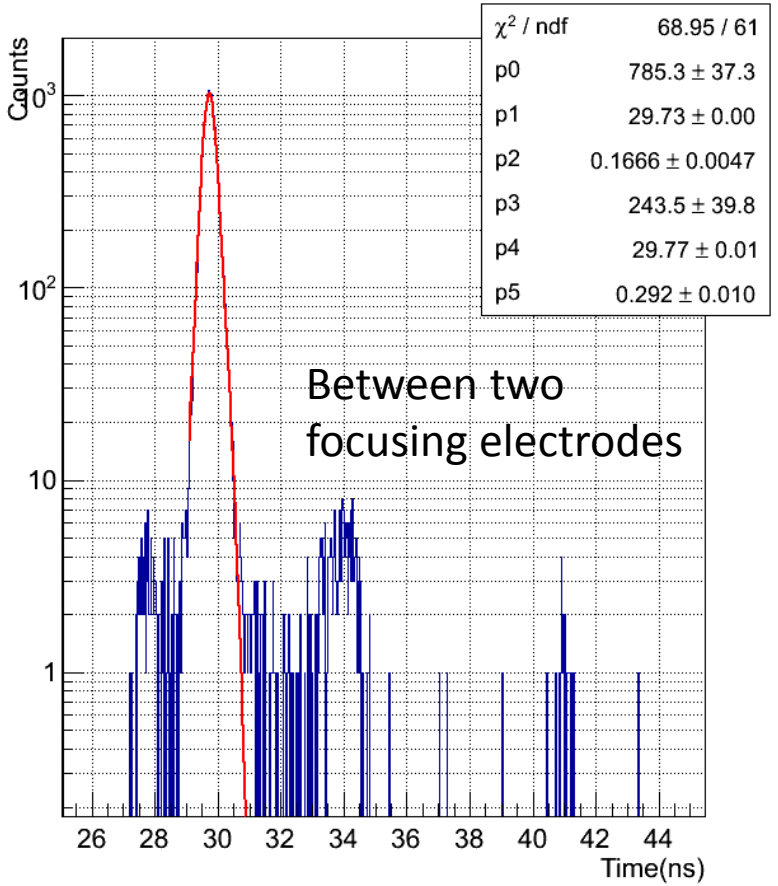
- As suggested by Jerry I have performed a full scan of a central pixel of H8500 to verify if there are differences with respect of a corner one
- I have done a high statistic run over 500μm with a 50 μm step to study in detail the effect of the inner structure on charge and time distribution



1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	41	43	44	45	46	47	48
49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64

