Cherenkov light measured with new SiPMs from Philips

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Philips

http://www.philips.com/digitalphotoncounting

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http://www.uni-giessen.de/cms/dueren

Outline

- The new TEK modules from Philips

- The new prototype from AGD

- Some photos from tests

- A few online plots

- Wishes to be done to improve for next try

The new TEK module from Philips

PDPC-TEK User Manual
Philips Digital Photon Counting

Document			
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The new TEK module from Philips

6.1.2. Tile dimensions
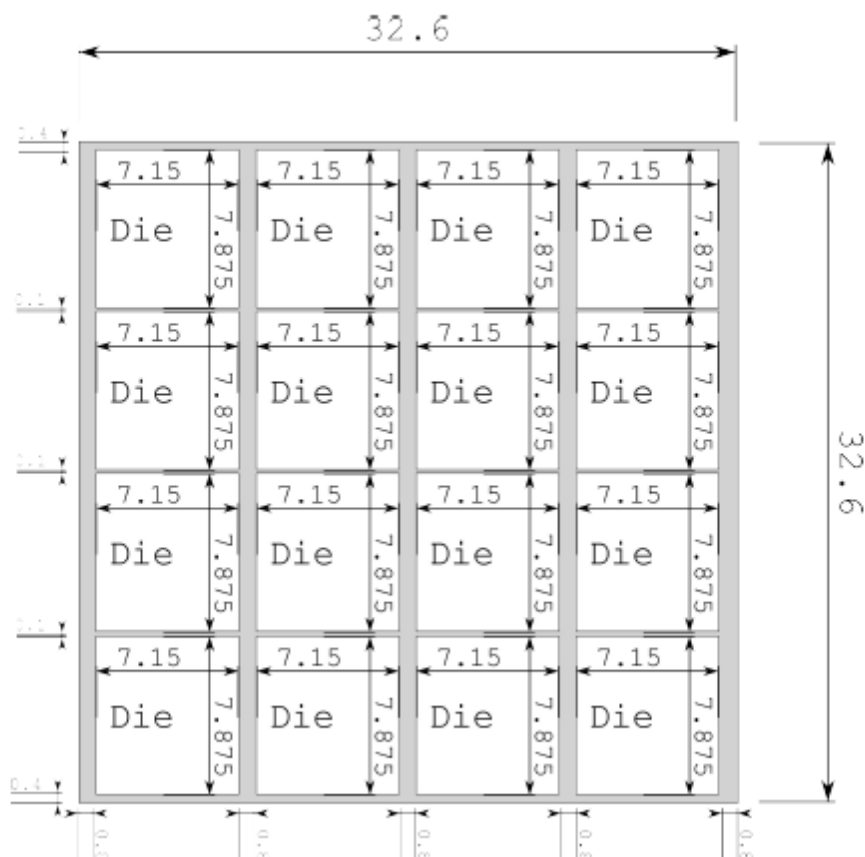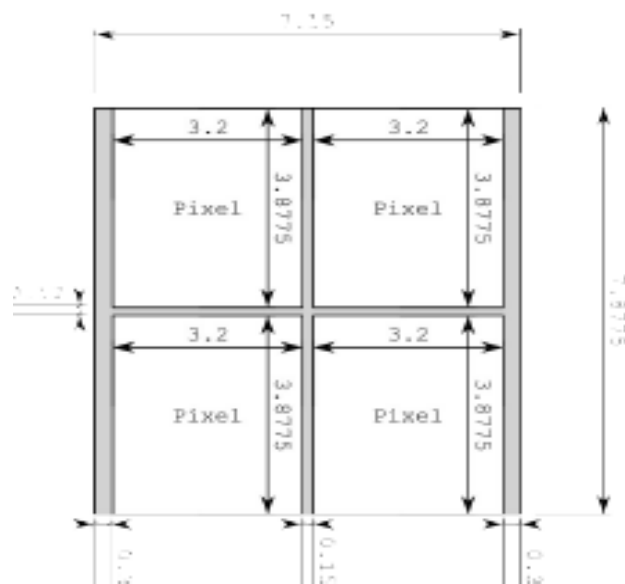

Tile=16 Die

Die=4 Pixel

Pixel=6396Cell

Pixel=4 subPixel, containing validation
Network

Each Die yield 1 TDC

We get also Photon counts per Pixel

Trying to make optical contact with grease

The grease we have tested

- Elastosil 601 A/B , two component silicon, which is we mix 9:1 will be like a transparent

  resin after 24 hour in room temperature

- The first tile(with only 4 quartz bars) was connected with this type of silicon, which was successfully removed during rebuild(see next picture)

- The second one is Silicon grease(ask BC630) , see previous page picture

- Both types seems to be worked well, although for the first tile we had malfunctioning of one die(see raw spectra page)

