

PMT Testing

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Goals of the test

- Test of PMTs already irradiated
- We need 10 with the same properties
- The PMTs should follow a law of the form,

$$\log Q = a \log V \quad (1)$$

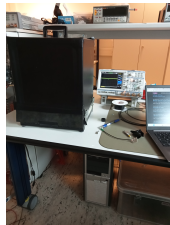
where Q is the charge measured by the QDC (offset subtracted) and V the tension applied to the PMT

- We measure Q for different values of V ($800V \xrightarrow{50V} 1300V$) using a UV LED with a fixed pulse applied
- We draw $\log Q = f(\log V)$ and fit it to a linear curve
- Acquisition done by Po1DAQ

Setup of the test



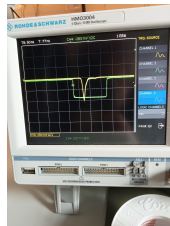
(a) PMT box



(b) Light tight box, to put the setup in

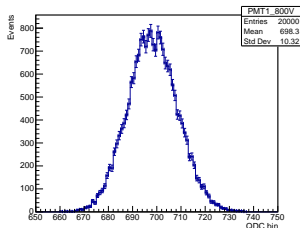


(c) UV LED pulse

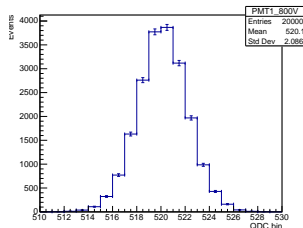


(d) PMT output

Output of the acquisition



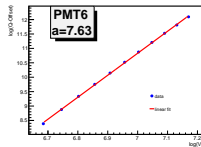
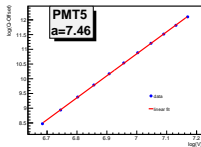
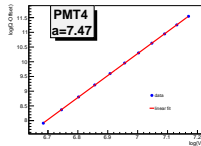
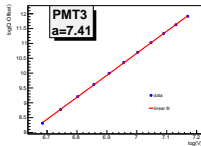
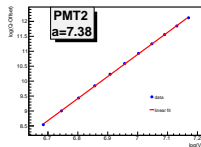
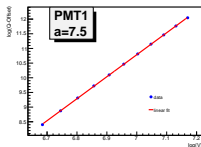
(a) Q distribution at 800V



(b) Q offset distribution at 800V (LED off)

- We take the mean of the Q distribution and subtract the mean offset (we always use the same offset for all voltage, the changes are very small)
- We fit the data ($\log V, \log(Q - Q_{\text{offset}})$) to a linear function

First analysis results



- We proceed to do the fitting and obtain a value for a
- This allows to perform a first basic comparison between the PMTs, while checking they're working *correctly*

Fit results for PMT1-6