Photosensors Studies for gamma ray detection in space application

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for the
Universities & INFN Bari Group

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outlook

- People @ Bari
- Heritage
- Facilities
- On-going R&Ds

The group

P. Spinelli

C. Favuzzi

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N. Giglietto

P. Fusco

F. Gargano

F. Giordano

F. Loparco

E. Bissaldi

S. Rainò

F. de Palma

D. Simone

L. Di Venere

M. Caragiulo

Professor

Phd

Expertise

Recent activities on
photonsensors

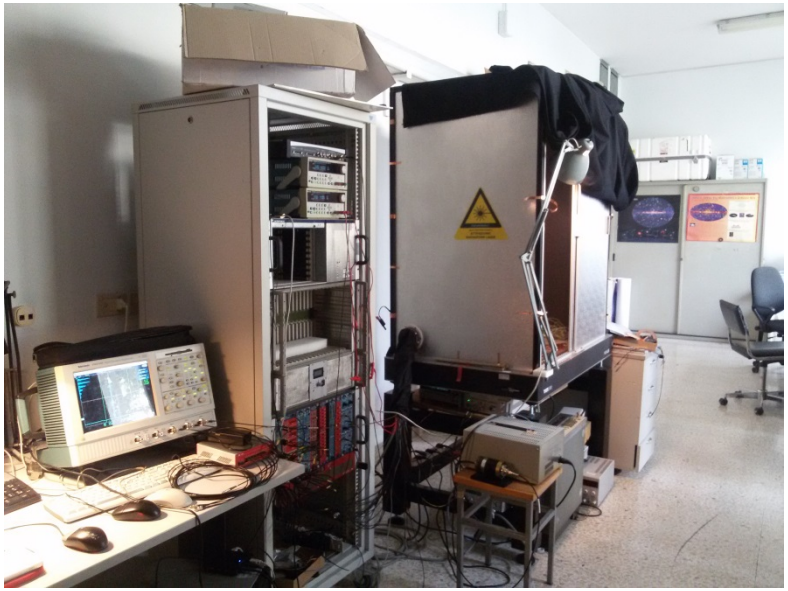
Responsibilities in
Tests and Space qualification
of Fermi Silicon TKR system

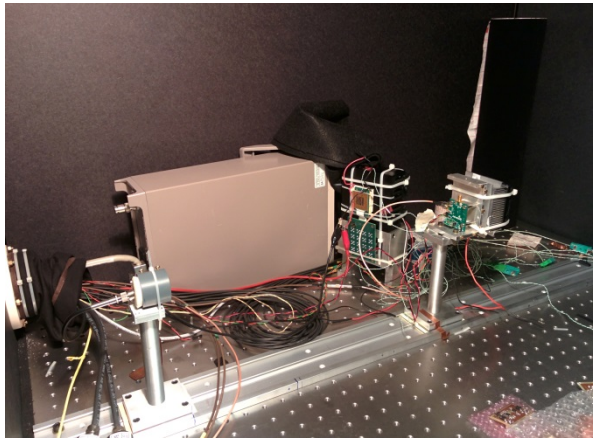
Very low light sensitivity for
imaging cerkenkov application

