# SDU #3 cosmic test result

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#### New SDU #3 module

Module No.	WLS fiber	Scintillator	Lead layer	Fiber end	Reflective layer	Front plate	Coating
SDU #3	Y11	Kedi(enhanced)	US company	Silver mirror	Print paper	No holes	SiO2+glue(1:1)

Comparing with SDU #2, the improvement is fiber and use more SiO2 ratio.





trigger

trigger

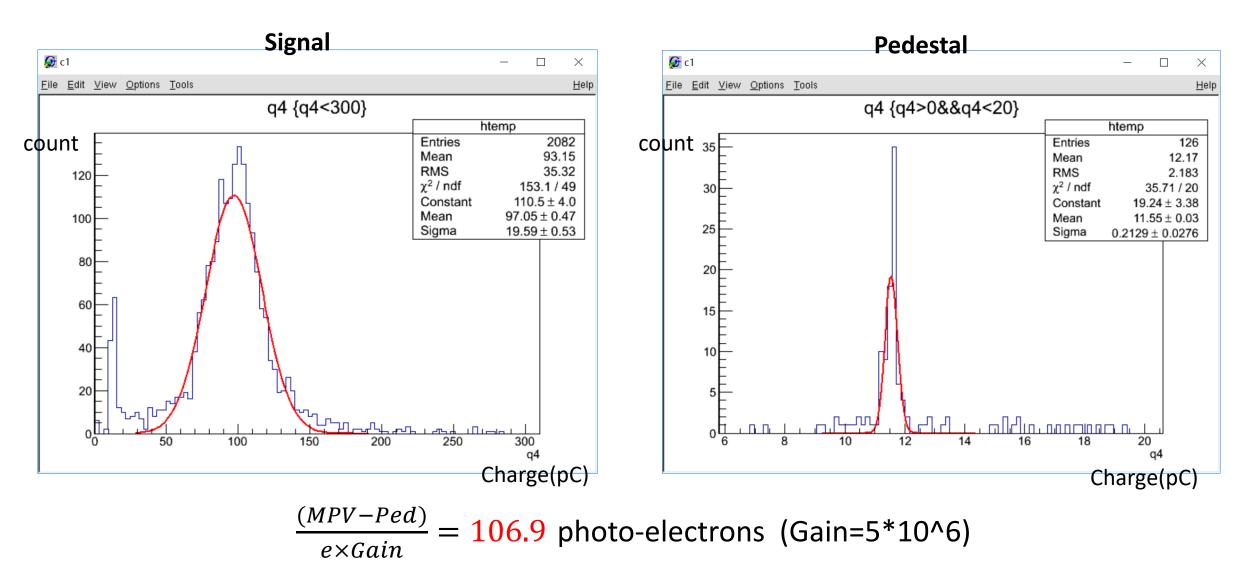
#### Vertical test result

#### 🚱 c1 $\times$ 🚱 c1 \_ $\times$ File Edit View Options Tools <u>H</u>elp File Edit View Options Tools <u>H</u>elp q4 q4 {q4>0&&q4<20} htemp htemp 100 Entries 760 Entries 116 Mean 325.3 Mean 10.98 40 RMS RMS 177.6 1.584 count couht $\chi^2$ / ndf $\chi^2$ / ndf 54.34 / 29 33.51 / 16 80 35 Constant $41.67 \pm 6.87$ $51.32 \pm 3.18$ Constant Mean $11.33 \pm 0.01$ $404.3 \pm 2.0$ Mean Sigma $0.08109 \pm 0.00871$ 30 Sigma $40.05 \pm 1.72$ 60 25 20 4( 15 10<u>⊢</u> 20 5 400 600 800 200 1000 12 14 16 18 Charge(pC) Charge(pC) $\frac{(MPV-Ped)}{1} = 491.3 \text{ photo-electrons} \text{ (Gain=5*10^6)}$ exGain For preshower test, Y11 light yield is twice of BCF91. Comparing with SDU #2(426.5), our result is only 15% better. (Maybe SDU #3 mirror quality is bad or maybe fiber test use different scintillator)

Signal

Pedestal

#### Horizontal test result



## Detector "noise" rate (triggered by itself)

Vertical 🕼 c1 \_ Х Edit View Options Tools <u>H</u>elp File noise htemp 25 Entries 2 1.8 1.6 1.4 1.2 0.8 0.6 0.4 0.2 Mean 9.58 RMS 0.9368 슈타 7.5 8.5 9 9.5 10 10.5 11 11.5 count/s

Horizontal 🚱 c1 Х File Edit View Options Tools <u>H</u>elp noise htemp Entries 25 9.208 Mean RMS 0.8676 2.5 0.5 7.5 8 8.5 9.5 10 10.5 11 9 count/s

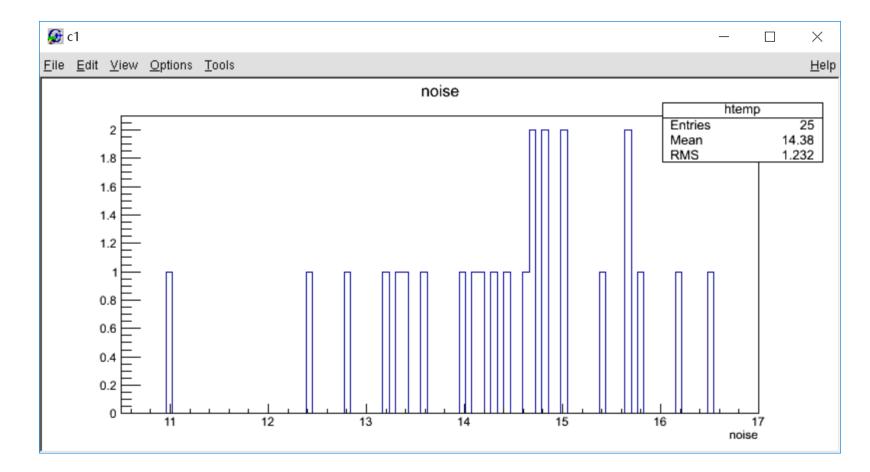
Threshold 100mV (10 SPE)

### SDU #3 cosmic test without coating

Signal Pedestal 😥 😥 Х \_ <u> </u>61  $\times$ File Edit View Options Tools <u>H</u>elp <u>File Edit View Options Tools</u> <u>H</u>elp q4 {q4<600} q4 {q4>0&&q4<20} count htemp htemp Entries 499 Entries 62 count 16 268.3 Mean 50 12.01 Mean RMS 128.6 RMS 1.931  $\chi^2$  / ndf  $\chi^2$  / ndf 52.67 / 36 12.83 / 8 Constant  $11.37 \pm 3.76$  $27.98 \pm 2.19$ Constant 40 Mean  $11.27 \pm 0.04$  $316.3 \pm 1.8$ Mean Sigma 12  $0.1403 \pm 0.0407$ Sigma  $30.53 \pm 1.73$ 10 30 20 10 200 300 400 500 600 18 20 charge q4 charge  $\frac{(MPV-Ped)}{2} = \frac{381.3}{2}$  photo-electrons (Gain=5\*10^6) e×Gain

Coating add 29% pthoto-electron.

# "noise" rate without coating



• Rate is higher compared with coating.