Elastosil 601 A/B in work
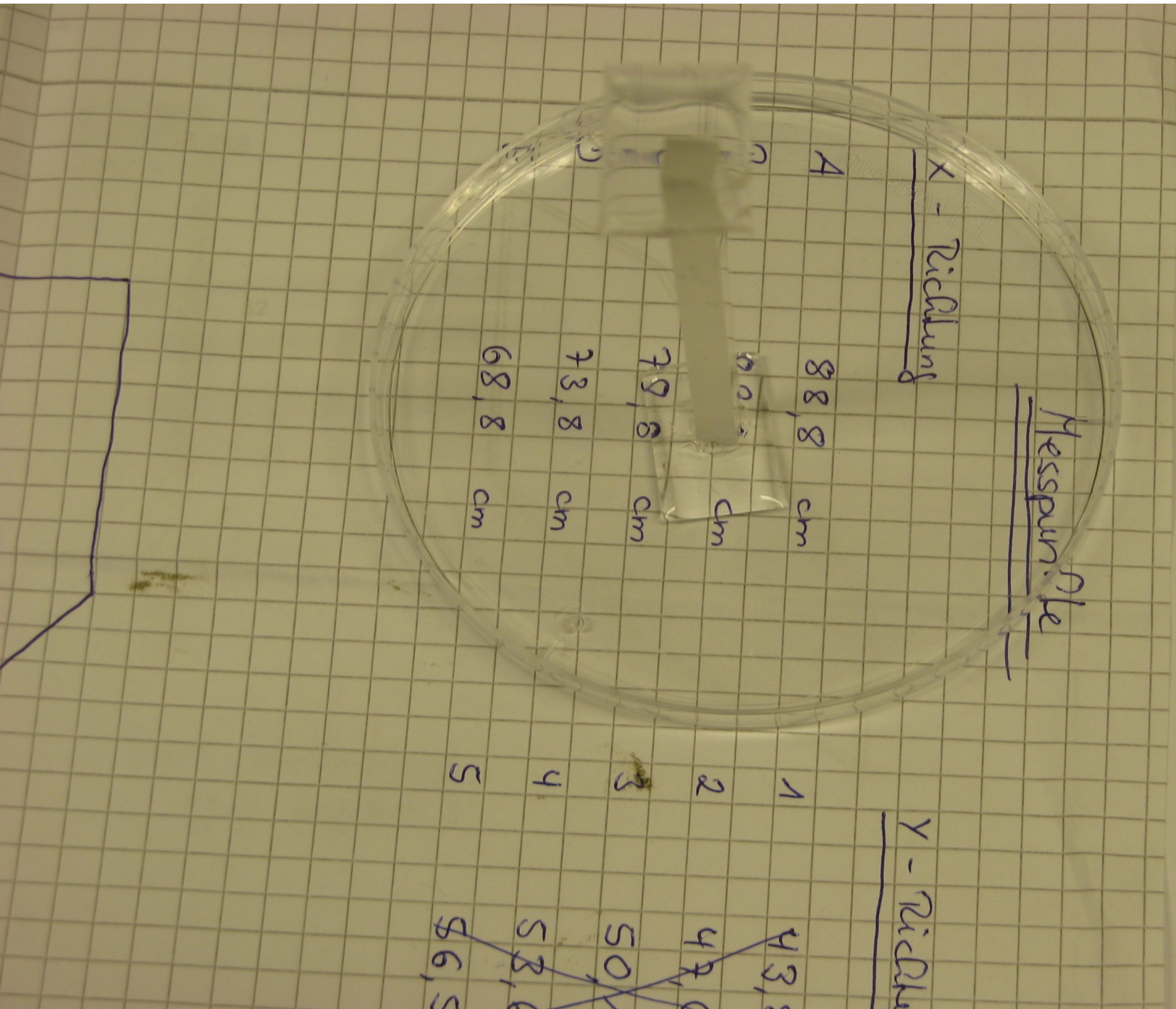
The New prototype from AGD
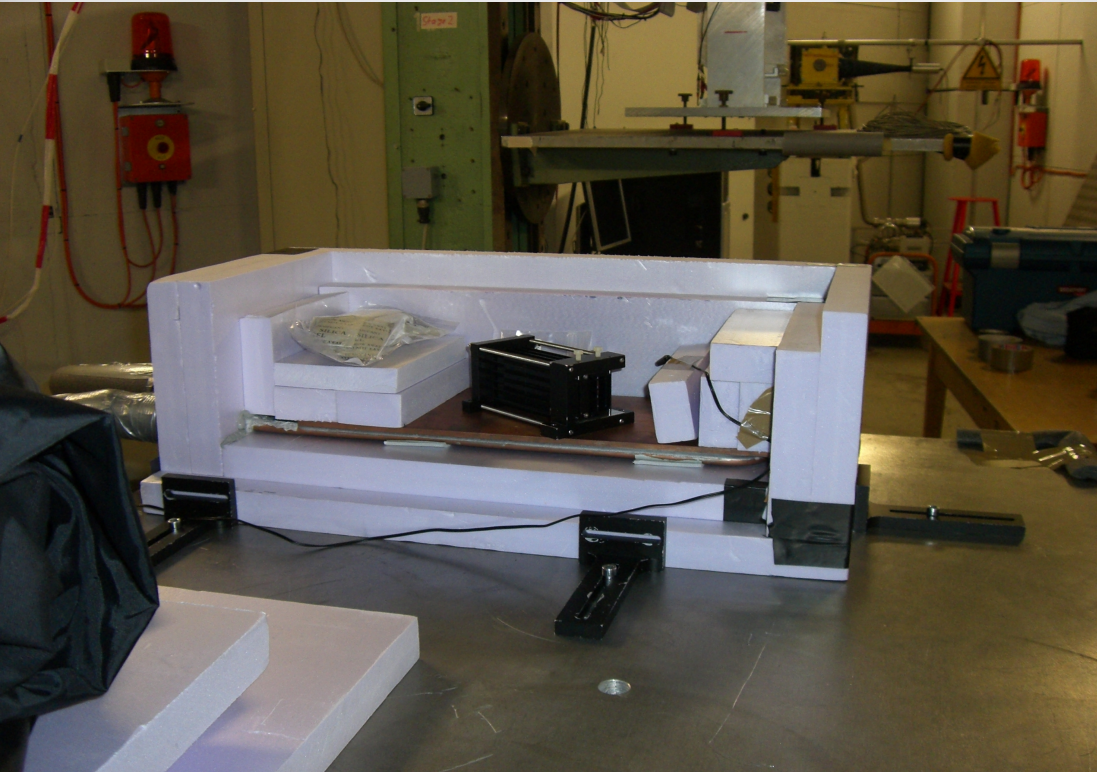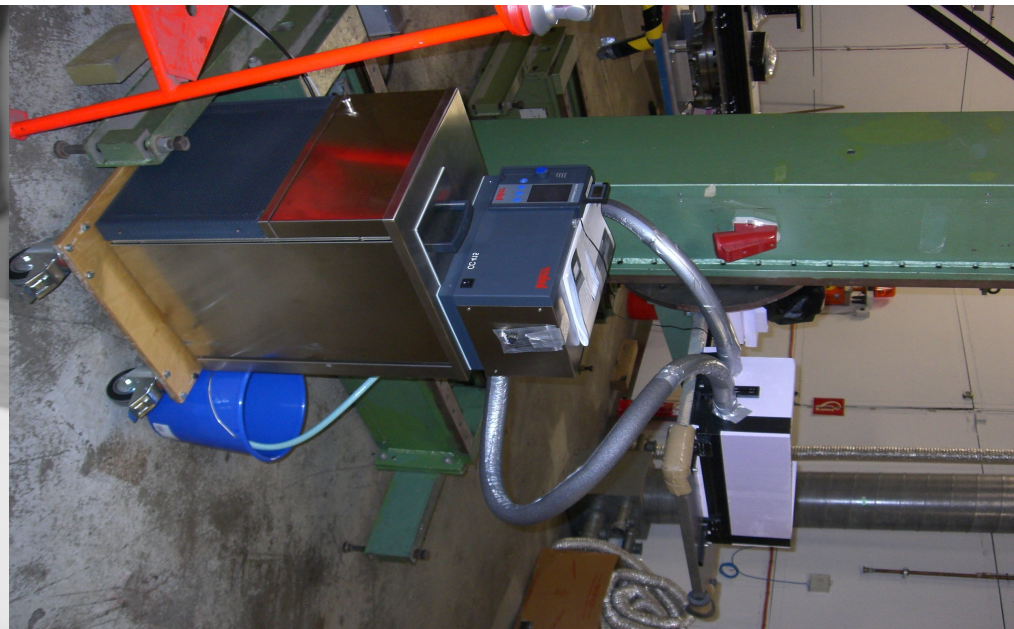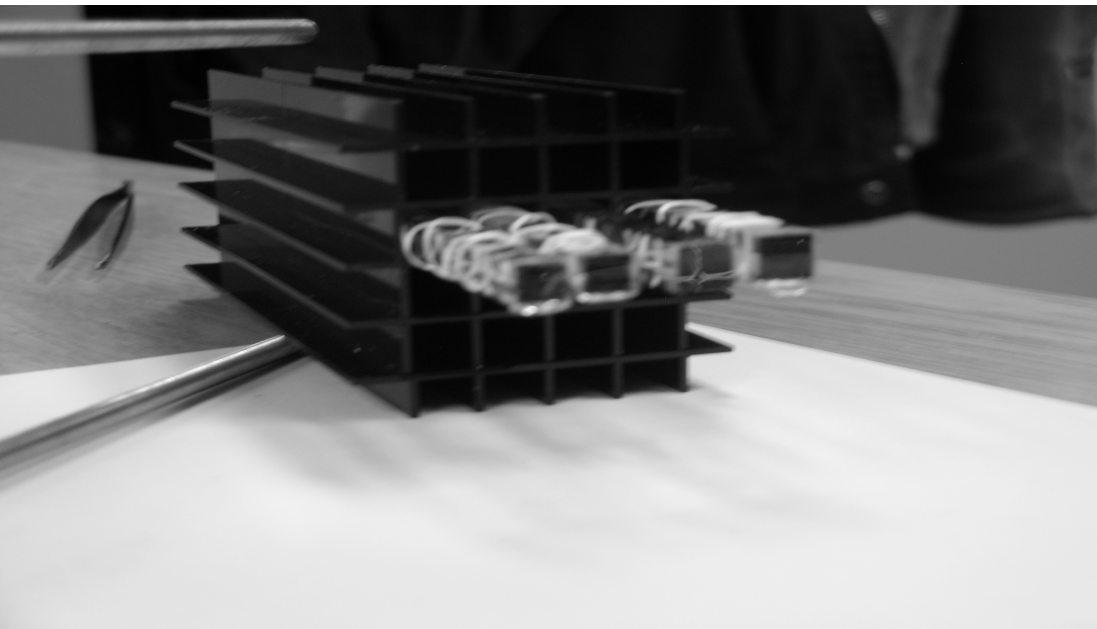
The radiators

