Neutron Detector for LAMPS-H

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Thur. Apr. 13, 2017

Lab. Meeting
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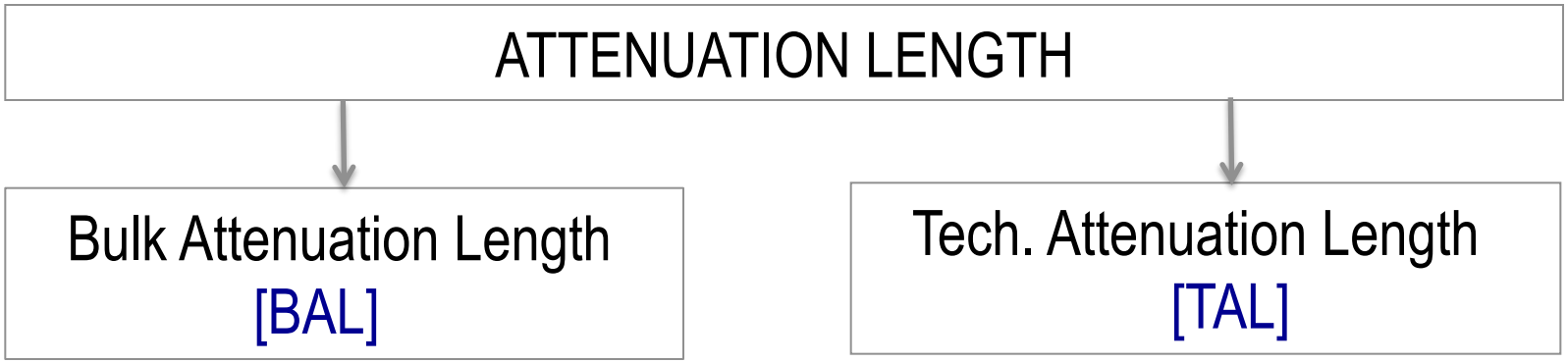
Waveform Data Analysis[1]

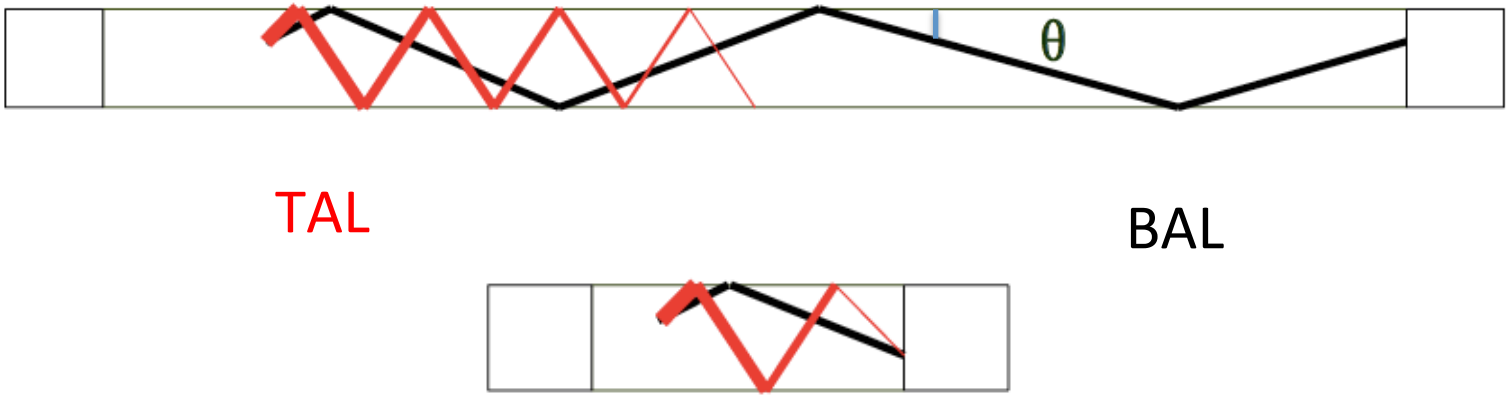
ATTENUATION LENGTH

- Attenuation lengths for plastic scintillators depend on a number of factors: material, geometry, reflectors, absorbers, surface …..

- Ex. : Technical attenuation length of a block 200 x 18 x 18 cm^3 was found to be 3.5 to 4 m. *[D. R. Nicoll & M. J. C. Scotland]*



Waveform Data Analysis[2]



ATTENUATION LENGTH, [λ]

$$N = N_o \exp\left(-x/\lambda\right)$$

- N : Number of Photons of Incident Radiation (ADC value)
- X : Path length of the scintillating material
  (Effective speed of light -> TDC value)
- Λ : Attenuation Length (1/e) or 1/absorption coefficient.

