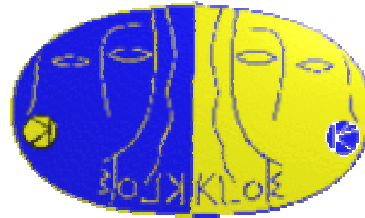


QCAL upgrade plan

E. Santovetti

KLOE General meeting 10-11 October 2002



Current situation

Efficiency, resolution, Background occupancy
Electronic noise

Future intervention

PM test and selection
Replacement of ~ 10 PM
Electronic upgrade

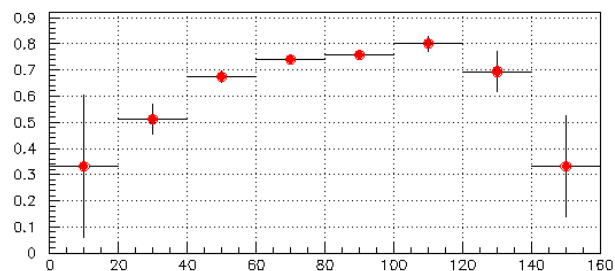
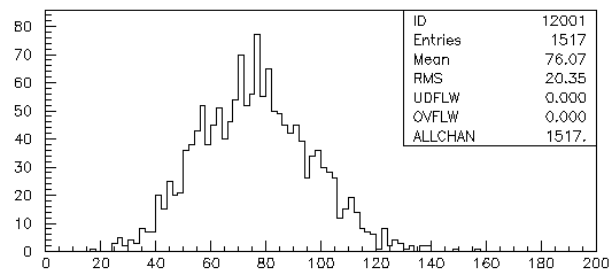
Efficiency



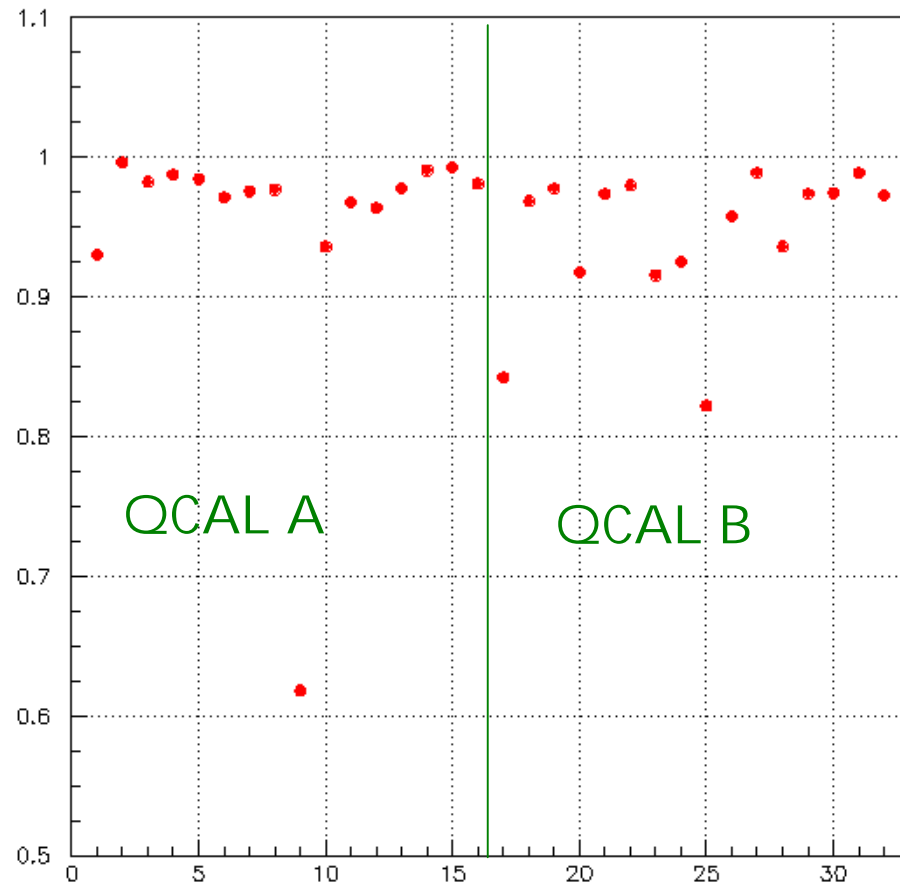
Average ch. efficiency = 97 %

Actual detection eff. > 99 %

Photon efficiency from
 $K_L \rightarrow \pi^+\pi^-\pi^0$ (70 MeV) ~ 85 %



MIP detection Efficiency vs ch
(efficiency of the single channel !)



