Statistics of 1040 1‘ Size Hemispherical PMTs of type R10408 from Hamamatsu for the MAGIC-I Upgrade Camera

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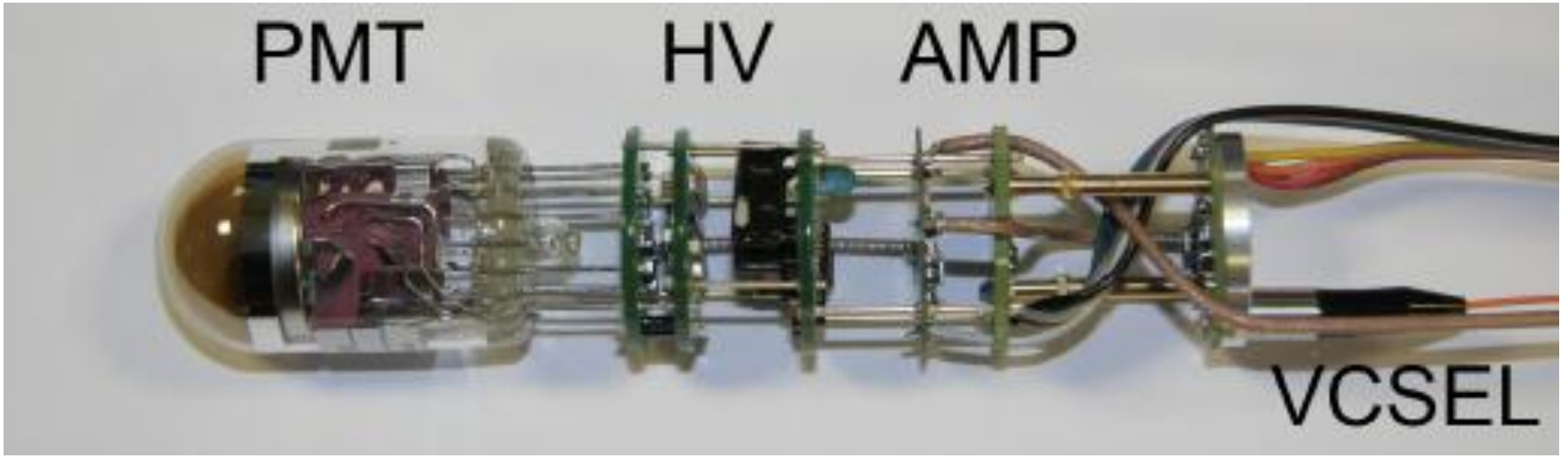
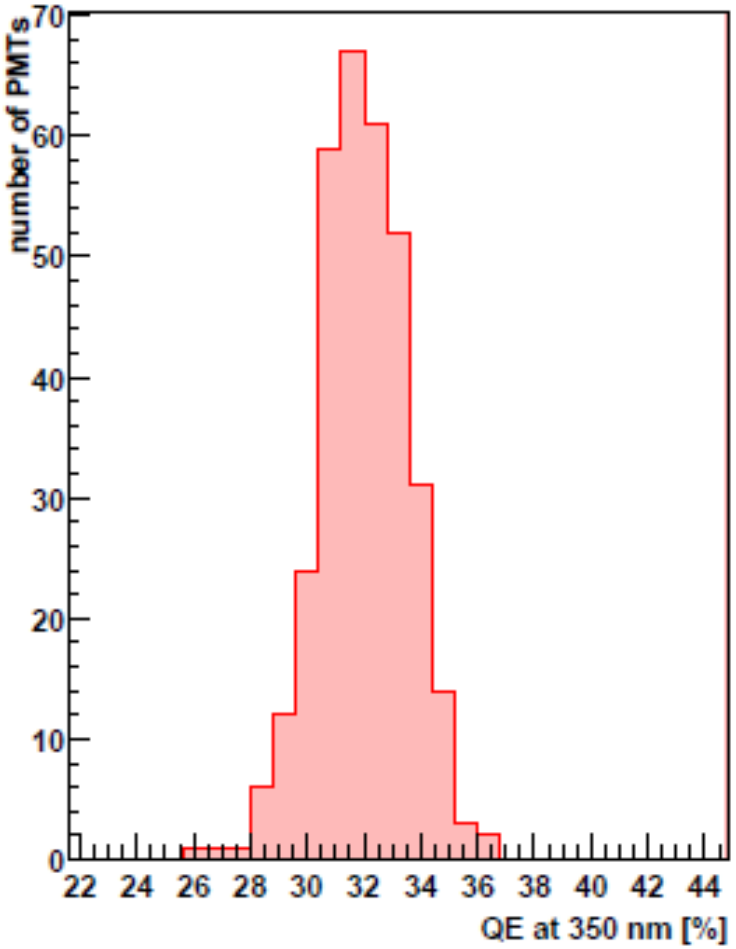
The Pixel design

