Subject: FRS - TPC Calibrations
Posted by SMilne on Tue, 15 Jul 2014 16:31:49 GMT
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Hi all,

I am currently performing some TPC position calibrations using the TPC fiber masks, however for some reason the code does not appear to be producing the relevant spectra for the TPC21 and TPC22 fiber mask calibrations, but it is for the TPC41 and TPC42 fiber mask calibrations. I don't know why this would be the case, however Lianne is using some calibration files from another year and having the reverse problem, i.e. works for TPC21 and TPC22 but not TPC41 and TPC42. Perhaps there are some issues with these calibration files?

The files which I am using are:
tpc21_fibermask_0086.lmd, tpc22_fibermask_0087.lmd, tpc41_fibermask_0088.lmd and tpc42_fibermask_0089.lmd

Found in:
/d/rising02/feb_14/calib

Also, could someone please clarify if these scintillator fibers were at 20mm(vertical)/10mm(horizontal) or 12mm(vertical)/6mm(horizontal) separation?

Many thanks,
Scott Milne

Subject: Re: FRS - TPC Calibrations
Posted by mlcortes on Wed, 16 Jul 2014 11:06:38 GMT
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Hi Scott,

I checked the 4 files and I see the masks for all of them.
Here is the assignment I am using for the TPC signals (this should be in the file Frs/tracking.config):

```
 ##############################################################################
# TPC S21
 ##############################################################################
processor Frs/TpcS21 FRS.StandardTpc
 times[0:7]        <-  FrsTpcCrate.tdc0[16:23]
 amplitudes[0:7]    <-  FrsTpcCrate.adc0[16:23]
 fiber             <-  FrsTpcCrate.tdc1[23]
 display    x:y       in TPCs/TpcS21
 display    x                       in TPCs/TpcS21
 display    y                       in TPCs/TpcS21
 display    x_fiber:y_fiber               in TPCs/TpcS21
 display    checksums | gate_checksums     in TPCs/TpcS21/checksums
end
```

```
 ##############################################################################
# TPC S22
 ##############################################################################
processor Frs/TpcS22 FRS.StandardTpc
 times[0:7]        <-  FrsTpcCrate.tdc0[24:31]
 amplitudes[0:7]    <-  FrsTpcCrate.adc0[24:31]
 fiber             <-  FrsTpcCrate.tdc1[23]
 display     x:y      in TPCs/TpcS22
 display     y                       in TPCs/TpcS22
 display     x                       in TPCs/TpcS22
 display     x_fiber:y_fiber               in TPCs/TpcS22
 display     checksums | gate_checksums     in TPCs/TpcS22/checksums
end

 ##############################################################################
# TPC S41
 ##############################################################################
processor Frs/TpcS41 FRS.StandardTpc
 times[0:7]        <-  FrsTpcCrate.tdc1[0:7]
 amplitudes[0:7]    <-  FrsTpcCrate.adc1[0:7]
 fiber             <-  FrsTpcCrate.tdc1[25]
 display     x:y     1000,-50,50:800,-50,50  in TPCs/TpcS41
 display     y                        in TPCs/TpcS41
 display     x                        in TPCs/TpcS41
 display     x_fiber:y_fiber               in TPCs/TpcS41
 display     checksums | gate_checksums      in TPCs/TpcS41/checksums
end
 ##############################################################################
# TPC S42
 ##############################################################################
processor Frs/TpcS42 FRS.StandardTpc
 times[0:7]        <-  FrsTpcCrate.tdc1[8:15]
 amplitudes[0:7]    <-  FrsTpcCrate.adc1[8:15]
 fiber             <-  FrsTpcCrate.tdc1[26]
 display     x:y     1000,-200,200:1000,-200,200  in TPCs/TpcS42
 display     y                        in TPCs/TpcS42
 display     x        in TPCs/TpcS42
 display     x_fiber:y_fiber               in TPCs/TpcS42
 display     checksums | gate_checksums      in TPCs/TpcS42/checksums
end
```

Then I look at the x:y histogram and I see the fibers. It may be good to leave smart histograms to start. If there is no good calibration you can be out of range and see nothing.
Is also to note that the input "fiber" in each processor is not really relevant as coincidences were made before passing the signals to the electronics (This may not be the case for all the experiments).
Also notice that at some point there was a problem with a TPC and not all the signals were used for the analysis. I think there is an elog entry about it. If i find it I let you know.