Time distribution



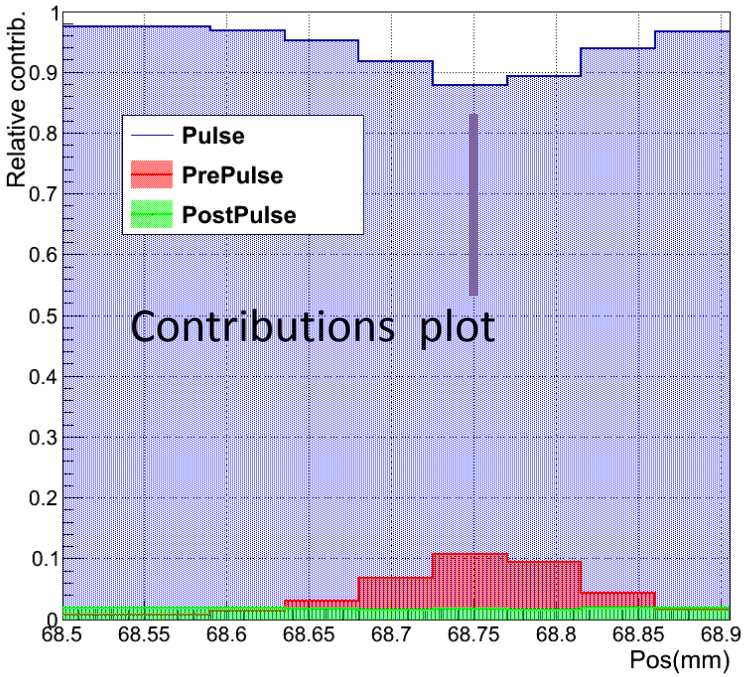


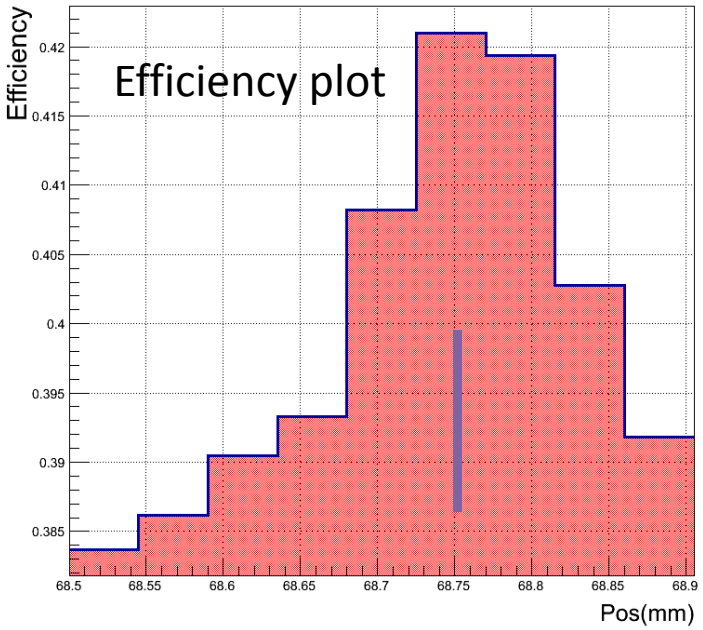
The data are corrected by time walk effect

The fit is done with two Gaussian function (see next slides)

I have counted the number of pre-pulses, pulses and after pulses form these plots

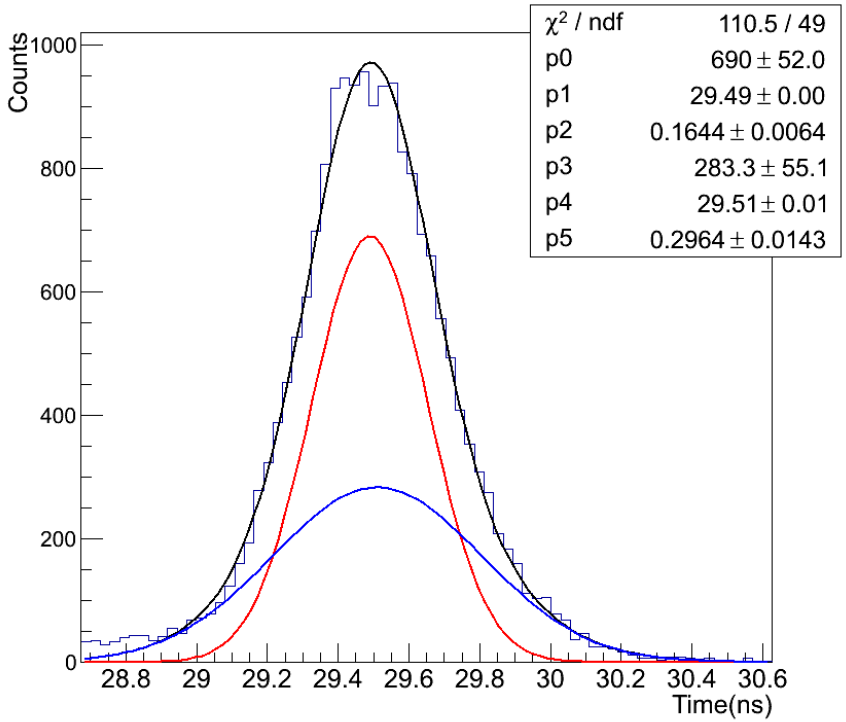
Pre/after pulses and efficiency

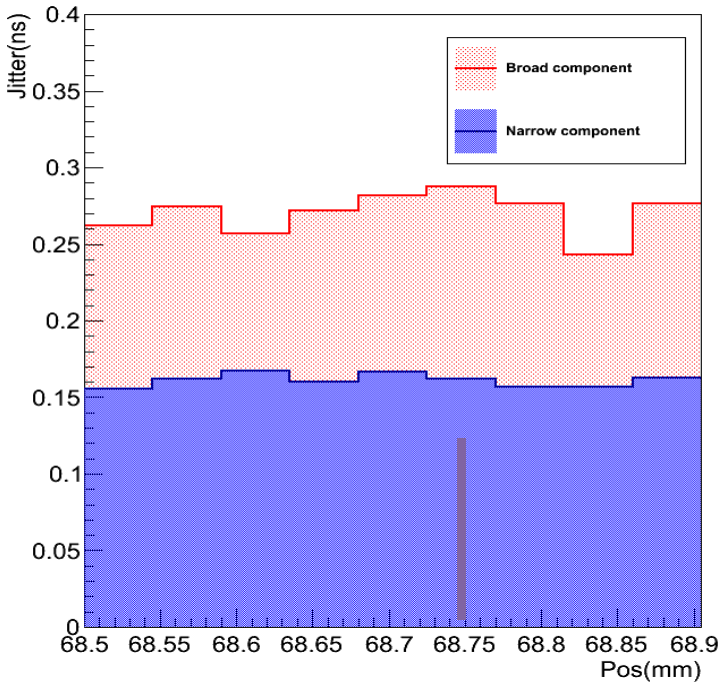




- In this plot are shown the different contributions to the detected pulses.
- The number of pre-pulse is much more evident near the focusing electrodes, as already seen in the corner pixel.
- The number of post pulse is almost constant
- The increasing in overall efficiency near the focusing electrodes is due to the fact that in these region is higher the probability to detect a thoroughgoing photon.