Waveform Data Analysis[3]

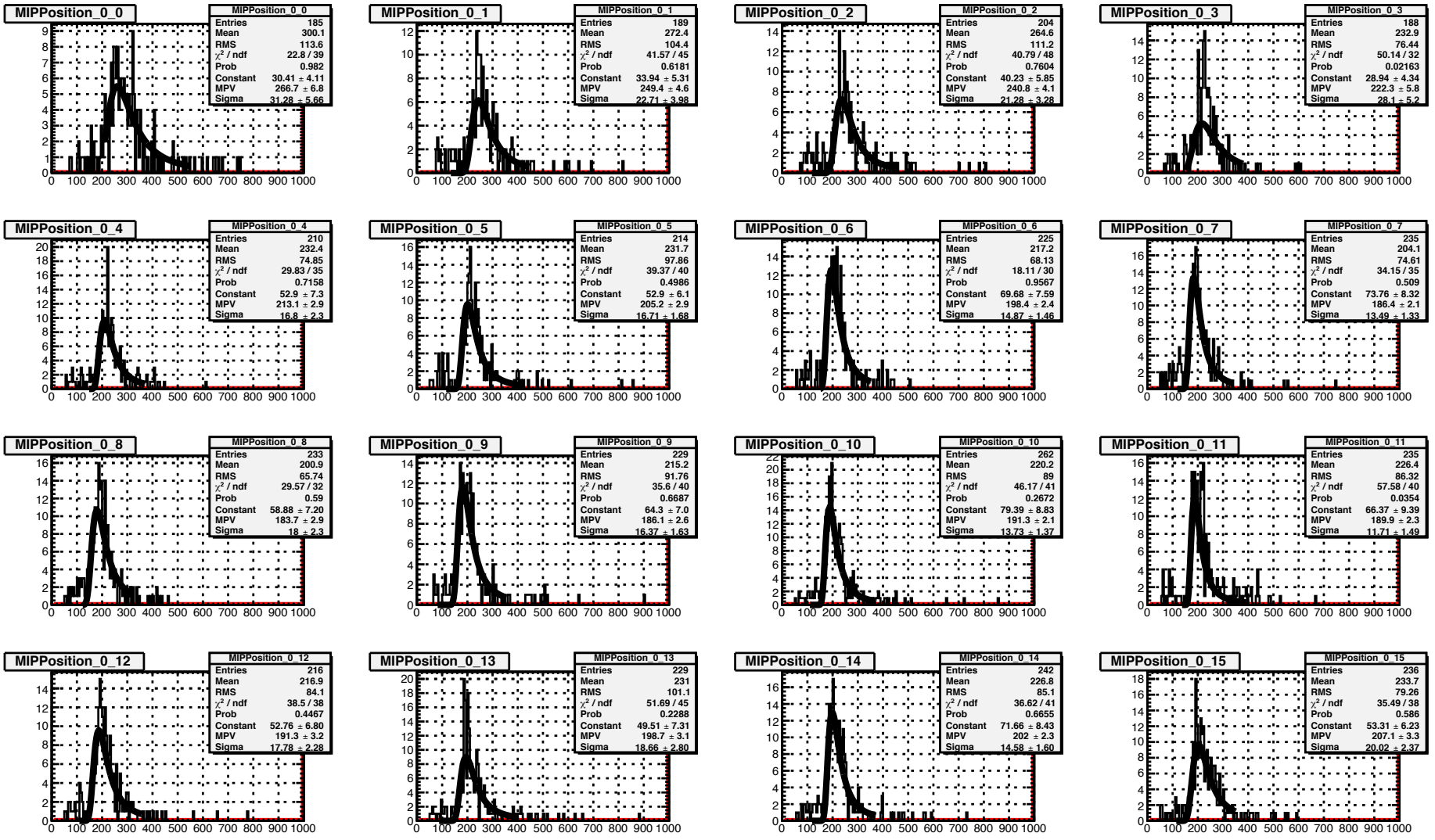


Fig.1: Pulse height for left side photomultiplier tube

Waveform Data Analysis[4]