SuperB with MaPMTs
CTA with SiPMs

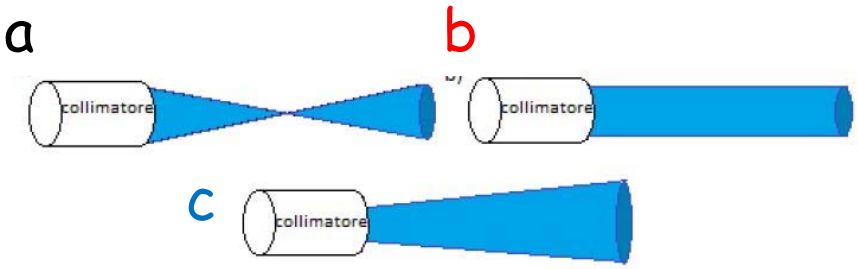
The facility @ Bari

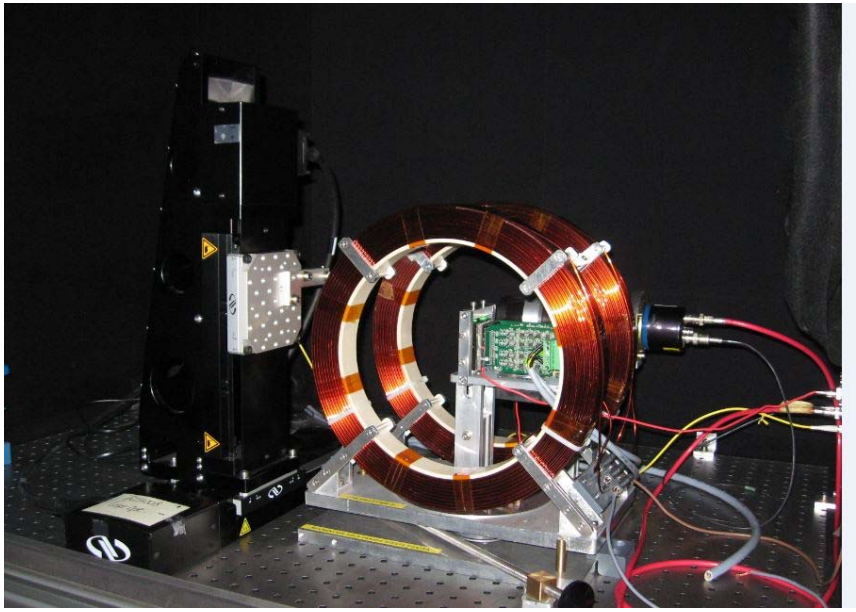
We have a fully equipped lab to perform different kind of photo-sensor characterization

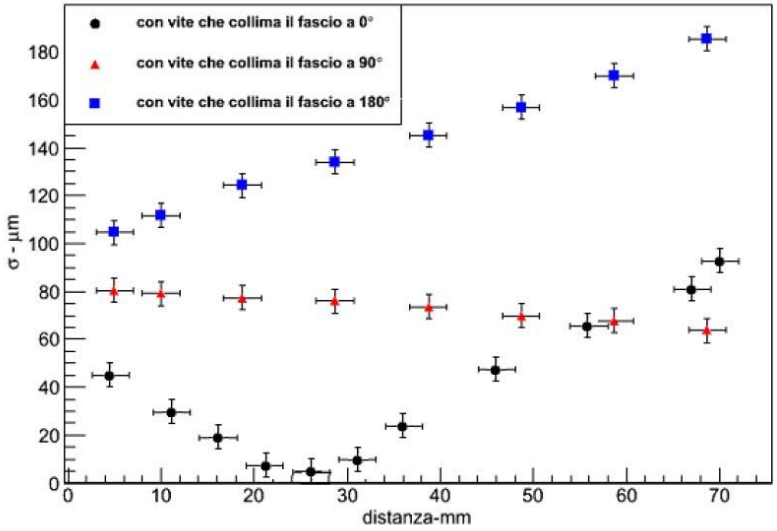




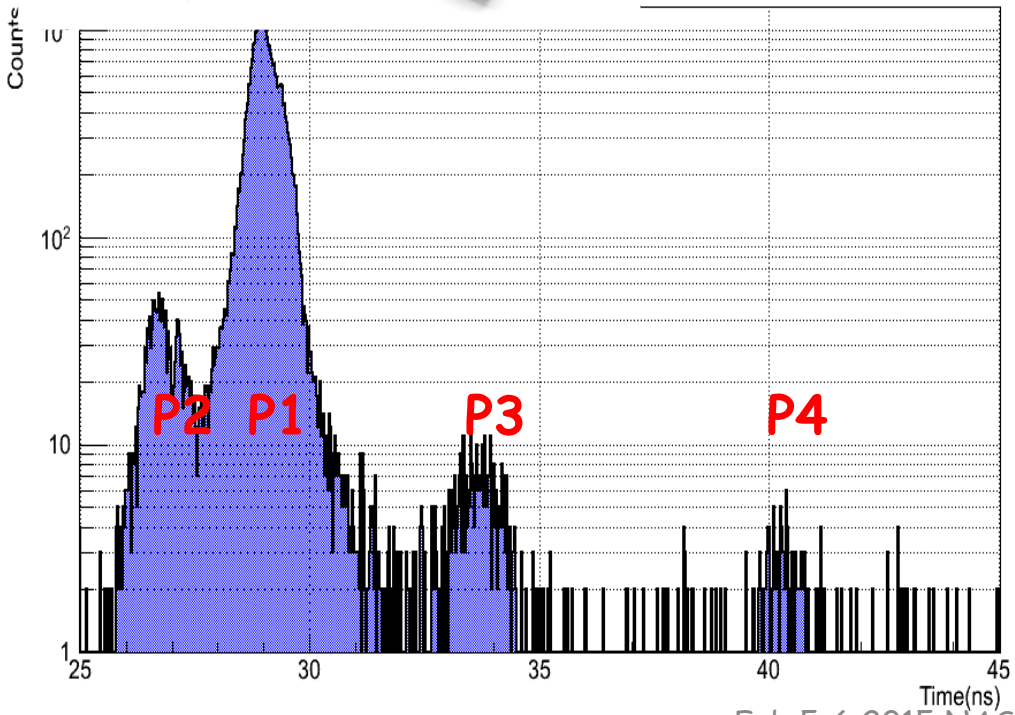
- Very precise beam monitor,
- test @ very low light intensity
- Performance in magnetic field