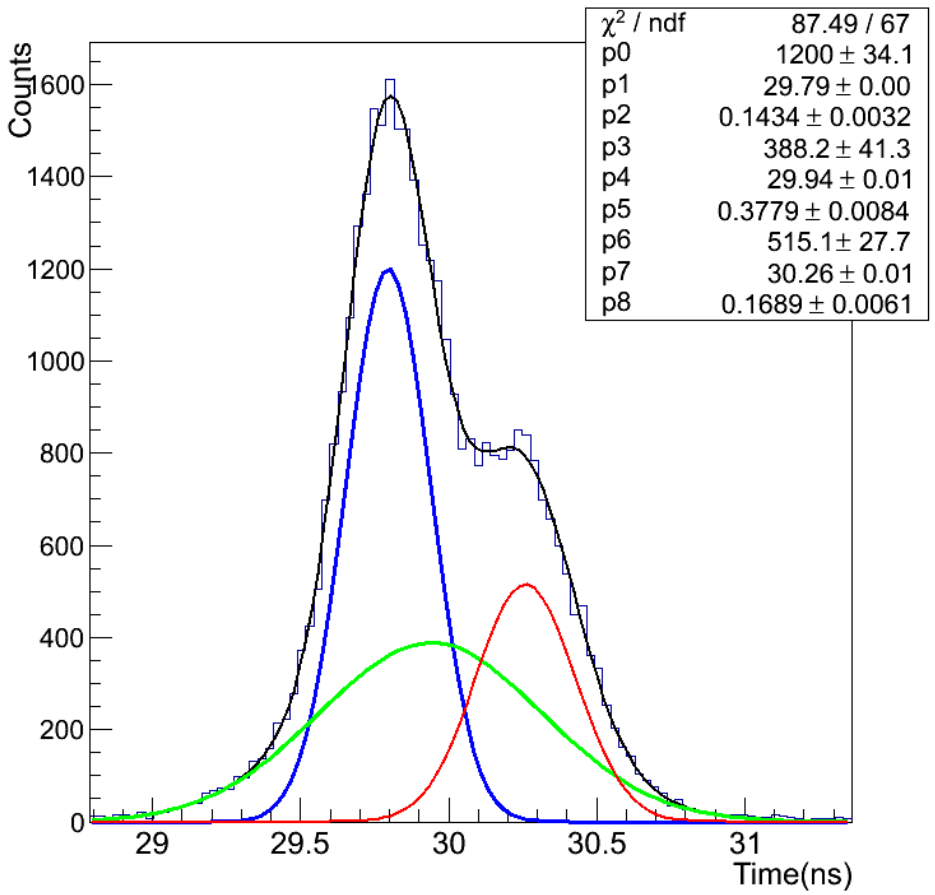
Time distribution fit





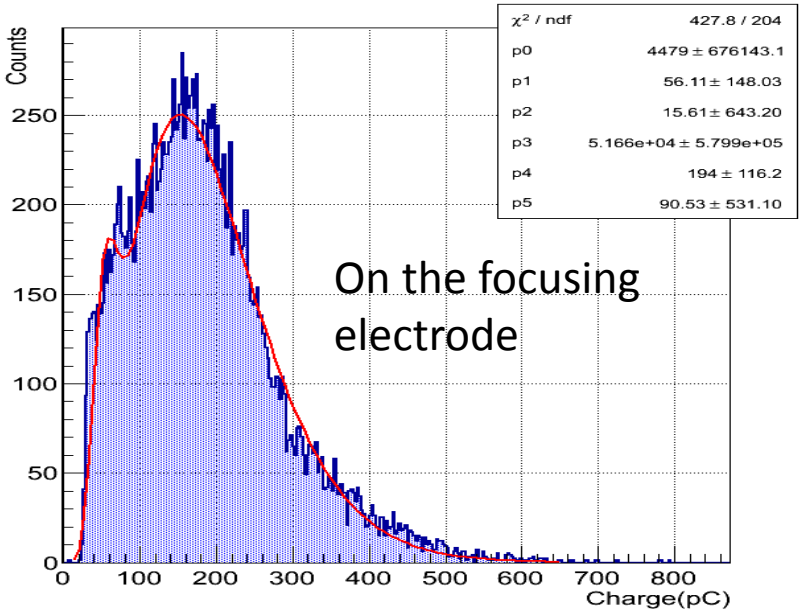
- I have found that also with my data the best way to fit the time distributions is to use two Gaussian (as reported by Jerry in TDR)
- It seems that we have two contributions: one **narrow** with a σ of **140ps** (once the electronics intrinsic jitter of 85ps has been subtracted) and one **broader** of **270ps**
- The relative contribution of the two kind of events is almost half and half and it is almost the same over different positions.