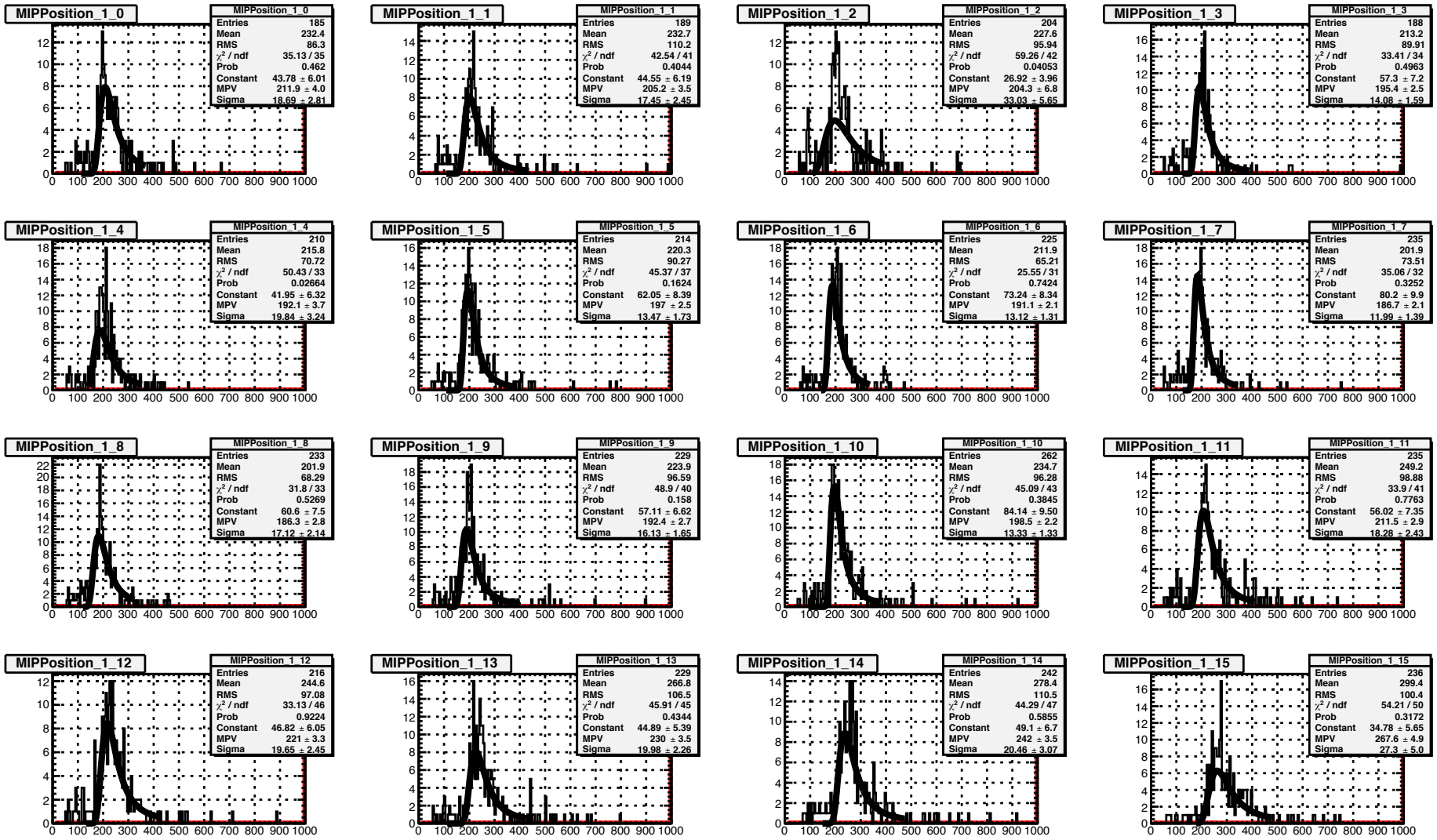


Fig.2: Pulse height for right side photomultiplier tube

Waveform Data Analysis[5]