About the size of the grid, usually is the 12 x 6mm, nevertheless the logbook should say which fiber was used. Do you have a scan of the logbook?

Cheers,

Subject: Re: FRS - TPC Calibrations
Posted by SMilne on Wed, 16 Jul 2014 11:45:51 GMT
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Hi Liliana,

Thanks for your response. It is good news you can see them all and at least the files are fine. I checked my tracking.config, which is slightly different only for TPC21 and TPC22 (highlighted in red):

```
 ##############################################################################
# TPC S21
 ##############################################################################
processor Frs/TpcS21 FRS.StandardTpc
	times[0:7]	<-  FrsTpcCrate.tdc0[16:23]

	#for $i in [0:3]
	# times[$i] <- FrsTpcCrate.tdc0[16]
	#end
	# second delay line has problems, we get better x-position if we take only data from first delay line
	#times[4:5] <- FrsTpcCrate.tdc0[20:21]
	#times[6:7] <- FrsTpcCrate.tdc0[20:21]

	amplitudes[0:7]	<-  FrsTpcCrate.adc0[16:23]
	fiber		<-  FrsTpcCrate.tdc1[23]
	display	xc			in TPCs/TpcS21/xs
	display	yc			in TPCs/TpcS21/ys
	display	x:y	1000,-50,50:300,0,200  in TPCs/TpcS21
	display	x	1000,-100,100		in TPCs/TpcS21
	display	y			in TPCs/TpcS21
	display	x_fiber:y_fiber		in TPCs/TpcS21
	display	checksums | gate_checksums	in TPCs/TpcS21
end
 ##############################################################################
# TPC S22
 ##############################################################################
processor Frs/TpcS22 FRS.StandardTpc
	times[0:7]	<-  FrsTpcCrate.tdc0[24:31]
	amplitudes[0:7]	<-  FrsTpcCrate.adc0[24:31]
	fiber		<-  FrsTpcCrate.tdc1[24]
	display	xc			in TPCs/TpcS22/xs
```

```
      display    yc                          in TPCs/TpcS22/ys
      display    x:y    1000,-50,50:300,0,200  in TPCs/TpcS22
      display    y                           in TPCs/TpcS22
      display    x      1000,-100,100        in TPCs/TpcS22
      display    x_fiber:y_fiber             in TPCs/TpcS22
      display    checksums | gate_checksums  in TPCs/TpcS22
end
 ##############################################################################
```

The only differences I can spot in TPC21 are commented out? However, I can try making that change to TPC22 and it should work. Yeah, I am starting from the histograms in the 'xs' and 'ys' folders in Frs/TPCs/TpcS##, and things are calibrating nicely as expected for the TPC41 and TPC42. I do have a photocopy of the log book for this experiment, but perhaps this information will be further back, when these calibrations were made.

Thanks,
Scott

Subject: Re: FRS - TPC Calibrations
Posted by mlcortes on Wed, 16 Jul 2014 11:52:23 GMT
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Hi Scott!

As I sayd before, the fiber input is not relevant, so it should not affect the result.
Have you tried to make the x:y histogram smart? I mean, if you replace

display x:y 1000,-50,50:300,0,200 in TPCs/TpcS21

by

display x:y in TPCs/TpcS21

and check this x:y histogram you should see the fiber (In this case if you replay the file of TPC21). Let me know if that works...