- Quartz bars 5(6)X5(6)X90 mm, ~n=1.474(440nm)

  Cherenkov angle 47.28 degree

- Plexiglass bars 5X5X90 mm ~1.55(440nm)

 Cherenkov angle 49,82degree

- The setup allows to do Y and X scan

  Done!, Unfortunately we saw only light from Quartz bars, the angle was different???
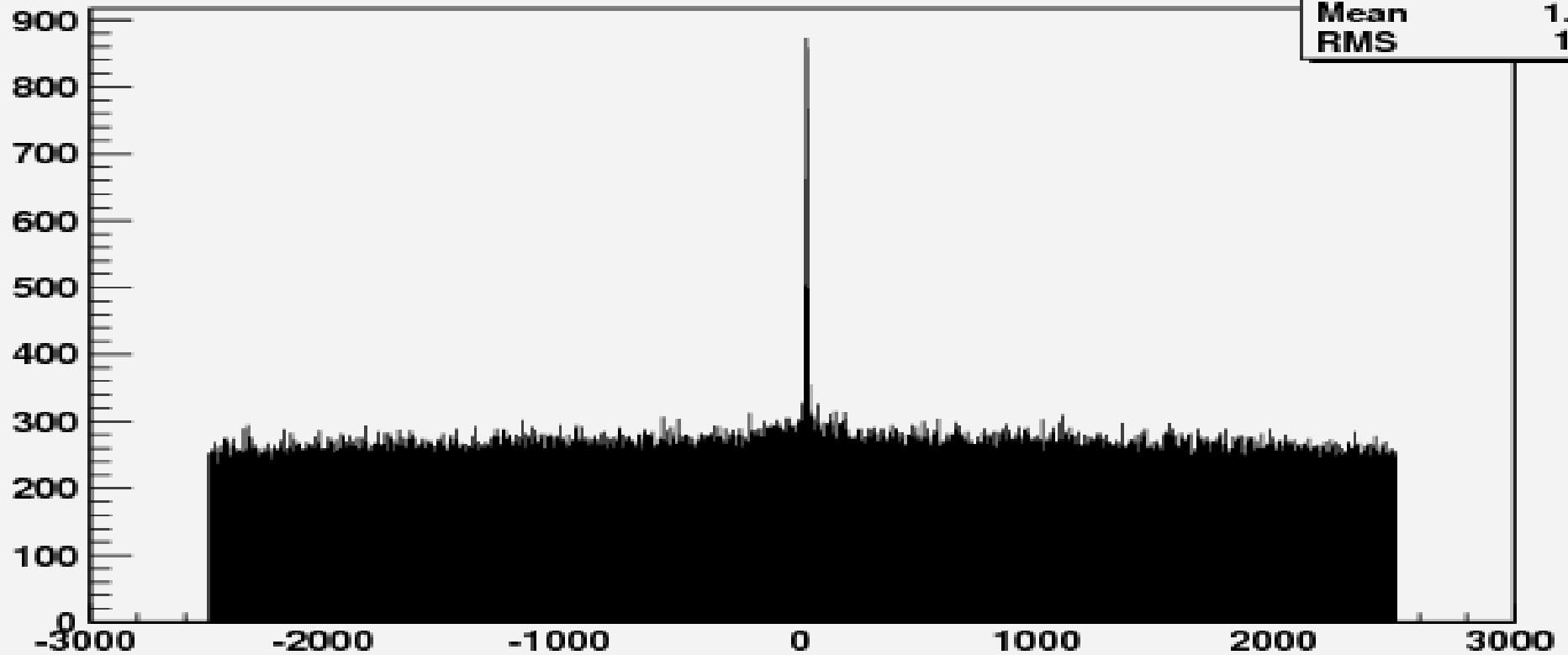
The data taking settings