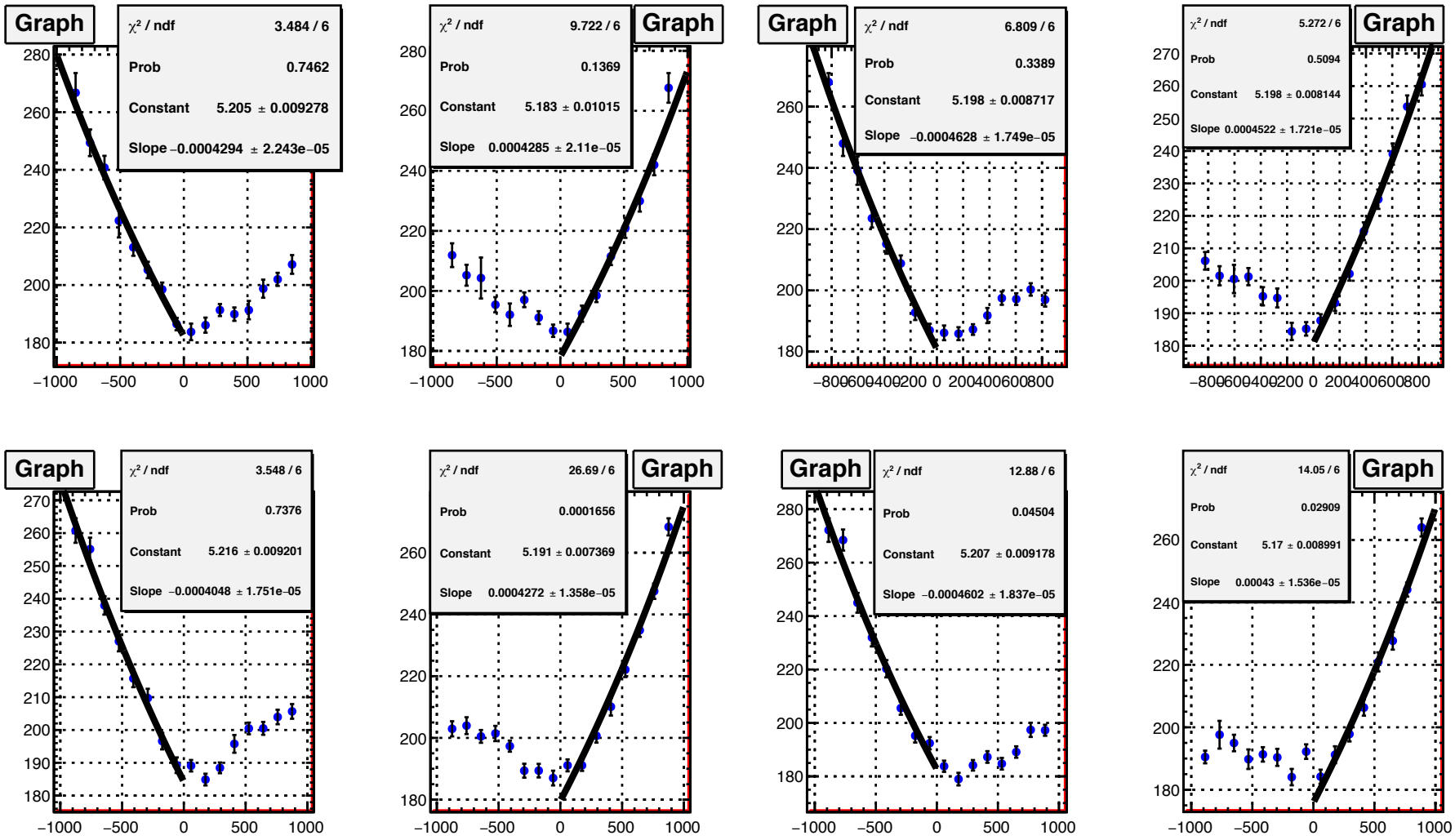


Fig.3: TAL for each module = slope^{-1}

Waveform Data Analysis[6]

D1	Mod 0	233 cm
	Mod 1	233 cm
D2	Mod 2	216 cm
	Mod 3	221 cm
D3	Mod 4	247 cm
	Mod 5	234 cm
D4	Mod 6	217 cm
	Mod 7	233 cm

Tab.1: TAL value = slope^{-1} ≅ 216 ~ 247 cm for pulse height

Waveform Data Analysis[7]