Subject: Re: FRS - TPC Calibrations
Posted by SMilne on Wed, 16 Jul 2014 12:07:03 GMT
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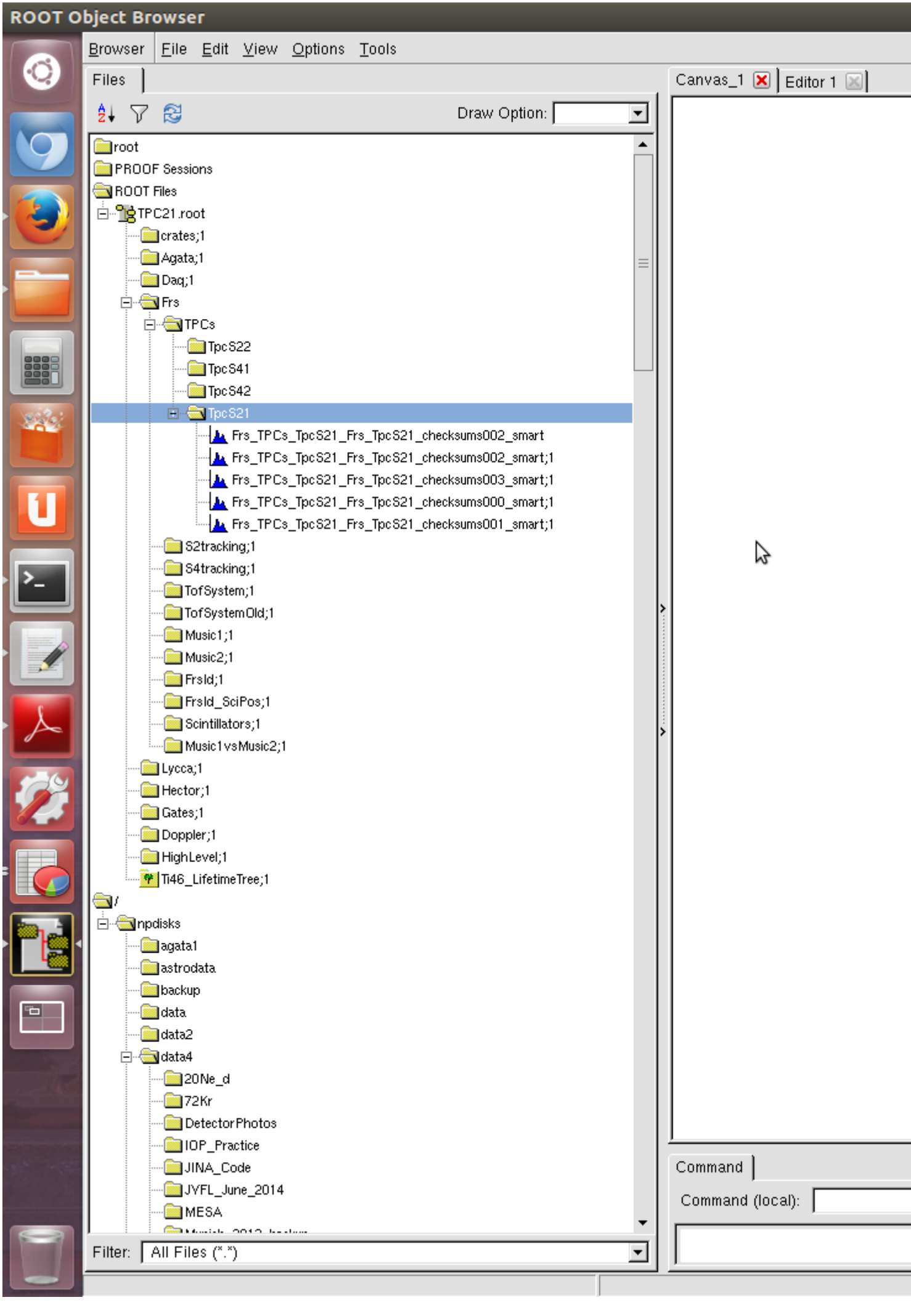
I just made that change and replayed the file, but it had no affect, I literally have nothing but the checksum spectra for some reason.

