Subject: LYCCA ToF scintillators Posted by a\_boso on Wed, 07 Oct 2015 08:09:48 GMT View Forum Message <> Reply to Message

Dear all,

I am trying to use ToF Start scintillator to get position informations.

Looking at the code I saw the possibility to use a "x\_shear" parameter, which permits to introduce a "y-dependent" offset on the x position. Which is the physical meaning of this quantity? How can I optimize it?

More generally, do you know how can I optimize the position information of the Lycca ToF scintillators? Which resolution should I expect?

Last question:

Could you please share the positions of the PMTs you have in the Lycca/Lycca/Membrane.par file for the ToFStart and ToFStop scintillators? I have more than one set, and I don't know which one is the right one.

Thank you very much!

Alberto

Subject: Re: LYCCA ToF scintillators Posted by Michael Reese on Fri, 12 Aug 2016 13:35:22 GMT View Forum Message <> Reply to Message

Hi,

By just plotting the x vs. y position as it comes from the ToF-scintillator, you will get a pattern of squares. The pattern comes from the gaps between the LYCCA modules.

If everything would be perfect, the lines in the pattern should be perpendicular. In practice they might look a bit sheard.

The "x\_shear" and "y\_shear" parameters are there to correct for that.

I hope the following schematic drawing makes it clear.

In addition, the pattern might be shifted in x and y direction, and rotated. There are other parameters forseen to correct these errors.

Regards, Michael

File Attachments
1) shear\_correction.png, downloaded 599 times





Subject: Re: LYCCA ToF scintillators Posted by SMilne on Fri, 12 Aug 2016 14:26:53 GMT View Forum Message <> Reply to Message

Hi Michael,

Could I please ask how this calibration would likewise be performed for the ToF start scintillator, i.e. where no such lines are present.

Thanks, Scott

Subject: Re: LYCCA ToF scintillators Posted by Michael Reese on Fri, 12 Aug 2016 15:20:20 GMT View Forum Message <> Reply to Message You need to create a pattern artificially. One possible way to do this is to draw a rectangular gate around the projected TPC-position, i.e. the "true" position, and make a gated ToF x:y plot with the condition that the "true" position is inside that gate. You'll see the distorted shape of whatever gate you have drawn.

Reminder of how to create such a rectangular gate in the config file (I didn't test that piece of code... there might be typos inside):

```
processor ToF_Start/TPC/gate UTILS.ConditionWindow2D
x <- Frs/S4tracking.xs[5]
y <- Frs/S4tracking.ys[5]
display x:y | xy_window
end
processor ToF_Start/distored UTILS.PairWithCondition
first <- Lycca/ToFStart/Membrane.x
second <- Lycca/ToFStart/Membrane.y
condition <- ToF_Start/TPC/gate.inside
display tested_first:tested_second
```

```
end
```

If you want to have multiple gates, you could do something like this for 6 gates:

```
for $i in [0:5]

processor ToF_Start/TPC/gate_$i UTILS.ConditionWindow2D

x <- Frs/S4tracking.xs[5]

y <- Frs/S4tracking.ys[5]

display x:y | xy_window

end

end

processor ToF_Start/distored UTILS.PairWithCondition

first <- Lycca/ToFStart/Membrane.x

second <- Lycca/ToFStart/Membrane.y

for $i in [0:5]

condition <- ToF_Start/TPC/gate_$i.inside

end

display tested_first:tested_second

end
```

Then you could draw gates in the shape of horizontal lines, three gates in the shape of vertical lines, and together they'll make a grid-like shape.

Subject: Re: LYCCA ToF scintillators Posted by Michael Reese on Fri, 12 Aug 2016 15:27:20 GMT

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Hi,

I should mention, that all these corrections should be done after the calibration of the PMTs is already optimized.

Calibrated PMTs will already give a good x:y pattern. The offset, rotation, and shear corrections are for fine-tuning the result.

Subject: Re: LYCCA ToF scintillators Posted by SMilne on Fri, 12 Aug 2016 15:32:10 GMT View Forum Message <> Reply to Message

Hi Michael,

Thanks for your response. I will give it a try and see what I get.

Yeah, the other calibrations are already completed, this was just to try and optimise them a little more.

Thanks, Scott