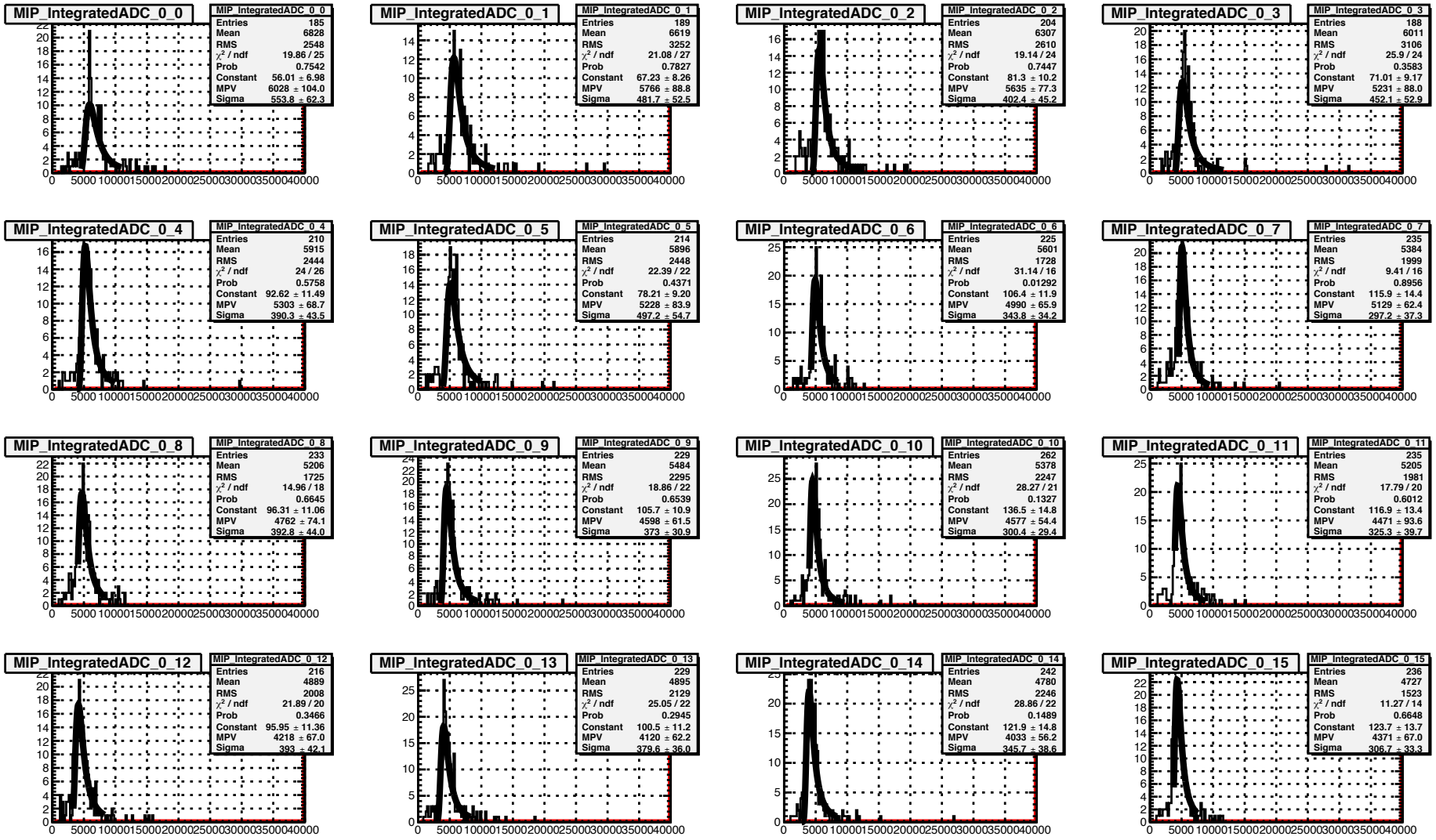


Fig.4: Integrated ADC for left side photomultiplier tube

Waveform Data Analysis[8]