- Activation of only 4 die's

- Voltage scan/setting voltage a bit(0.1,2V) below breakdown voltage

- Set the number of photon to be taken as trigger(1 was always)

  -enable validation(wait till second hit appear)

  -set integration interval(9X19.5ps was)

  -set recharging interval

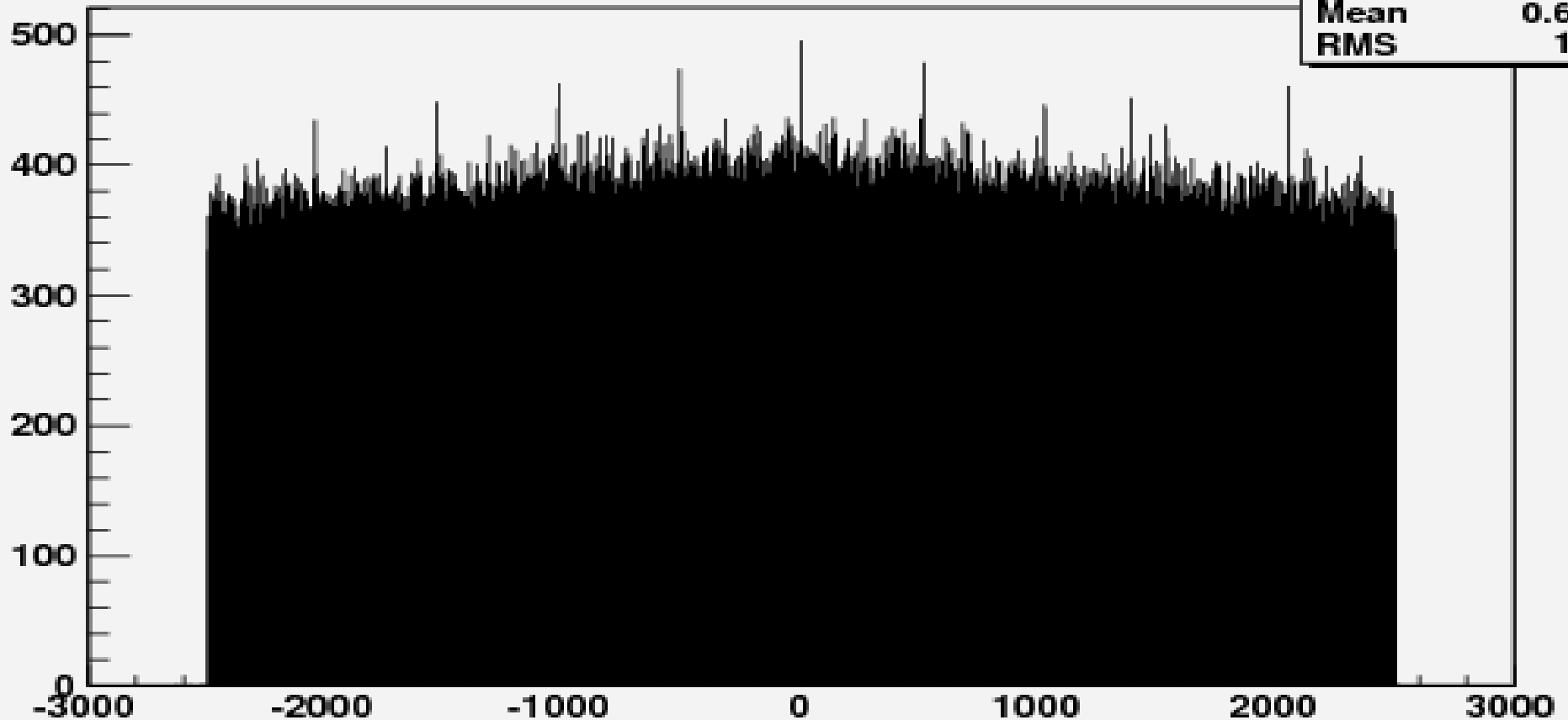 -set validation length(see raw spectra next)