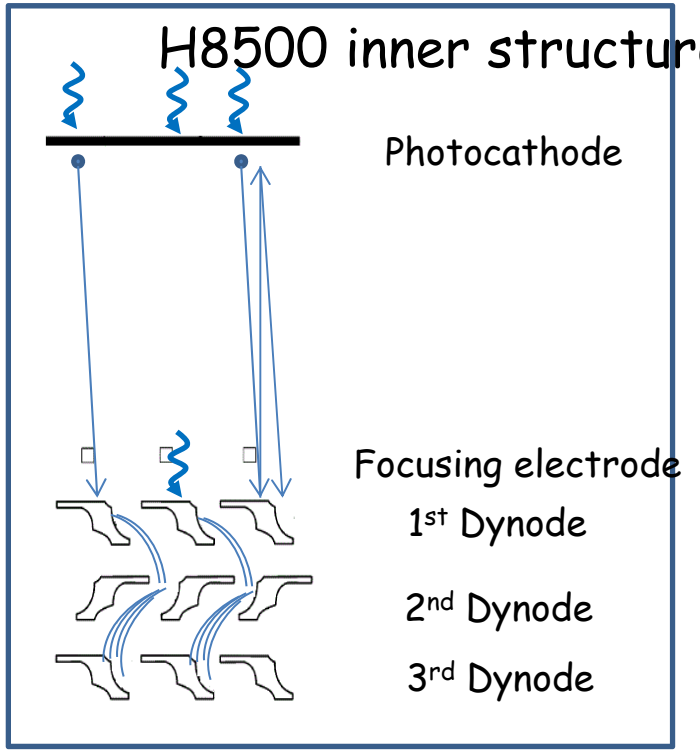






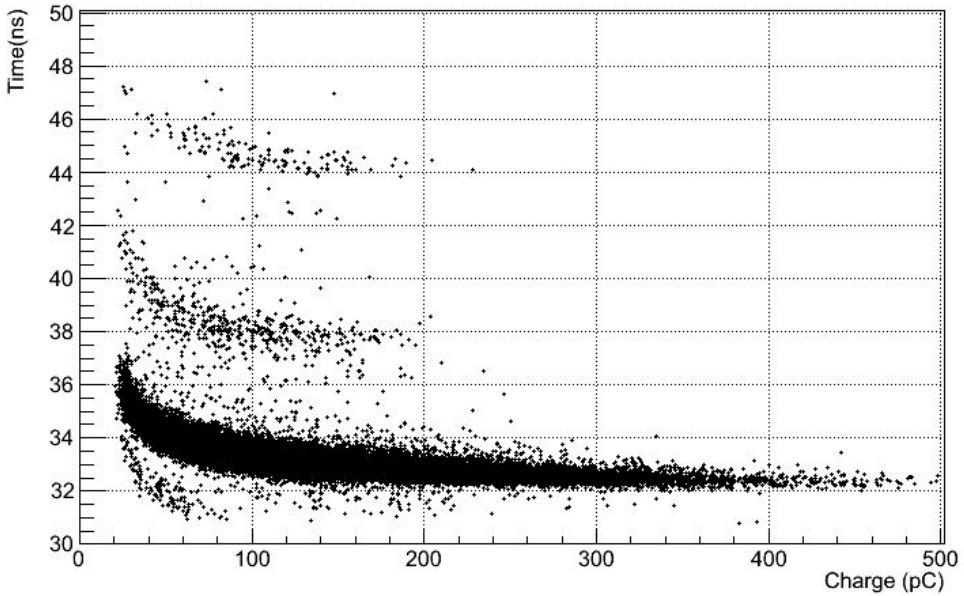
Super B - MaPMTs for PID



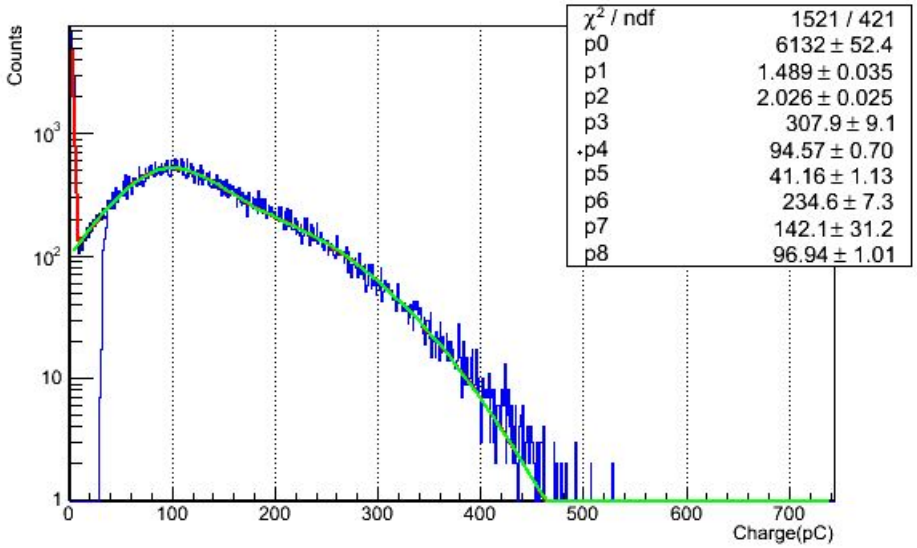


Fully carachterized Hamamtsu H8500 MaMPT discovering some intersting feature about transit time and gain uniformity