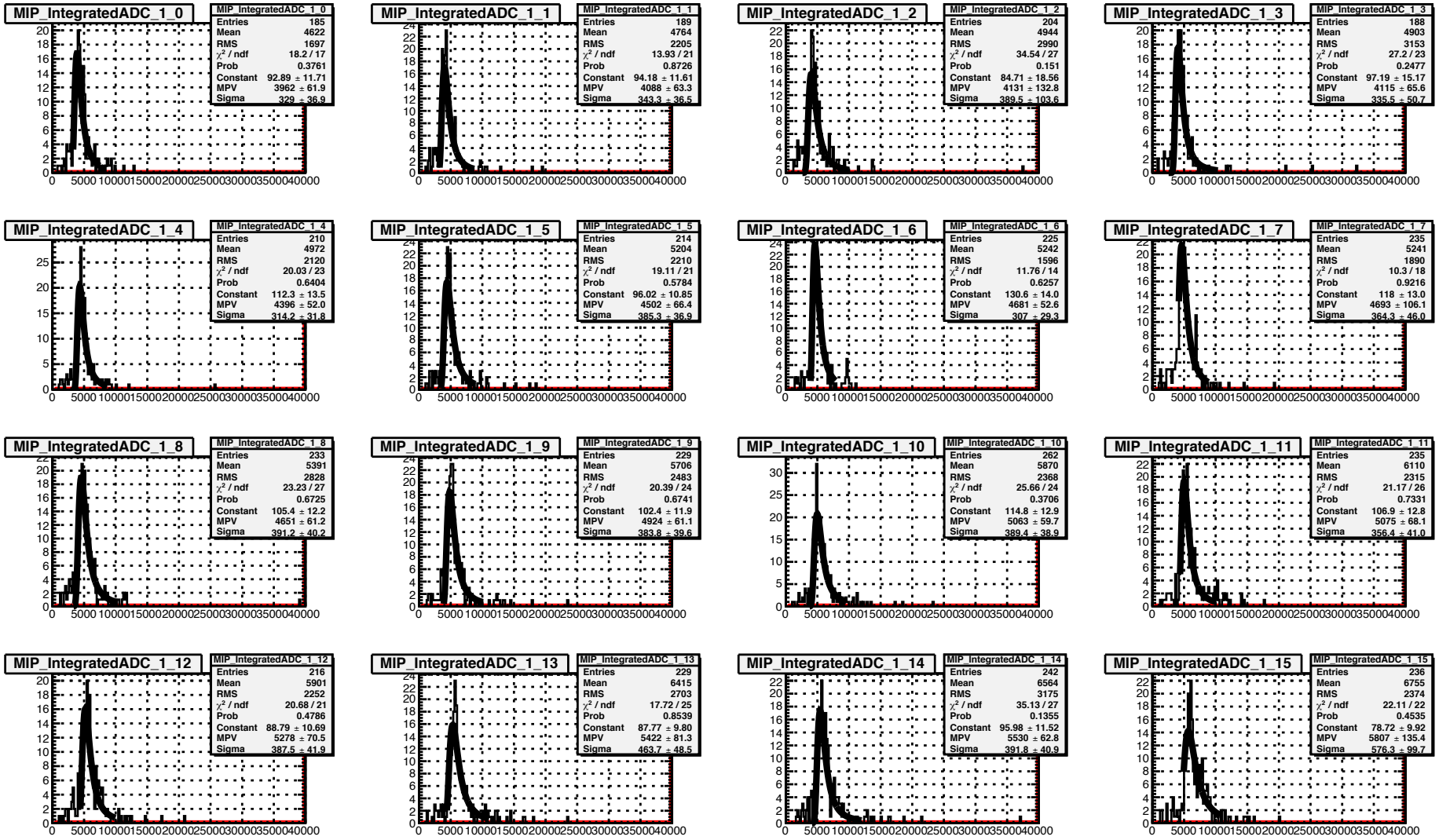


Fig.5: Integrated ADC for right side photomultiplier tube

Waveform Data Analysis[9]