The RAW spectra
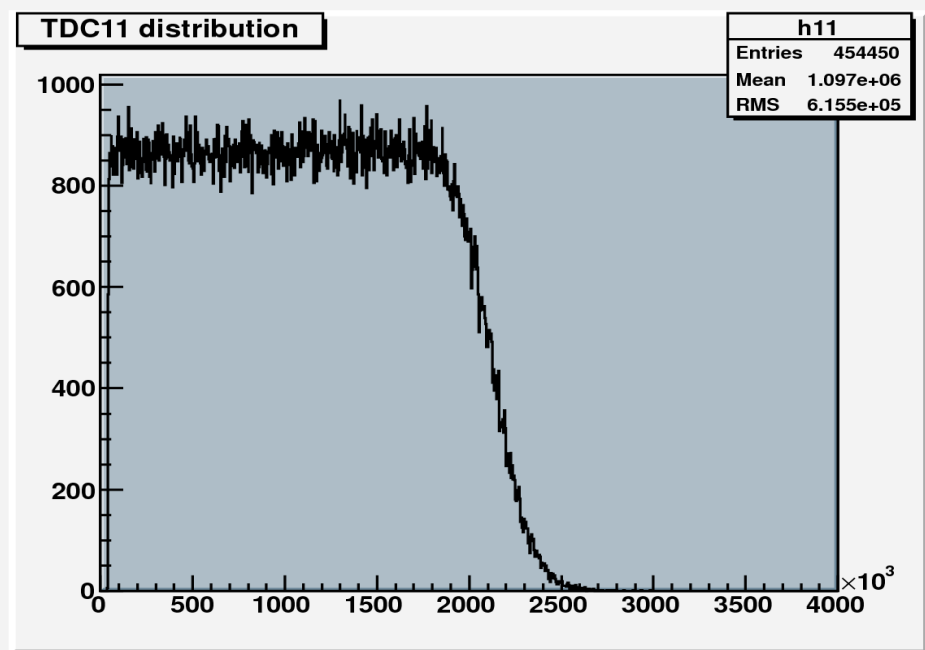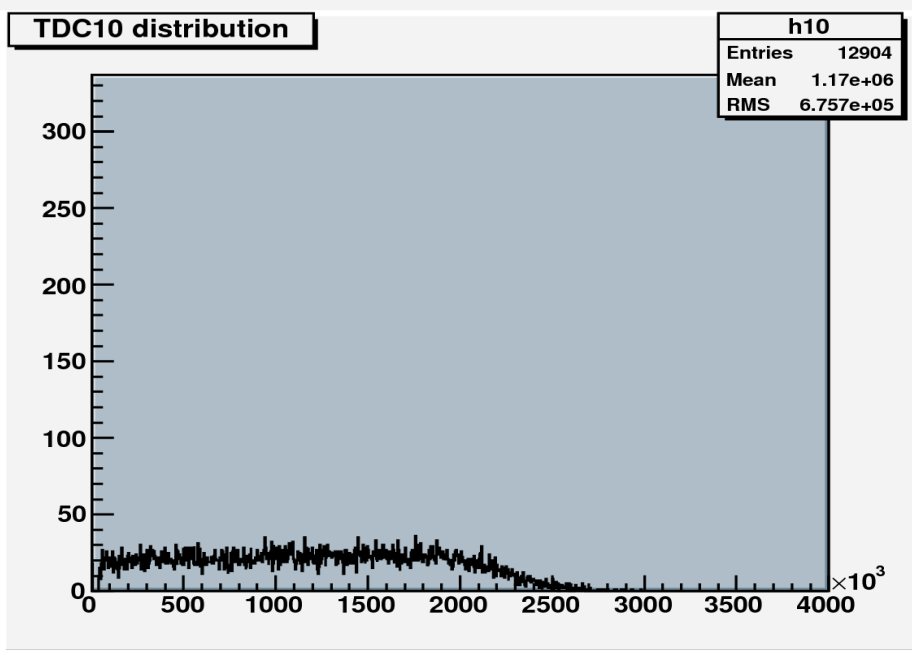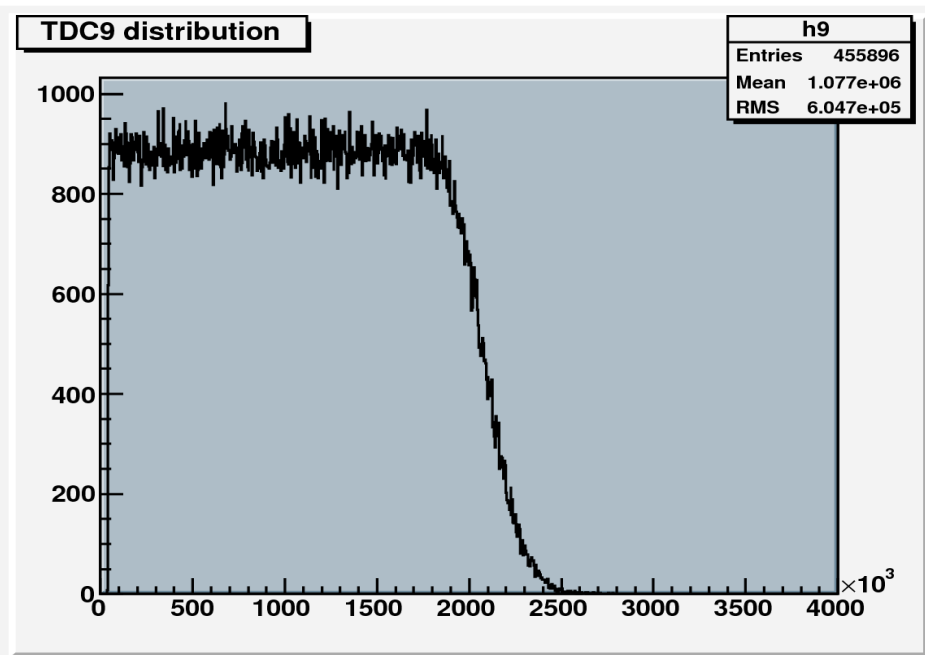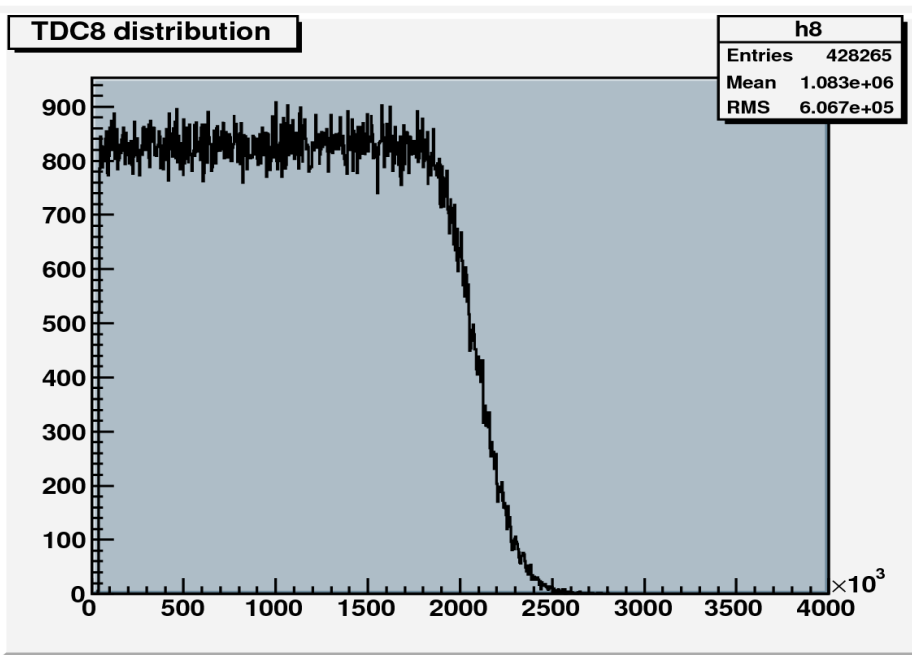
Beam ON