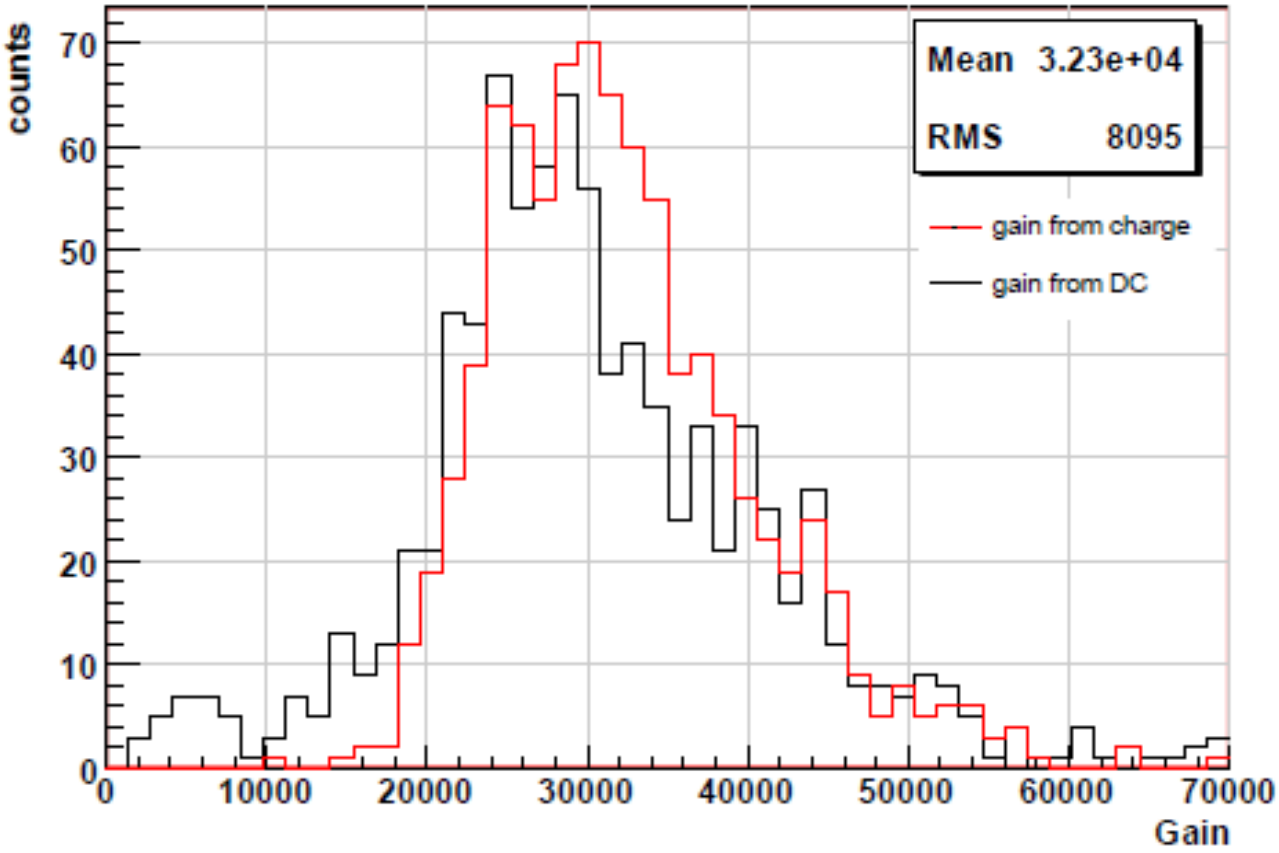


MAGIC-II PMTs QE @ 350 nm



<QE> = 32 %

Gain distribution @ the same applied HV

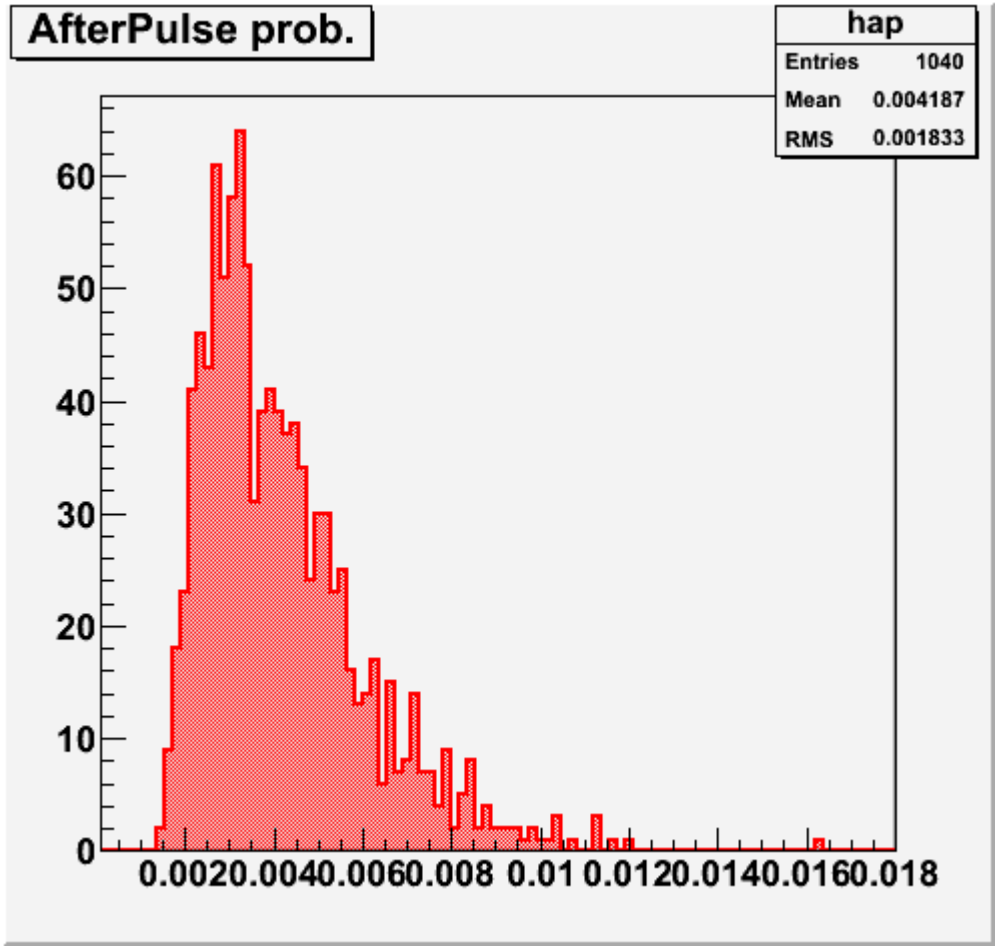


Gain distribution for all PMTs at the flatfielded voltage. The red histogram shows the gain calculated from the charge, while the black histogram shows the gain calculated from the DC current