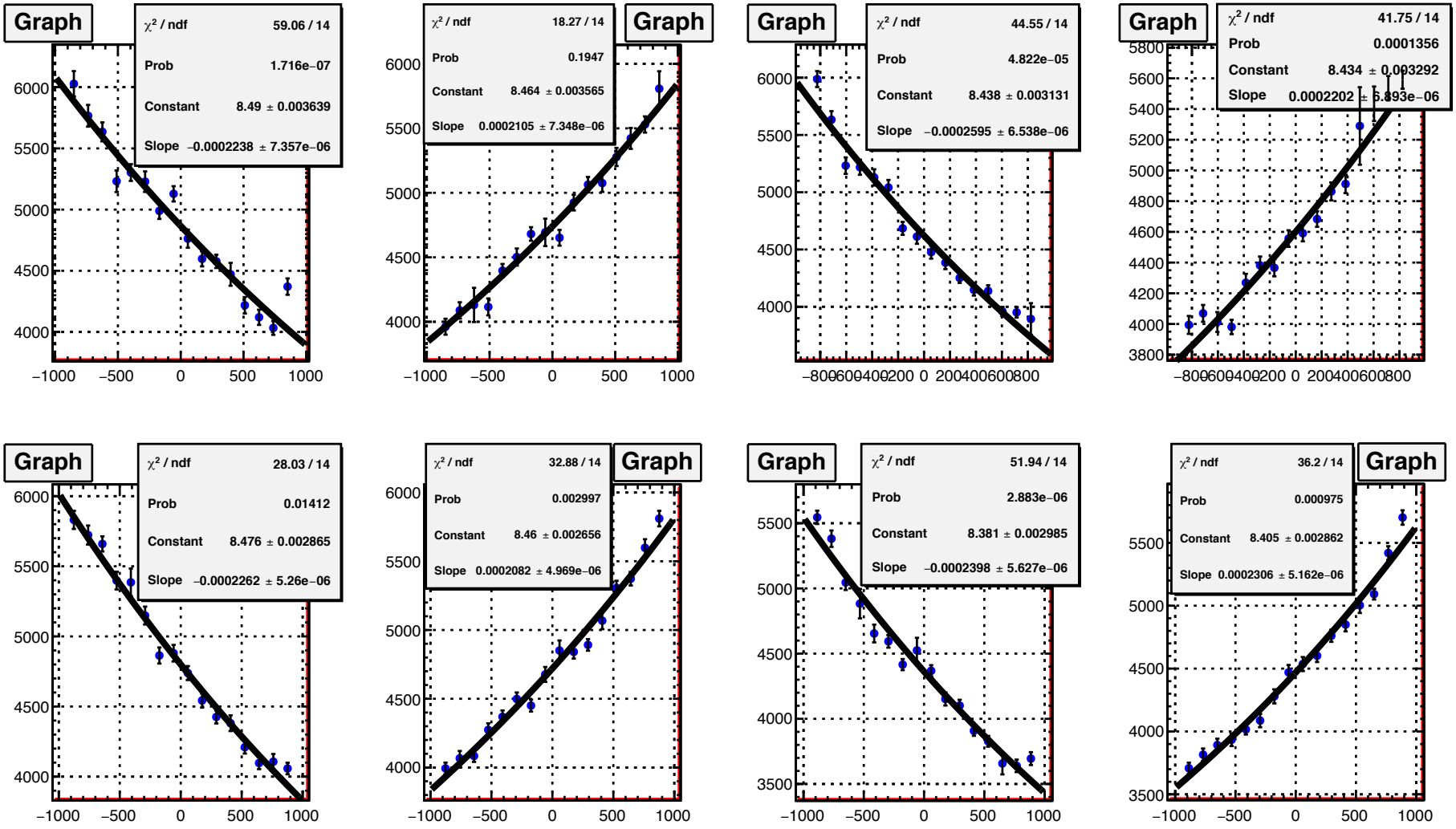


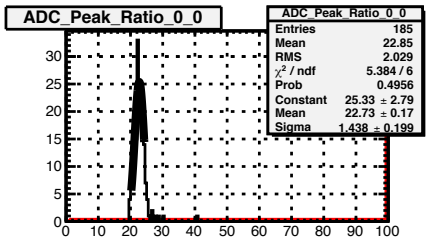
Fig.6: TAL for each module = slope^{-1}

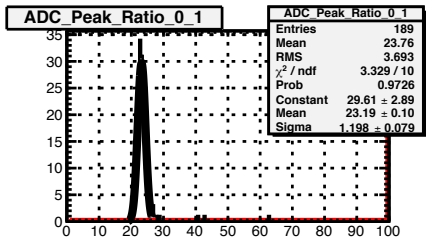
Waveform Data Analysis[10]

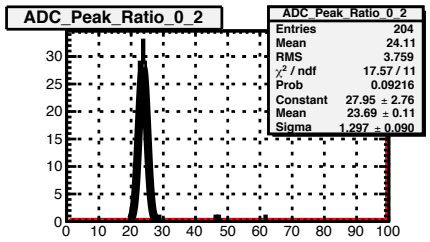
D1	Mod 0	447 cm
	Mod 1	475 cm
D2	Mod 2	385 cm
	Mod 3	454 cm
D3	Mod 4	442 cm
	Mod 5	480 cm
D4	Mod 6	417 cm
	Mod 7	434 cm

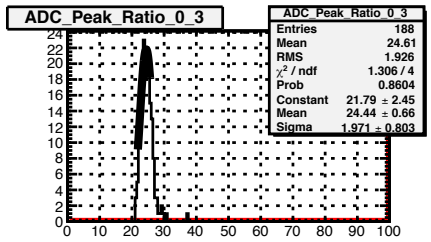
Tab.2: TAL range = slope^{-1} ≅ 385 ~ 480 cm from integrated ADC