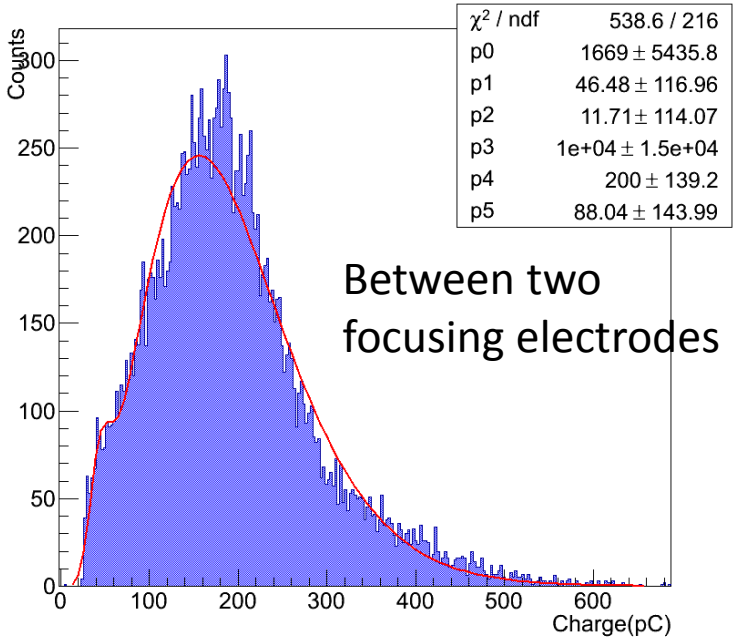
Time distribution fit for a corner pixel



- If we plot the same distribution obtained looking at a corner pixel (1st) we observe that the best fit is done with 3 Gaussian functions.
- The first two G essentially fit the narrow and broad components while the third one is necessary to fit the shoulder of the distribution i.e events that arrives 0.5ns later.
- Is this a feature only of this particular pixel or it is more common? Is this an issue?

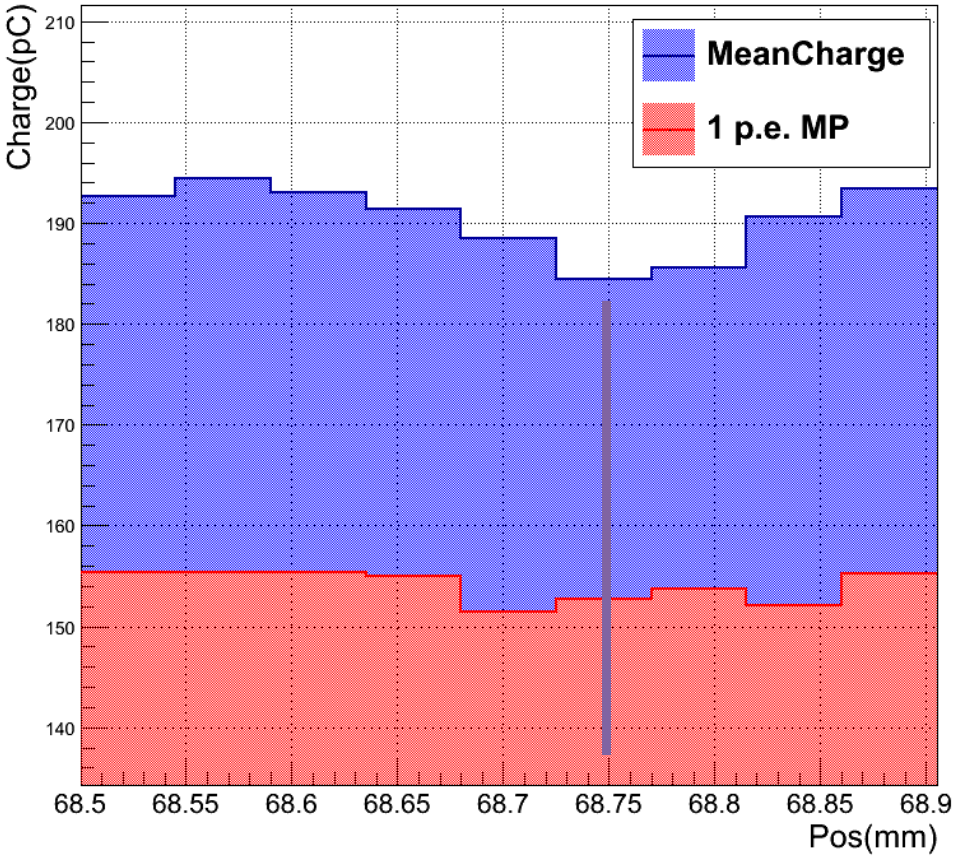
Charge distribution





- The fit is done with two Polya functions to take into account the contribution to charge distribution coming from pre pulse event.
- These events are characterized by a lower charge (1/3) since they are amplified by 11 stages instead of 12.
- The two distribution are not well separated and so the fit is not so good