File Attachments

1) tpc21.png, downloaded 728 times


ROOT Object Browser
Browser
File
Edit
View
Options
Tools
Files
Draw Option:
root
PROOF Sessions
ROOT Files
TPC21.root
crates;1
Agata;1
Daq;1
Frs
TPCs
TpcS22
TpcS41
TpcS42
TpcS21
Frs_TPCs_TpcS21_Frs_TpcS21_checksums002_smart
Frs_TPCs_TpcS21_Frs_TpcS21_checksums002_smart;1
Frs_TPCs_TpcS21_Frs_TpcS21_checksums003_smart;1
Frs_TPCs_TpcS21_Frs_TpcS21_checksums000_smart;1
Frs_TPCs_TpcS21_Frs_TpcS21_checksums001_smart;1
S2tracking;1
S4tracking;1
TofSystem;1
TofSystemOld;1
Music1;1
Music2;1
FrsId;1
FrsId_SciPos;1
Scintillators;1
Music1vsMusic2;1
Lycca;1
Hector;1
Gates;1
Doppler;1
HighLevel;1
Ti46_LifetimeTree;1
/
npdisks
agata1
astrodata
backup
data
data2
data4
20Ne_d
72Kr
DetectorPhotos
IOP_Practice
JINA_Code
JYFL_June_2014
MESA
Filter:
All Files (*.*)
Canvas_1
Editor 1
Command
Command (local):

Subject: Re: FRS - TPC Calibrations
Posted by mlcortes on Wed, 16 Jul 2014 12:13:57 GMT
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Hi Scott,

Can you please paste the file Daq/unpack_frs.config and Frs/tracking.config
It can also be useful if you attach the TpcS21.cal and TpcS21.par

We can try to find out what is the difference between your and my replay.

Subject: Re: FRS - TPC Calibrations
Posted by SMilne on Wed, 16 Jul 2014 12:35:50 GMT
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Hi Liliana,

Please find the files attached as requested.

Thanks,
Scott

File Attachments
1) tracking.config, downloaded 410 times
2) unpack_frs.config, downloaded 410 times
3) TpcS21.cal, downloaded 416 times
4) TpcS21.par, downloaded 421 times

Subject: Re: FRS - TPC Calibrations
Posted by mlcortes on Wed, 16 Jul 2014 12:55:51 GMT
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Hi again Scott,

I reproduce what you report using your files. The problem is that your checksums are not properly set. Usually the gates of the checksums be set in go4, nevertheless this only works while the file is running. This files are quite small so you will not manage to change the checksum gates in go4.
You can replace in the gates in your TpcS21.par. I used:

gate_checksums[0] 1600 1800
gate_checksums[1] 1600 1800
gate_checksums[2] 1500 1800
gate_checksums[3] 1600 1800

With this change you should see the grid (I see it using your files). You can check in the folder Conditions the rest of the check sums and set them by hand in the .par files of each TPC.

Let me know if it works.

Subject: Re: FRS - TPC Calibrations
Posted by SMilne on Wed, 16 Jul 2014 13:13:44 GMT
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Hi Liliana,

Thank you very much for your help! Sorry, I was not aware these needed changing from the ones set up for the experiment for these calibrations. I've tried it now and it works.

Thanks,
Scott

Subject: Re: FRS - TPC Calibrations
Posted by thuyuk on Wed, 03 Jun 2015 10:24:24 GMT
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Dear TPC and FRS experts,

My problem with the calibration of the TPCs is somehow complicated, since the time window to acquire the y-axis information was not properly set during the experiment (this was noted after the beam-time). Therefore, I seem to have very limited region of the TPCs in S4 in the vertical axis, meanwhile I have no problem with the horizontal axis. Please check out the following plot for better understanding:

In this image, it is seen that the x-axis distribution is more or less fine, but the y-axis has some kind of limited region drawn. This plot has been created using one of the runs where the primary beam is used and focused in S4. Therefore we expect to have the statistics should accumulate around (0,0) point. But, I have no idea whether the beam should form a circular shape in this case, or it should be dispersed along the horizontal axis.

Anyone who is expert on FRS could tell me, by heart, that what should one expect for the beam cross section shape?