Die 8 and Die10 time difference , active was only
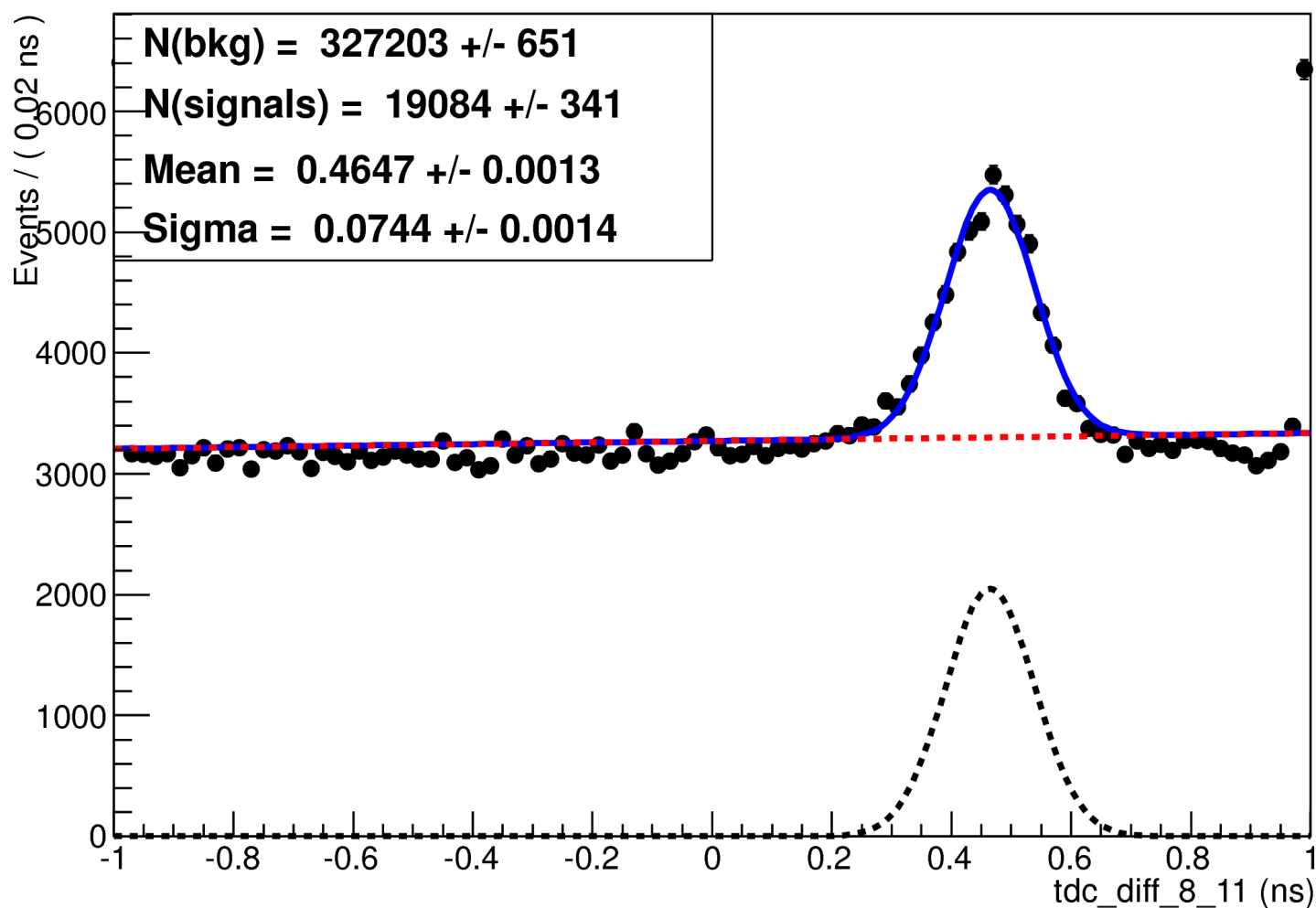4 Die's 8,9,10,11, 1channel=19.5ps

Beam OFF

Die 8 and Die10 time difference , active was only 4 Die's 8,9,10,11, 1channel=19.5ps

The data acquisition allow to select

- More than 0 photon....

A RooPlot of "tdc_diff_8_11"

N(bkg) = 327203 +/- 651

N(signals) = 19084 +/- 341

Mean = 0.4647 +/- 0.0013

Sigma = 0.0744 +/- 0.0014

The data acquisition allow to select

- More than 1 photon....

A RooPlot of "tdc_diff_8_11"

N(bkg) = 375976 +/- 716

N(signals) = 130671 +/- 518

Mean = 0.45750 +/- 0.00032

Sigma = 0.07843 +/- 0.00032

The data acquisition allow to select

- More than 2 photon....

A RooPlot of "tdc_diff_8_11"