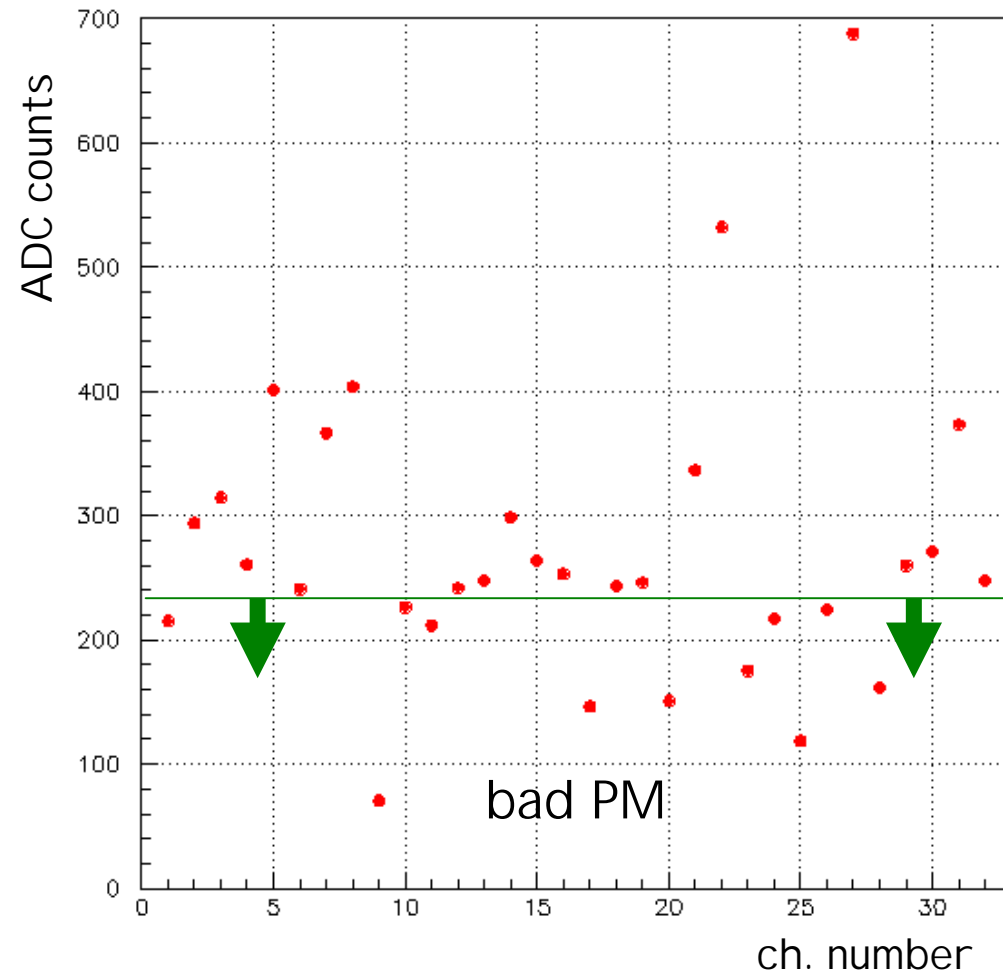
MI P signal amplitude



After HV equalization the response remains very inhomogeneous

The Magnetic field (5.2T) reduces the signal amplitude by 60%

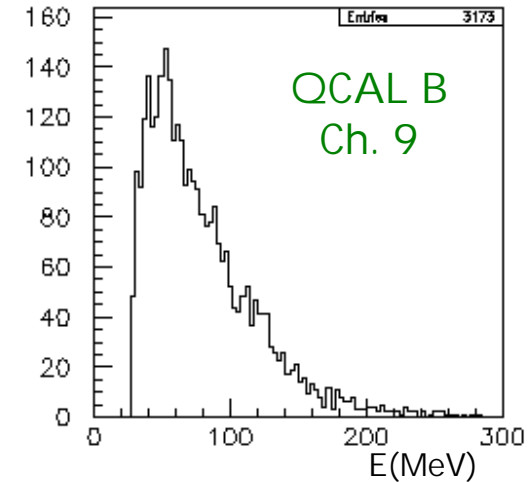