PMTs for the MAGIC-I Upgrade Camera

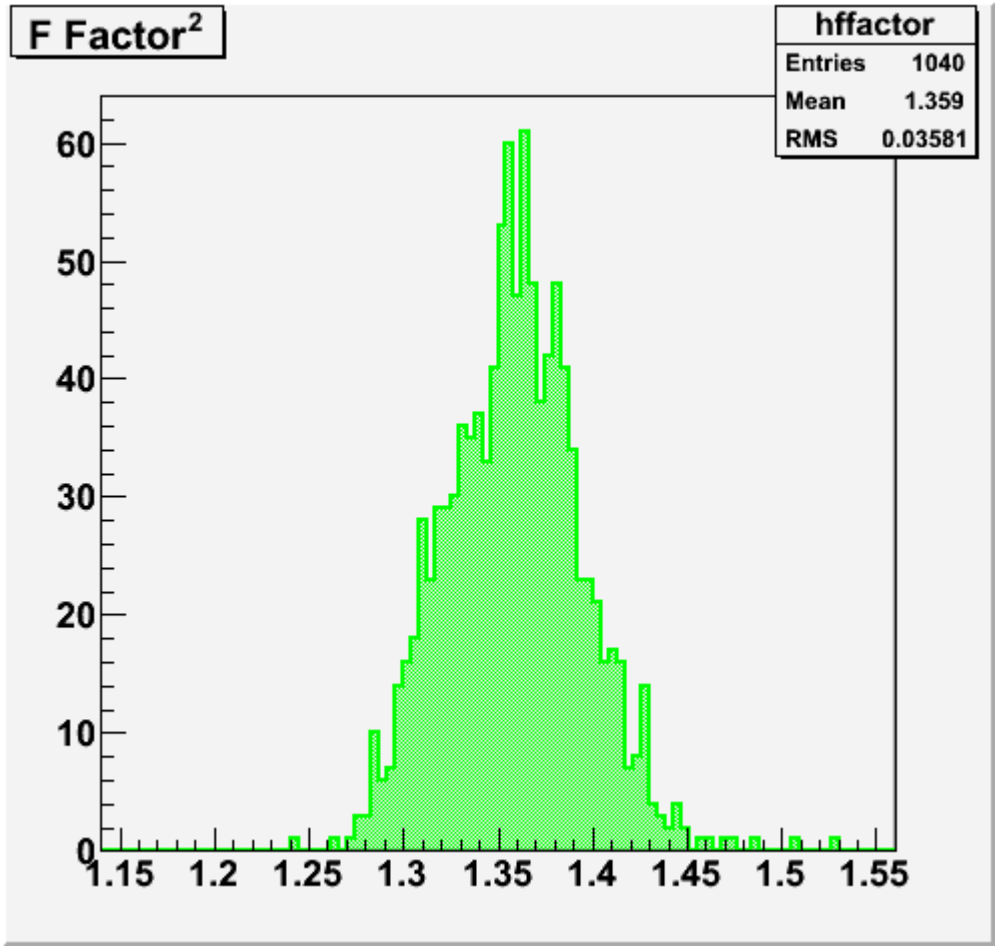
- The parameters are measured for the combination (PMT+VCSEL diodes); the latter introduce a ± 30 % peak-to-peak variation
- For narrowing the PMT gain distribution high gain PMTs (about one half) are run at a double gain and the output signal is halved by using a 1:2 voltage divider
- For this reason the gain and the applied HV distributions are looking ~2-times narrower than otherwise they should be

Probability of afterpulsiung for the threshold of ≥ 4 ph.e.