N(bkg) = 47514 +/- 285

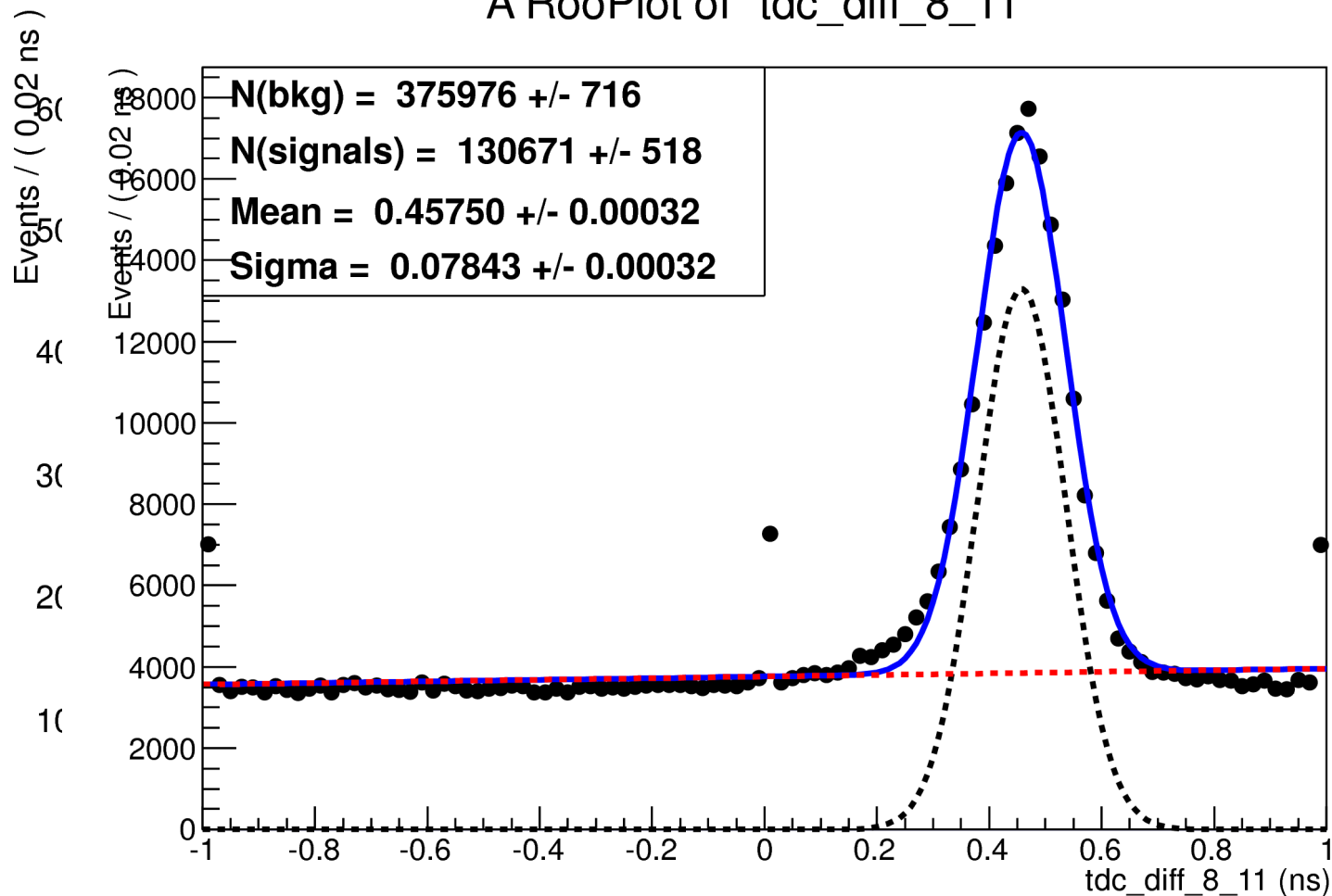N(signals) = 76391 +/- 332

Mean = 0.45341 +/- 0.00032

Sigma = 0.07440 +/- 0.00031
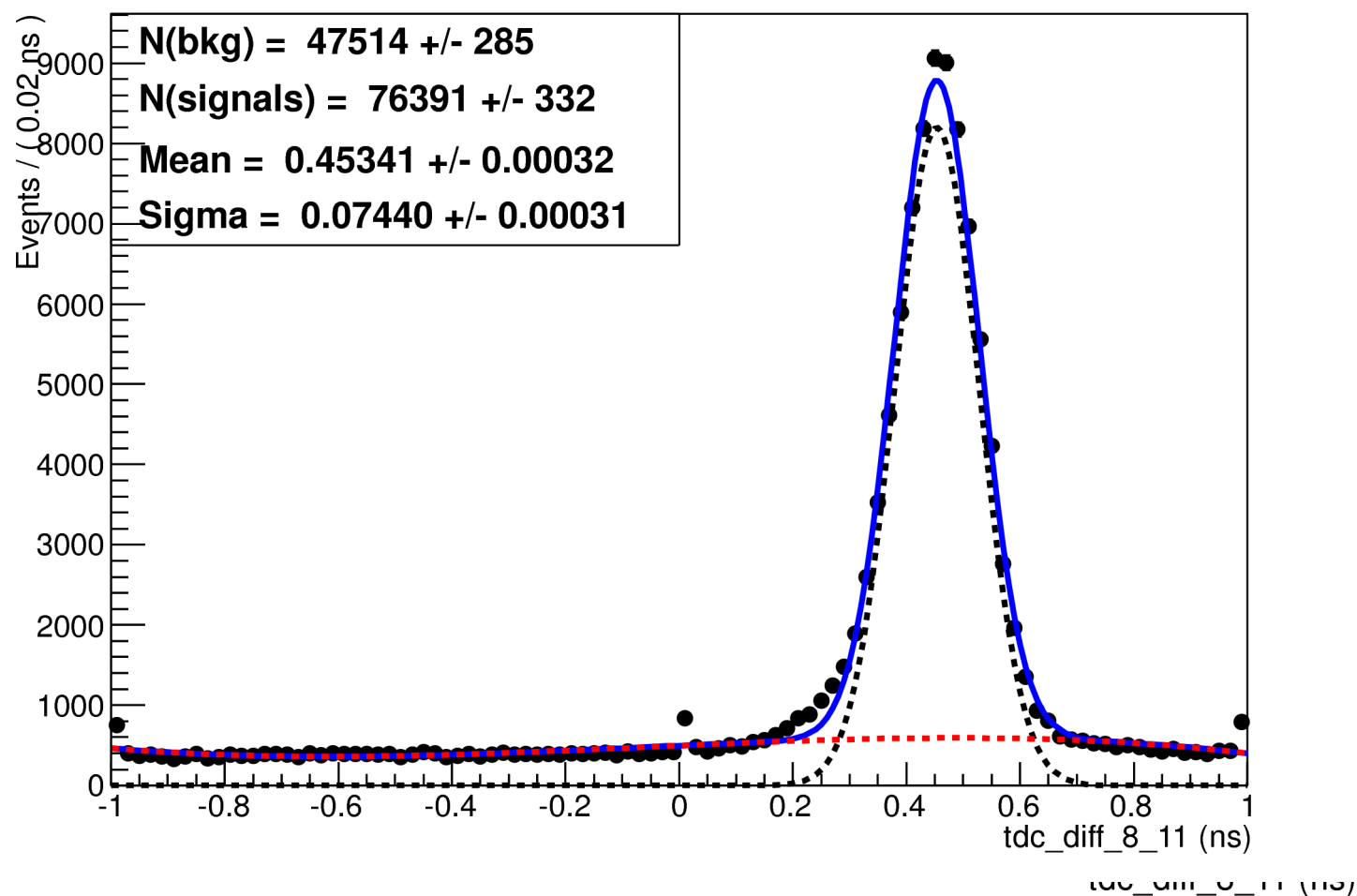
The data acquisition allow to select

- More than 3 photon....

A RooPlot of "tdc_diff_8_11"

A RooPlot of "tdc_diff_8_11"