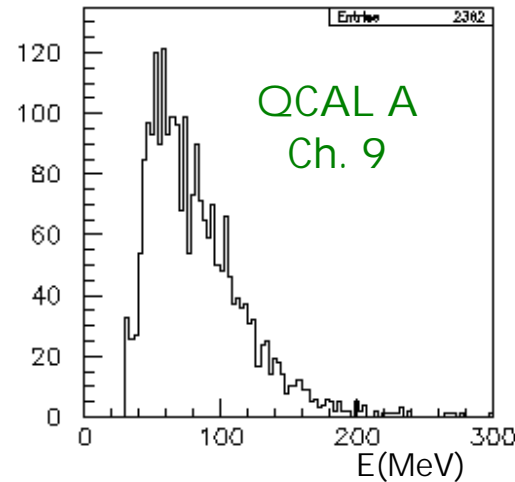
MI P signal amplitude vs ch



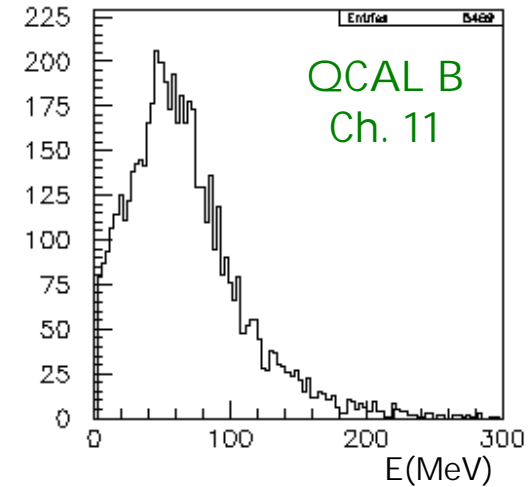
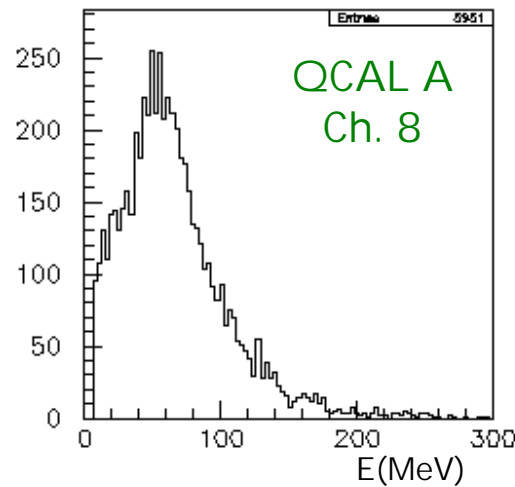
MI P signal amplitude/2



bad channel
The threshold
(3σ or 50 ADC counts)
cuts evidently the signal !