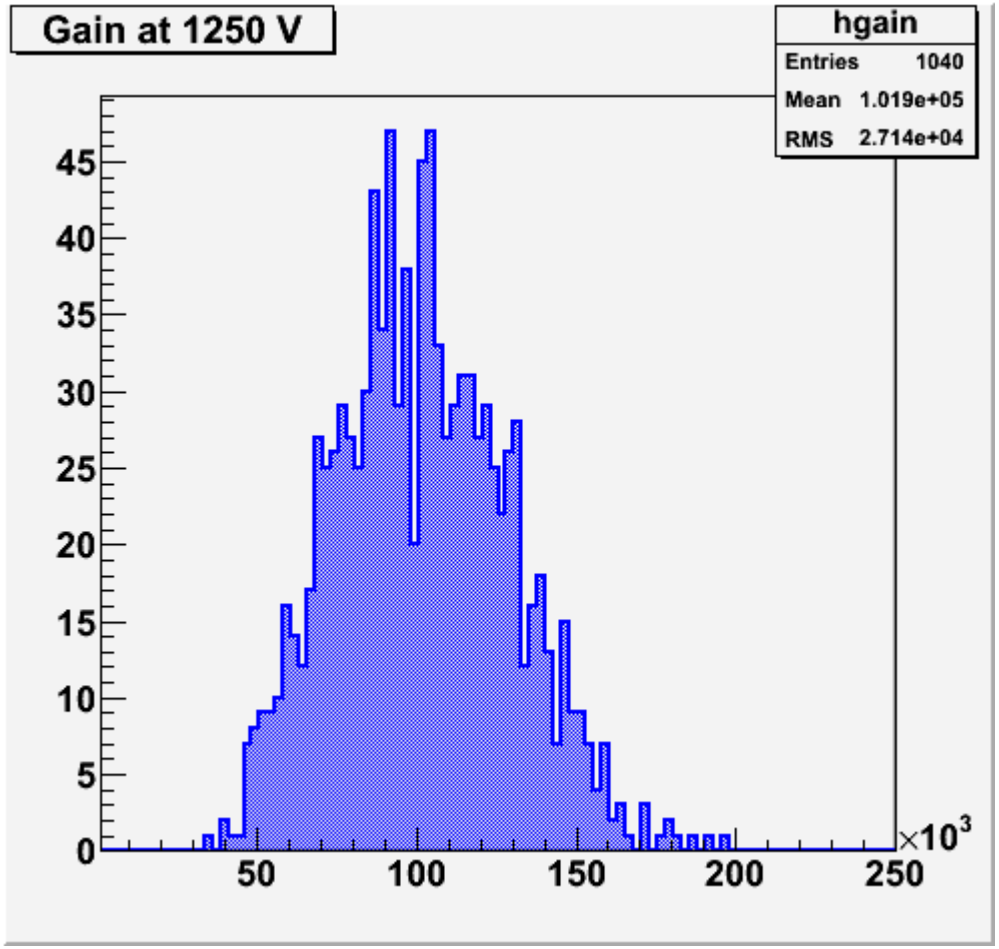
Mean = 0.42 %

F^2 factor value



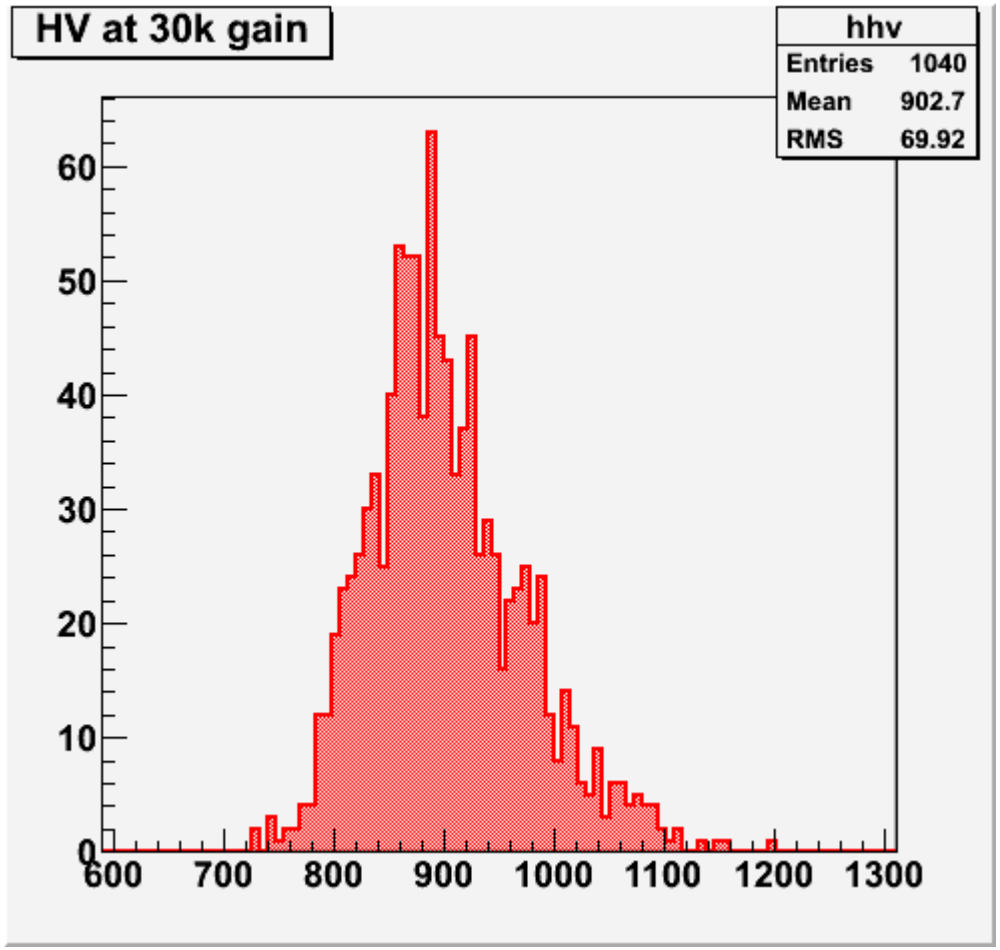
$< F^2 > = 1.36$

Gain @ 1250 V