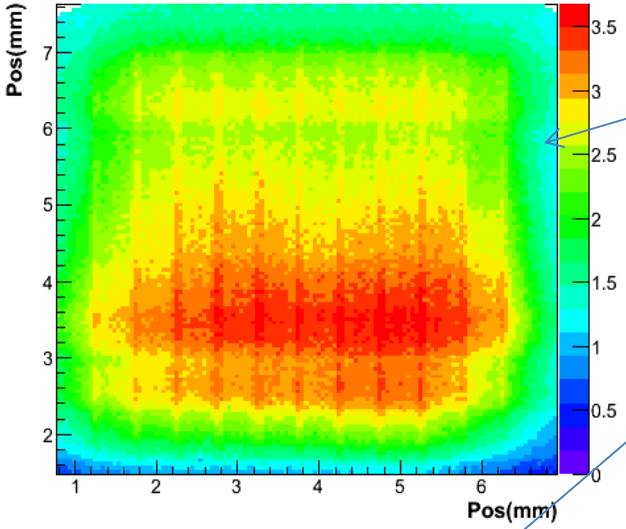
Transit time vs collected charge



Charge distribution

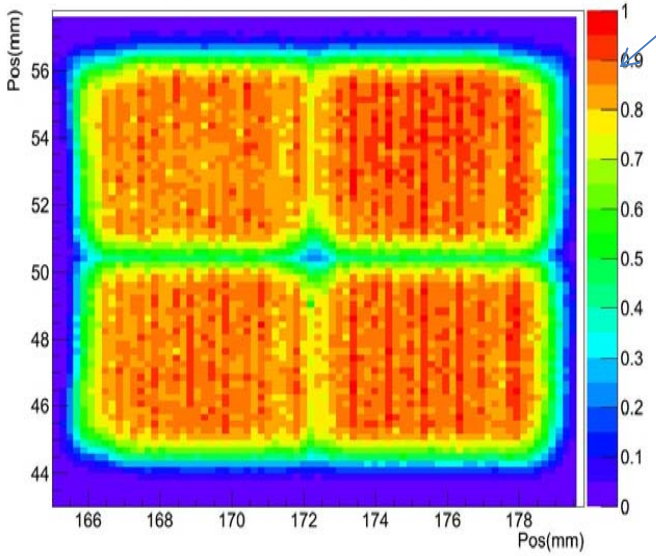


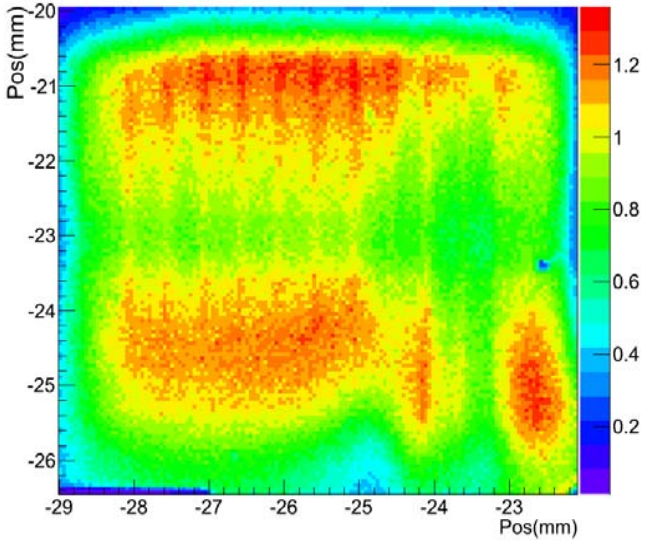
Charge map



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

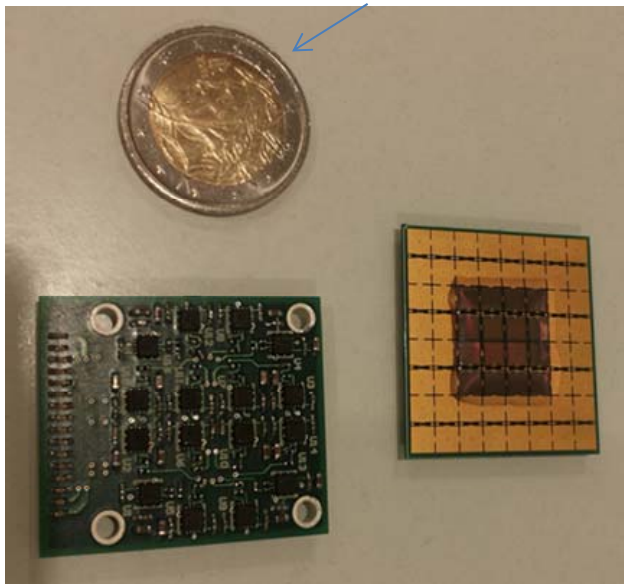
Efficiency Rat map