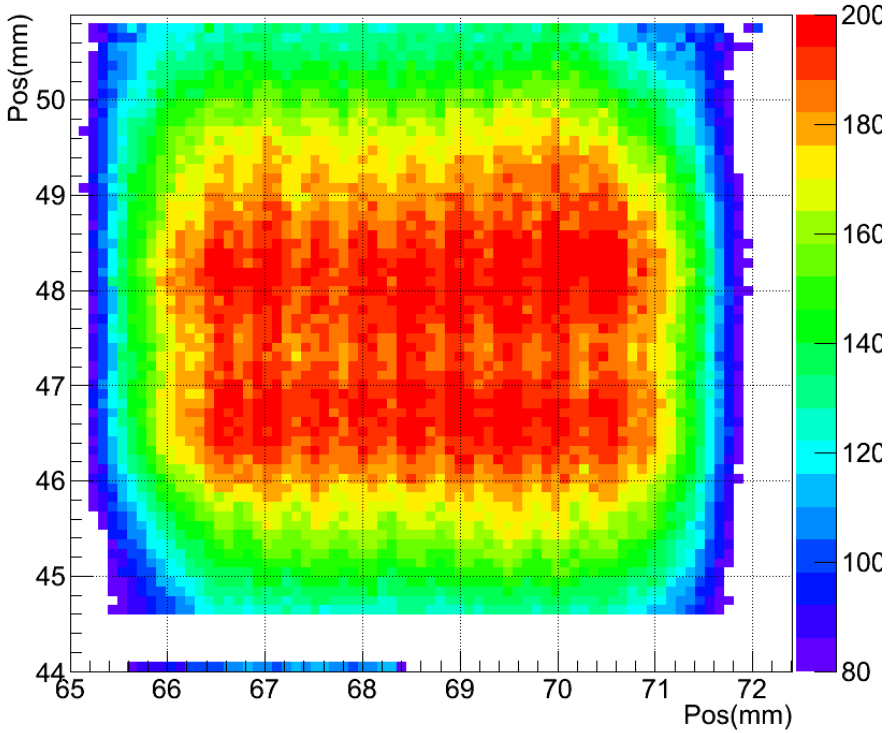
Charge vs Position



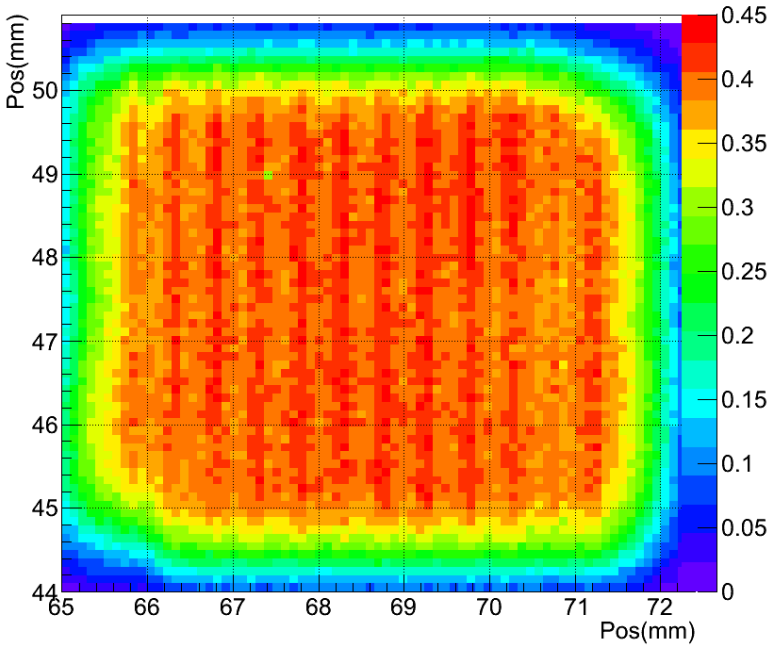
- The measured mean charge changes a little bit with position and it lowers near the focusing electrode because the contribution of pre pulse event (less charge) is greater.
- The most probable value of the 1P.E. distribution is instead more steady.