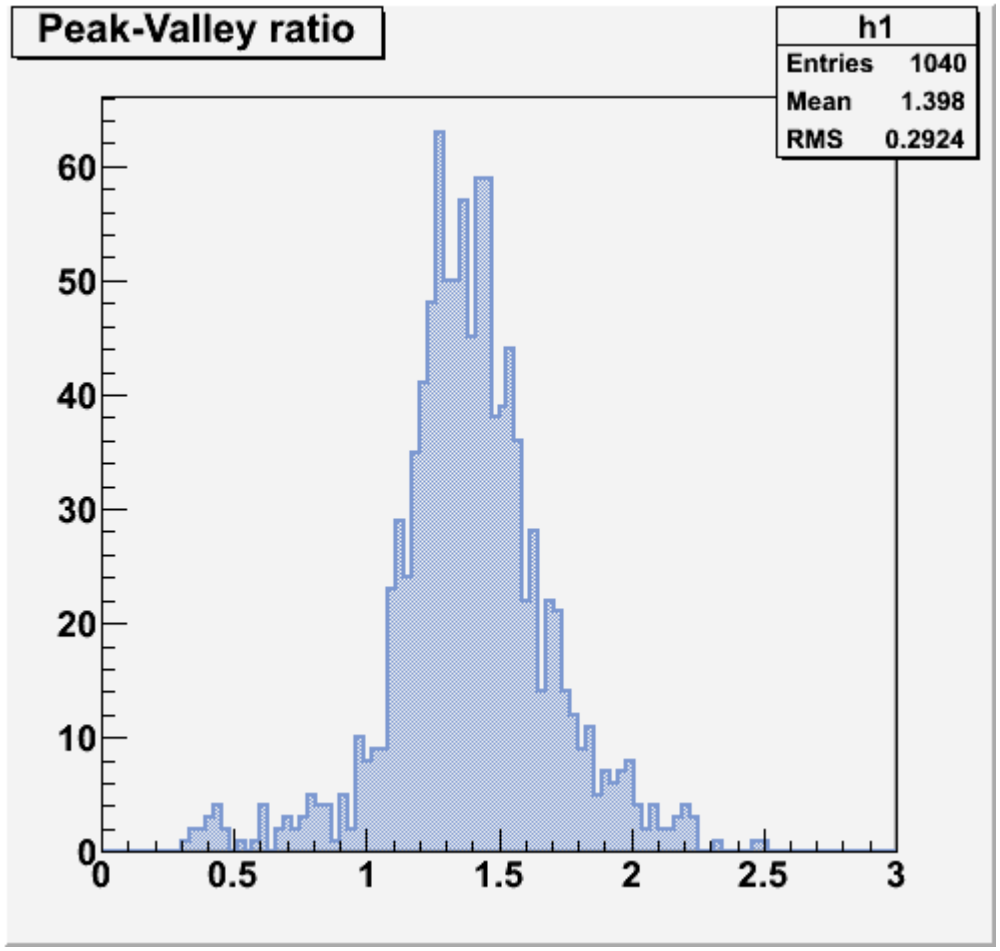
<Gain> = 1.02×10^5

Applied HV for a 30k gain



<HV> = 902.7 V

Peak-to-valley ratio



Mean = 1.4