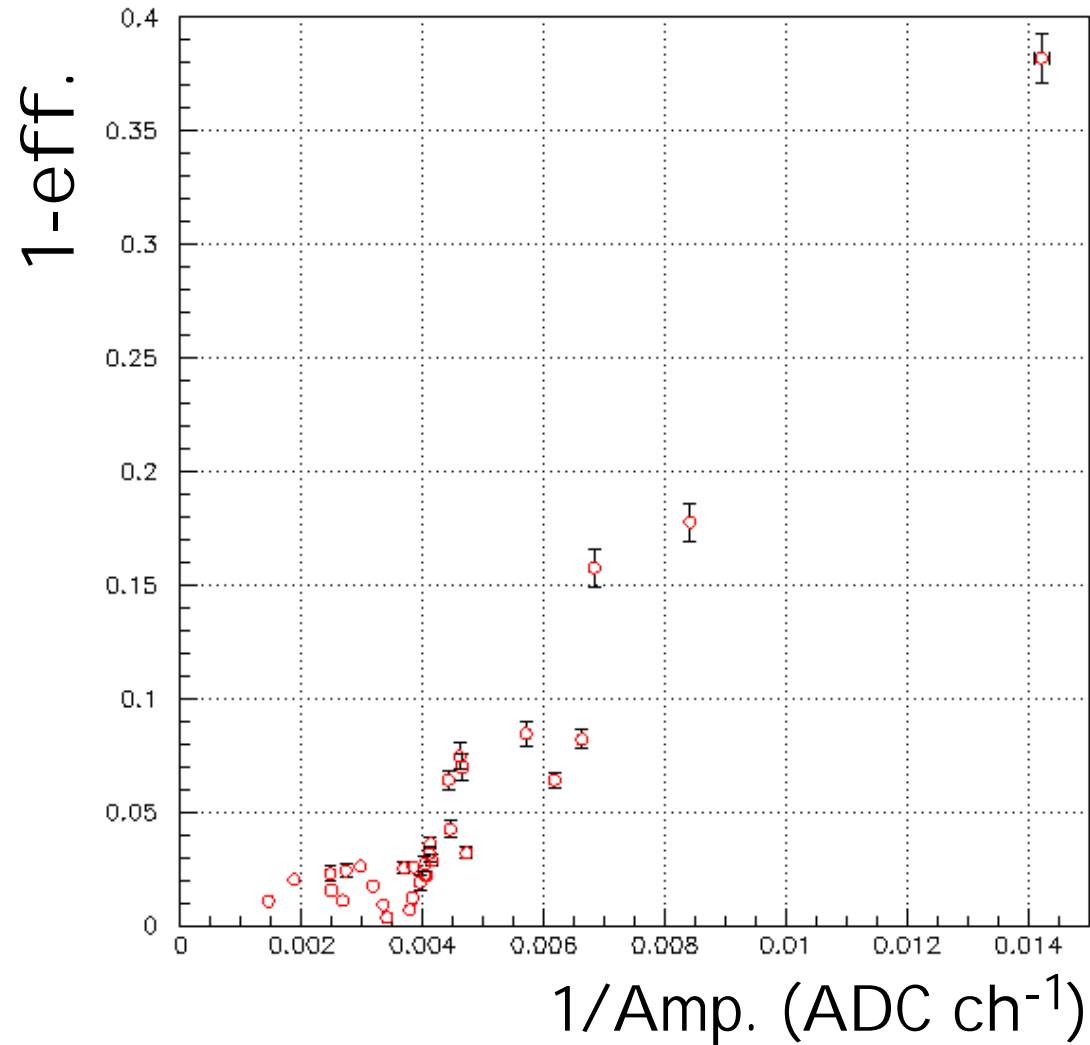
good channel



Efficiency



Efficiency and signal amplitude show a clear correlation



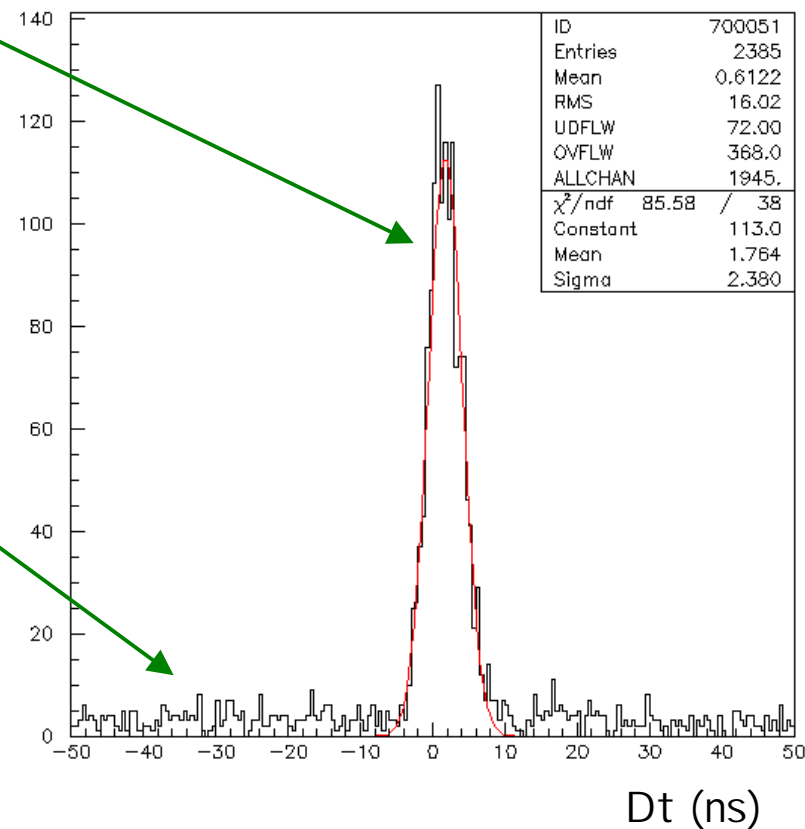
Background and time resolution



(from $K_L \rightarrow \pi^+\pi^-\pi^0$ events)