Maps

Charge Map



Efficiency Map

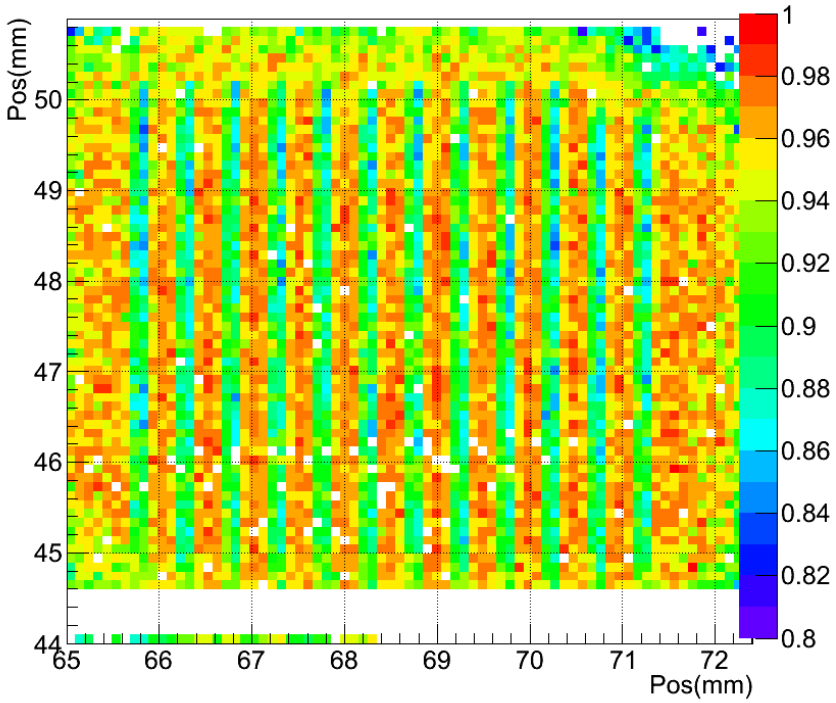


Outlook

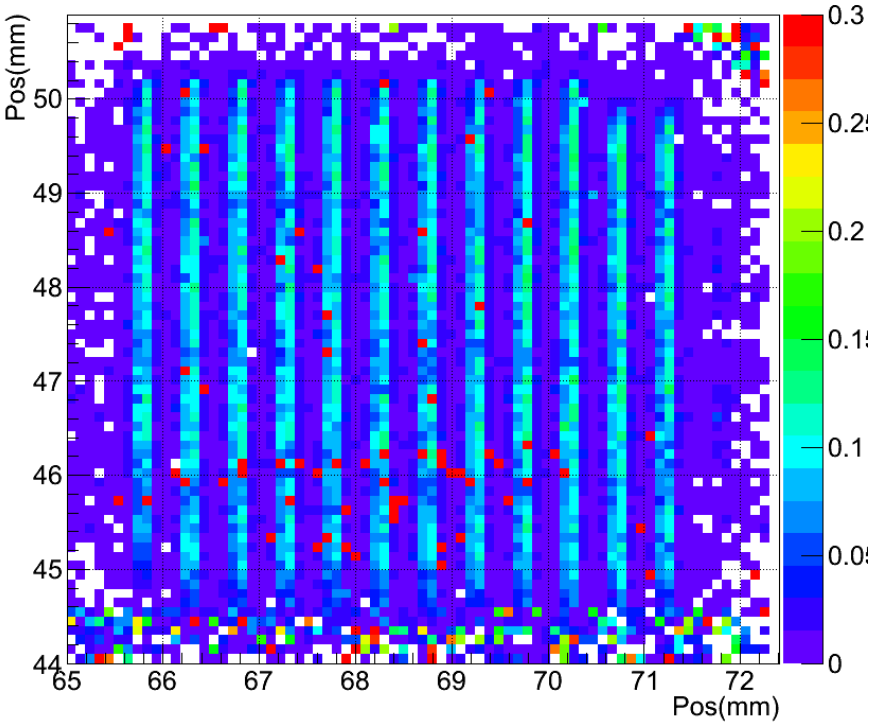
- Maps of all the pixels of H8500
- Study of charge and time performances inside magnetic field
- Test of characterization of the whole H8500 at the same time (diffuse and uniform illumination of the photocathode)
- … tests of the SCATS