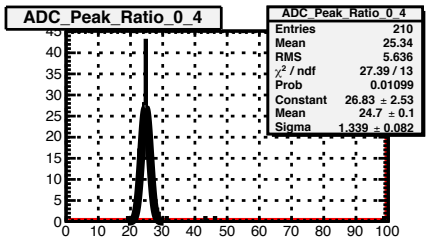
Backup[1] [Left Module]

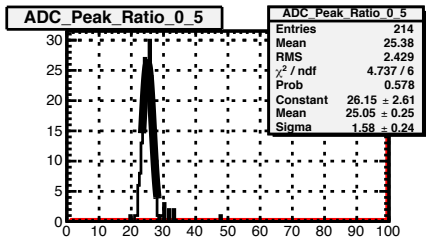


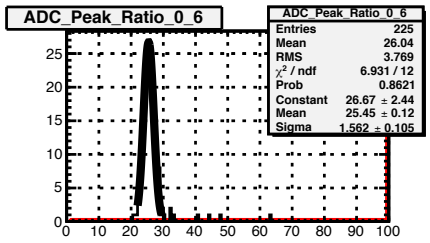


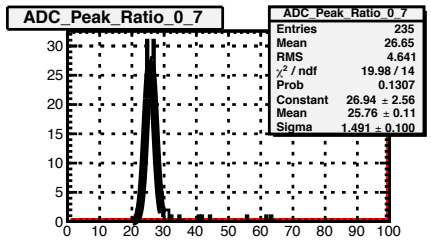


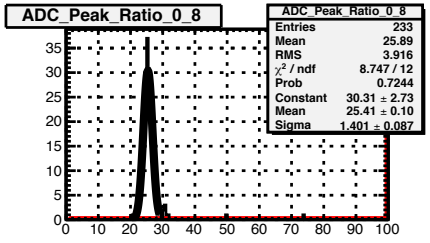


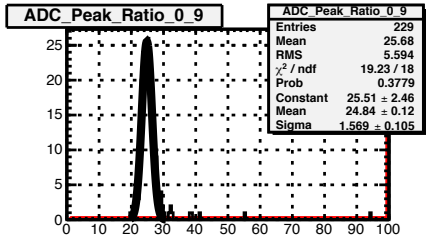


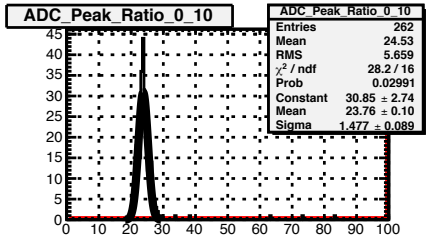


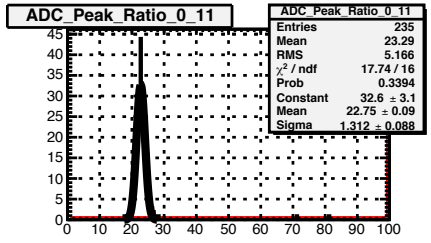


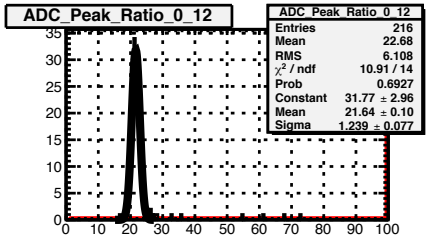


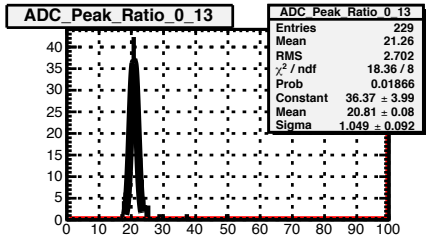


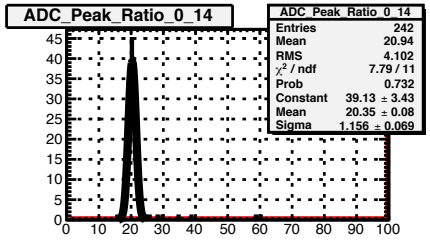


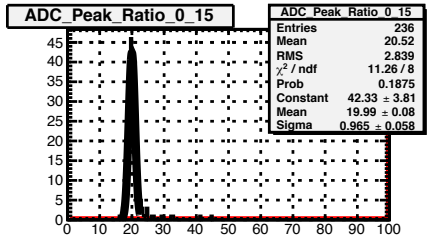












Backup[2] [Right Module]