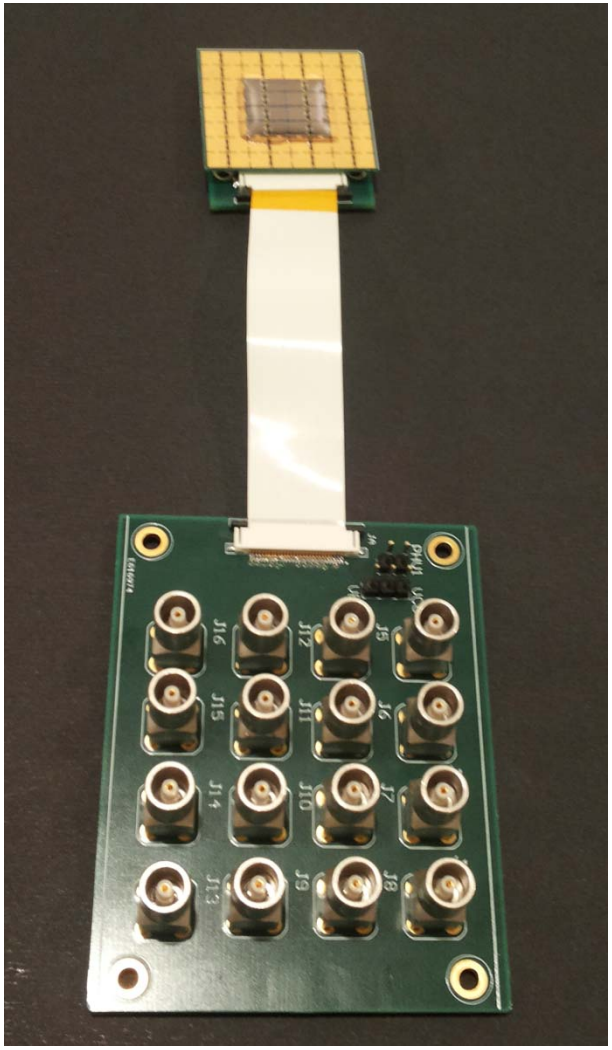


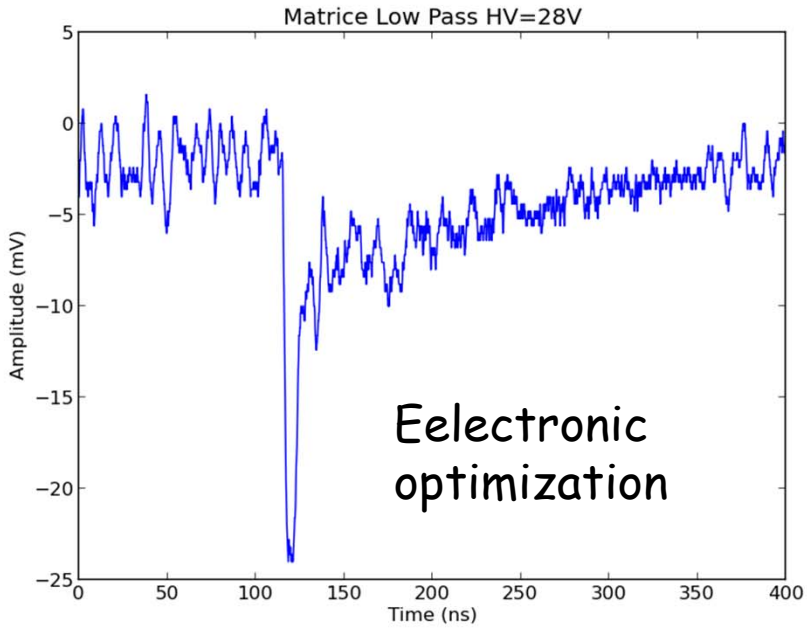
The SiPM matrix

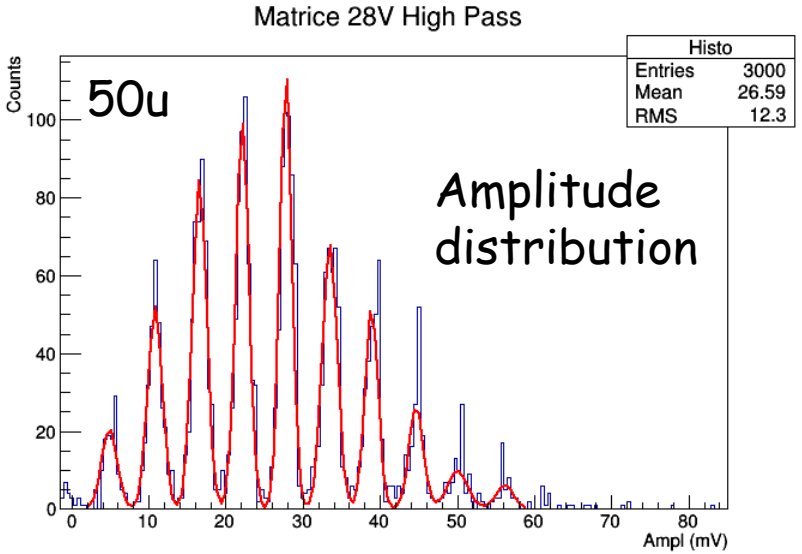
Dante's face

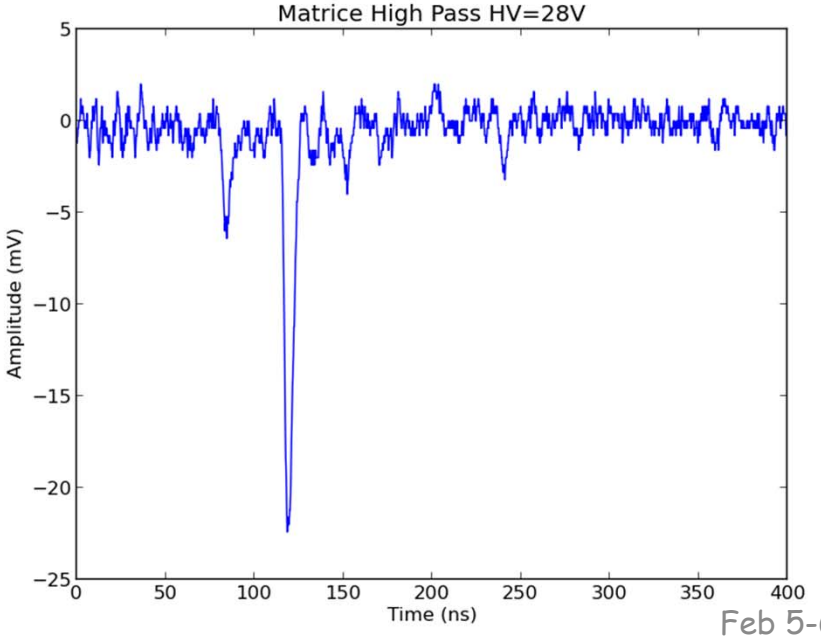


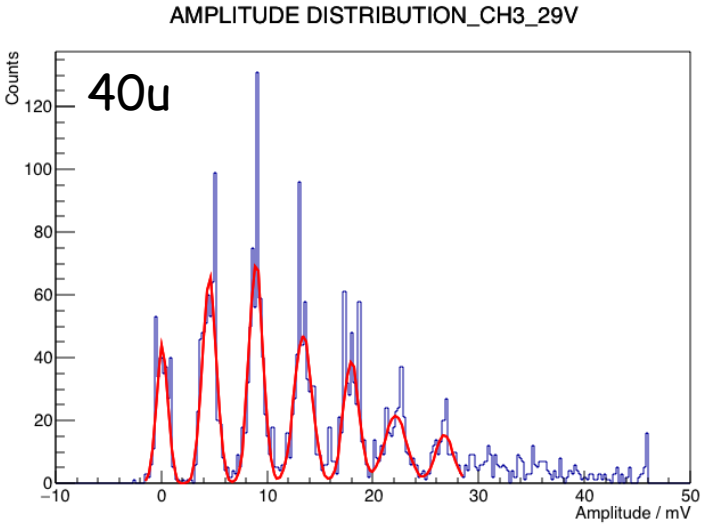
A ad8k OPA based electronics has been designed for conditioning the signals from 16 3x3 SiPMs