Backup slides

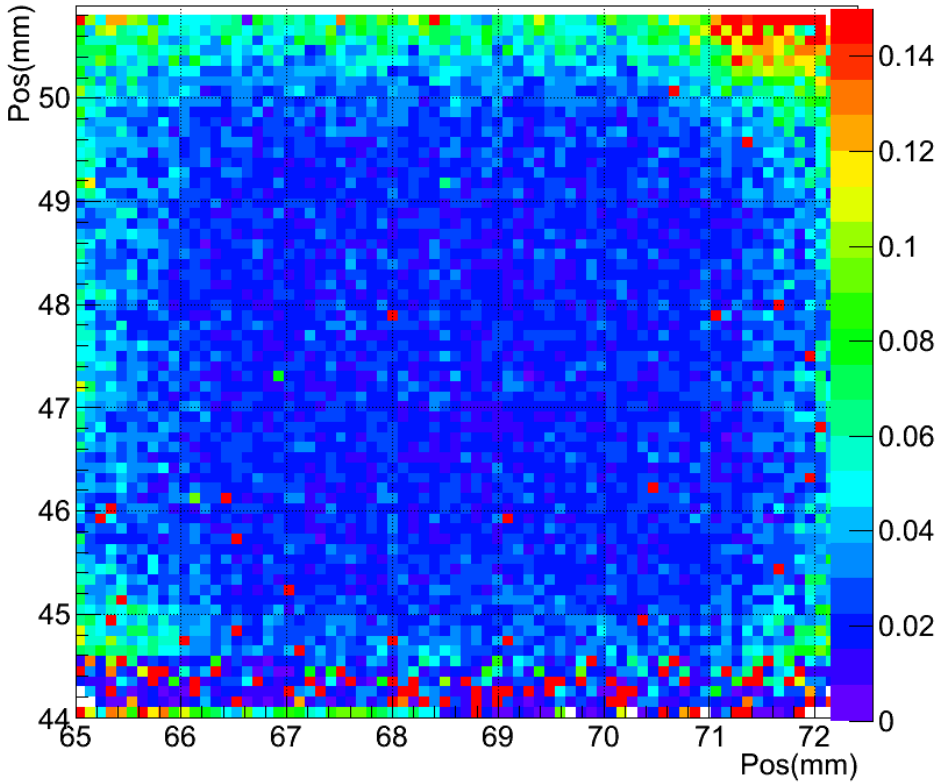
Pulse contribution



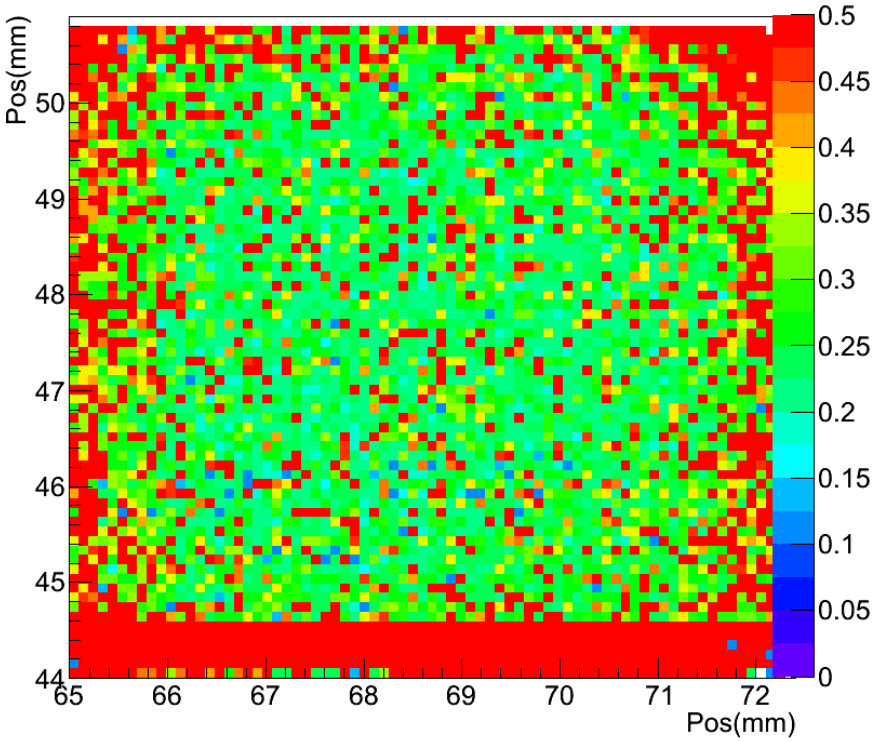
Pre Pulse contribution



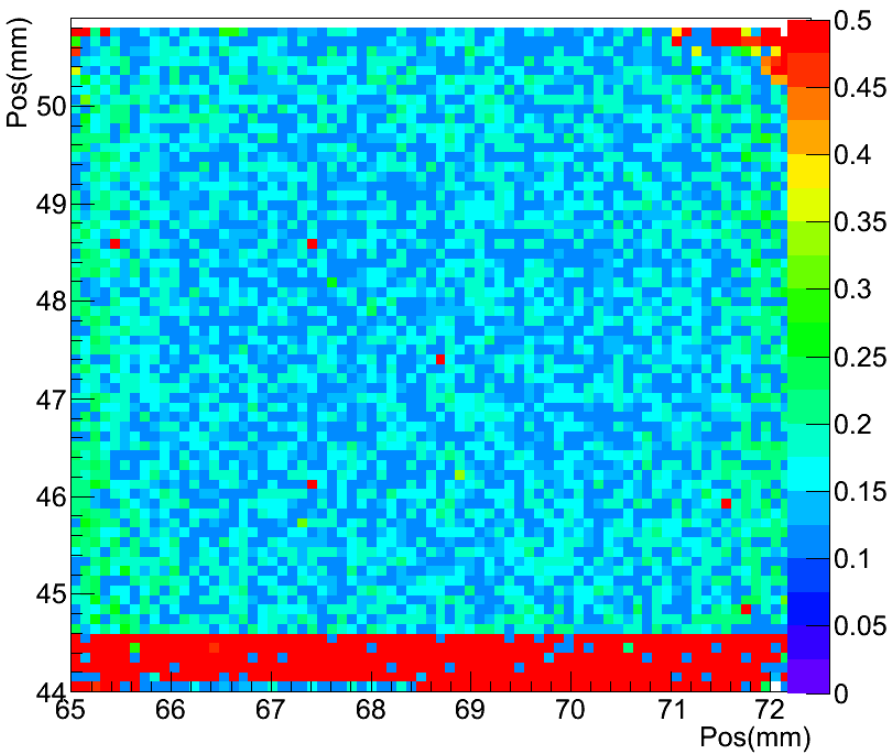
Post pulse contribution



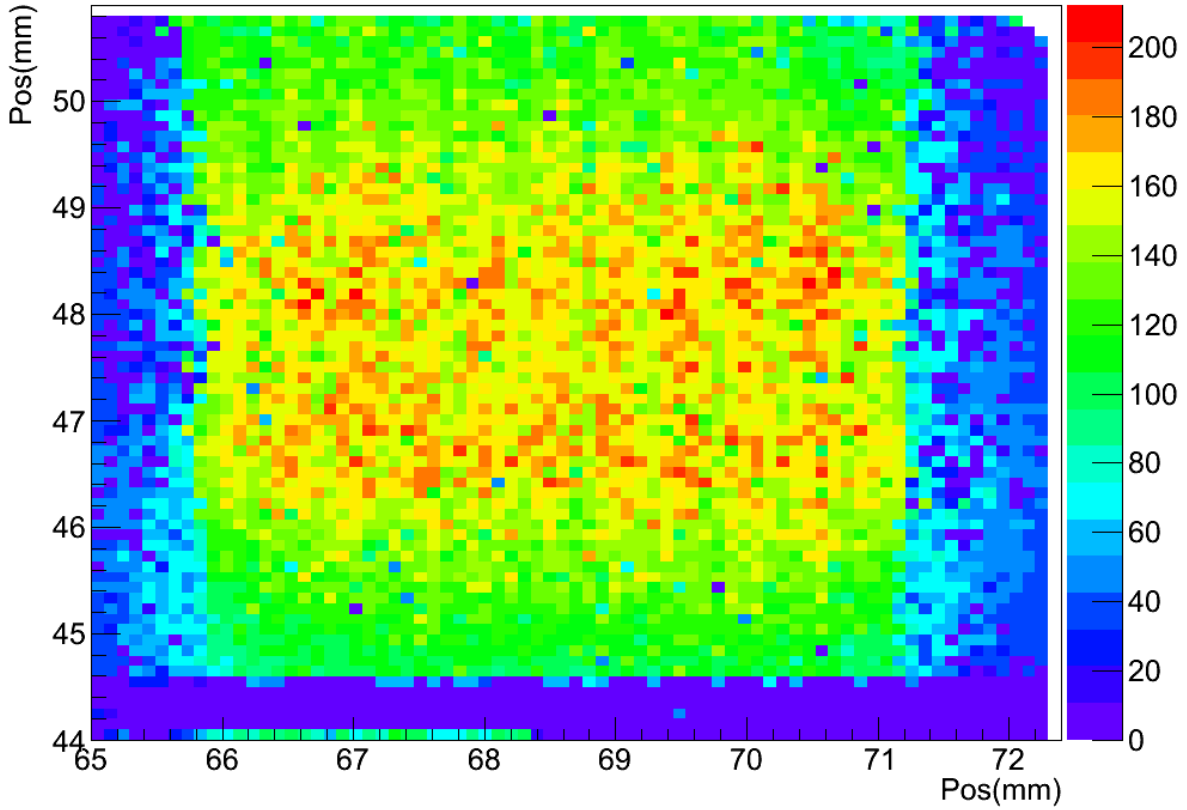
Jitter broad component



Jitter narrow component



Most Probable value distribution



- SCN2364 with pedestal SCN2348
  - High statistic scan of pixel 37
- SCN2363 with pedestal SCN2348
  - Map of pixel 37
- SCN2213 with pedestal SCN2108
  - High statistic run of pixel 1 near the electrode
- SCN2214 with pedestal SCN2108
  - High statistic run of pixel 1 between two electrodes