N(bkg) = 7002 +/- 114

N(signals) = 38764 +/- 211

Mean = 0.45057 +/- 0.00040

Sigma = 0.07180 +/- 0.00035
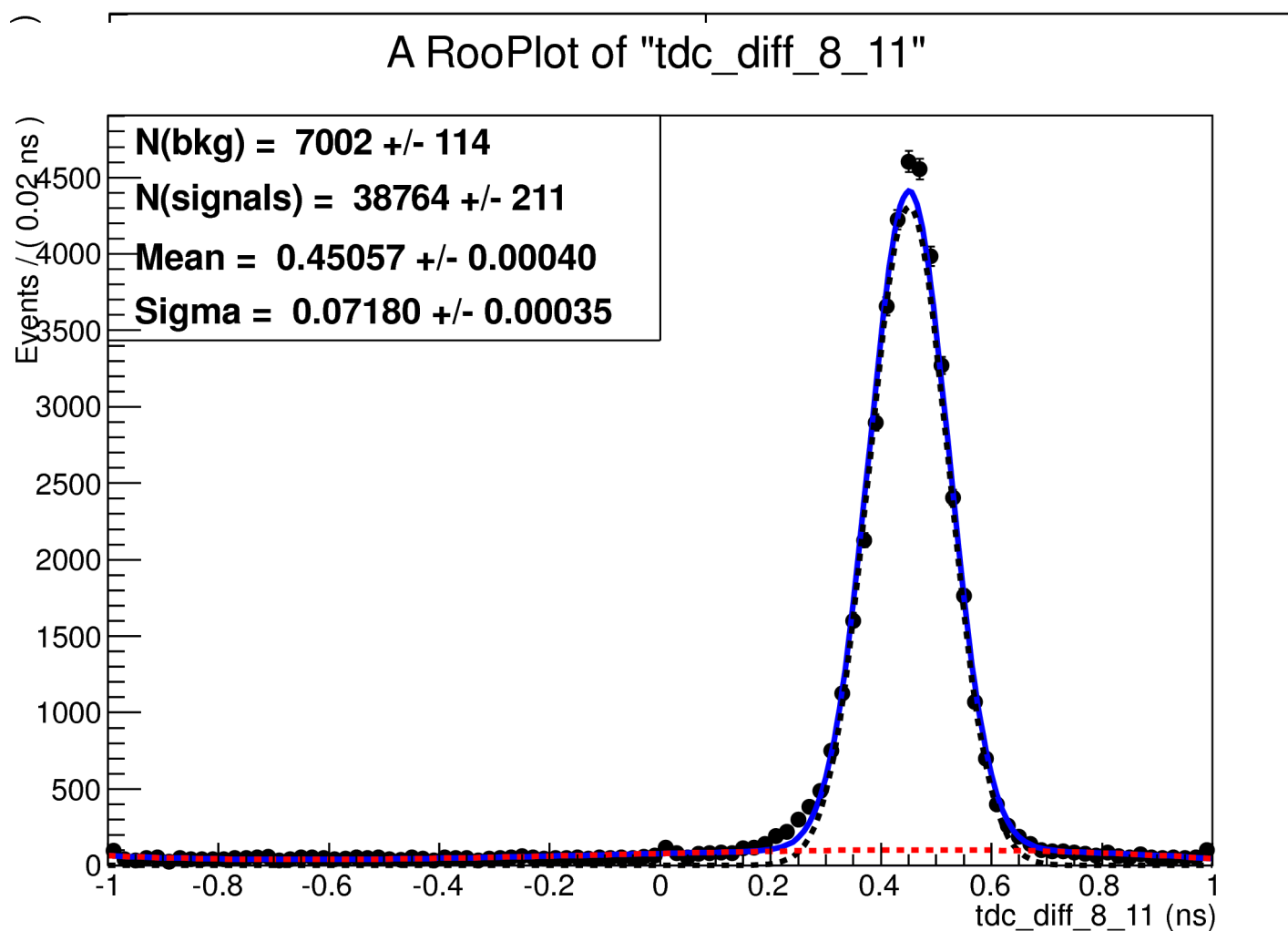
Desired modifications

- From Philips side , running with external trigger, with selected OR, AND, triggers

- From our side, a fine movable table with rotation possibility, to check direct and scattered light variation

- A MC to get photon numbers and time resolution possible we might expect from such a combination

- An effective cooling , removing of heat directly from module

Backup goes from here
Temperature behaviour...
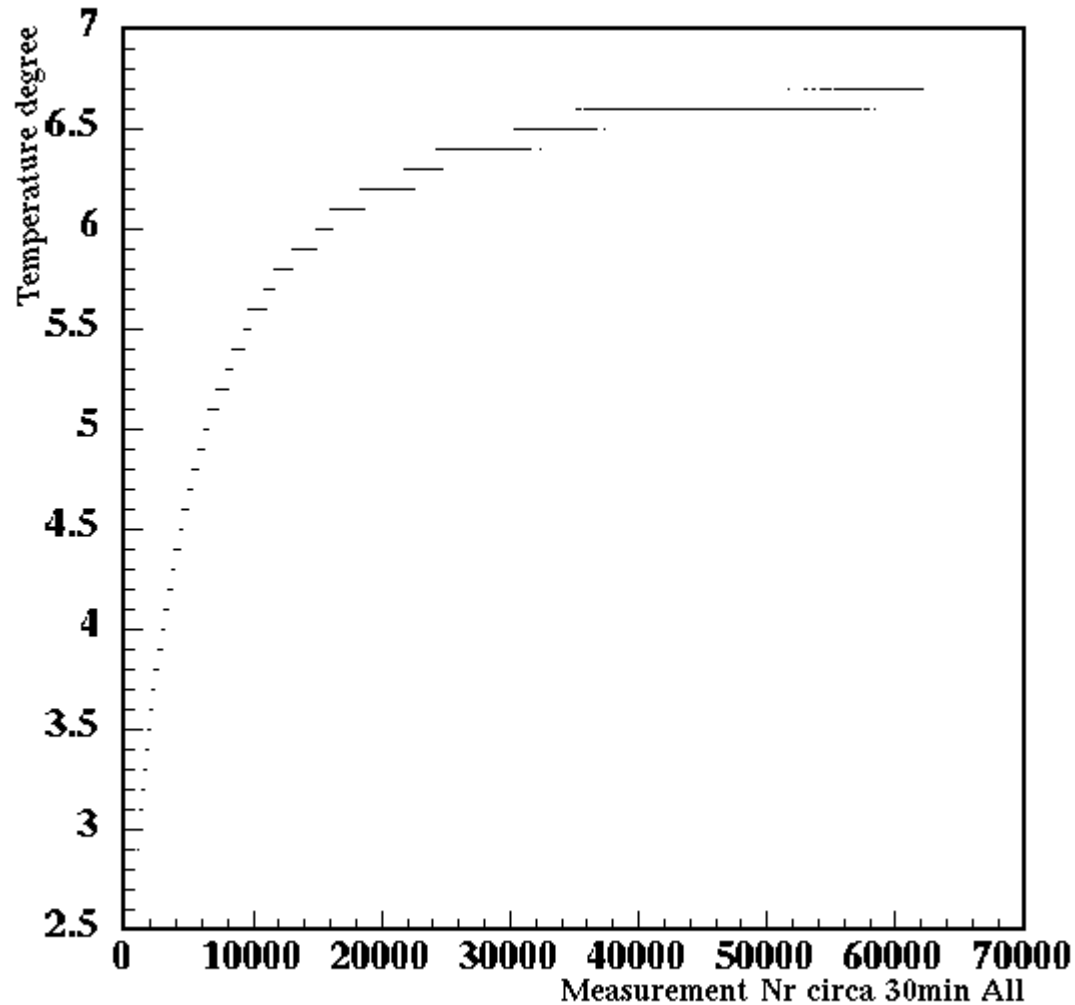
Backup goes from here
The DAQ logic