Matrice Low Pass HV=28V
Amplitude (mV)
Time (ns)
Eelectronic optimization

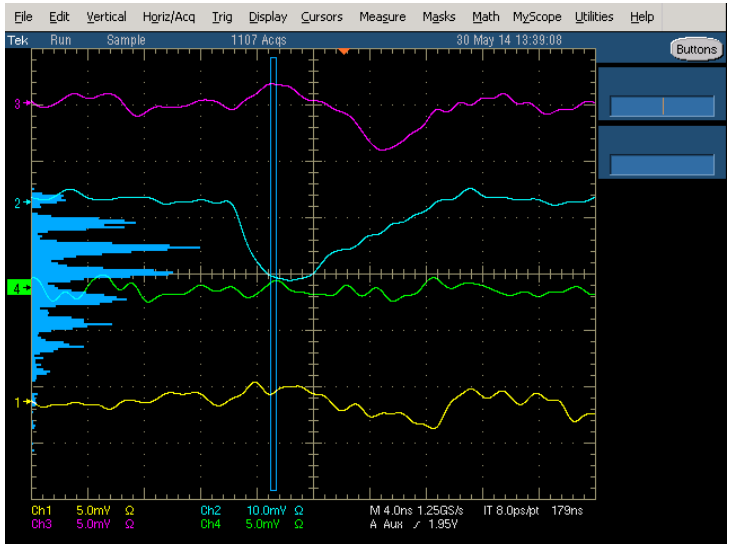

Matrice 28V High Pass
Histo
Entries 3000
Mean 26.59
RMS 12.3
50u
Amplitude distribution
Counts
Ampl (mV)


Matrice High Pass HV=28V
Amplitude (mV)
Time (ns)


AMPLITUDE DISTRIBUTION_CH3_29V
40u
Counts
Amplitude / mV

The matrix with the laser

Laser pulse



Conclusions

- Multichannel photonsers for imaging capability
- Vaccum tube vs solid state thecnology
- New PMTs (new cathode & new geometry) will be tested soon
- R&D on new sensor w italian foundry is still on-going