Time resolution for photons ~ 2.4 ns

Background occupancy ~ 0.3
($\Delta t = 200$ ns, all QCAL)



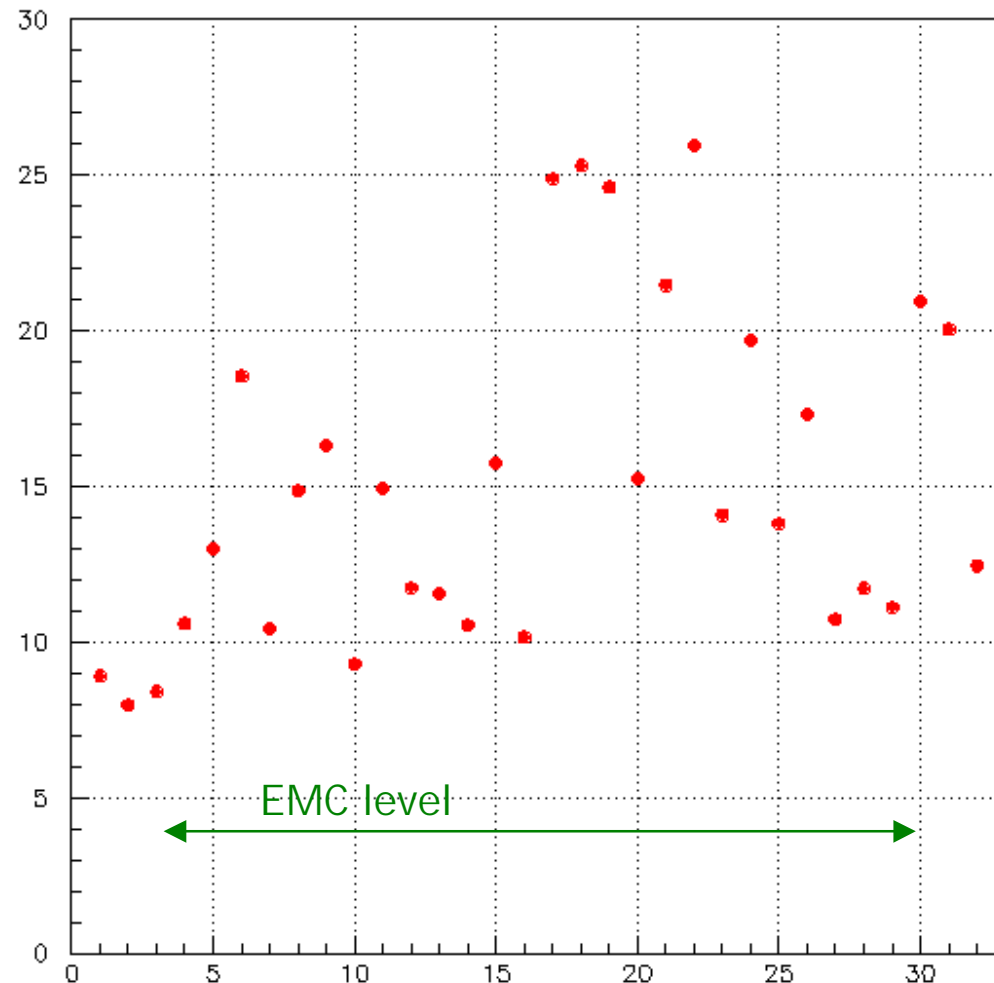
Electronic noise



The electronic noise is very high !

correlated with the magnetic field
ADC affected
low frequency (few MHz)

correlated with the machine
TDC and ADC affected
higher frequency



Future plan



Replacement of the worst (~ 10) photomultipliers

- preliminary test to check if there is an improvement

Replacement of the all 32 HV divider

- HV decoupling capacitor in the divider

Possible redesign of the FE electronics

- differential amplifier (lower noise) ?