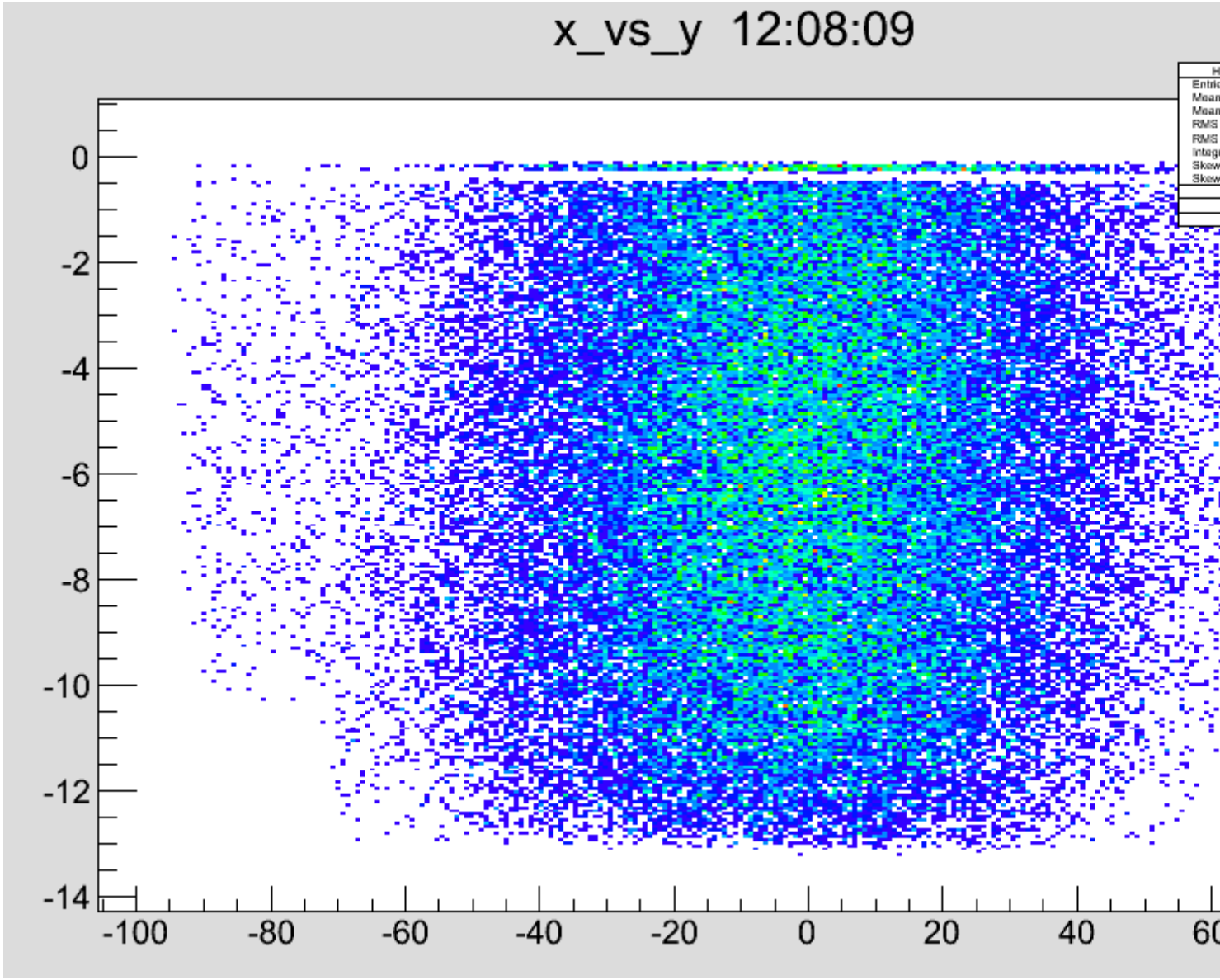
I'm hopeless, because the calibration coefficients determined using the calibration runs with the fiber mask do not work. I have to make the best guess and try to get some information from the TPCs, otherwise the Doppler correction in my experiment fails, and I will never get a proper gamma spectrum.

Thank you and best regards,
tayfun

File Attachments

1) Screenshot from 2015-06-03 12:08:35.png, downloaded 1042

times



Subject: Re: FRS - TPC Calibrations
Posted by mlcortes on Wed, 03 Jun 2015 12:04:25 GMT
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Hi Tayfun,

Don't be so hopeless yet...I can try to help you, but I need to start from the beginning.
Do I understand correctly that the problem is with S4 TPCs only?
In that case, can you please post the x vs y for both TPCs for the calibration runs with the mask?
As you know, each TPC fas more than one x and y. Can you please plot also all the xc and yc for each TPC.

I hope we can find something...
Liliana

Subject: Re: FRS - TPC Calibrations
Posted by thuyuk on Wed, 03 Jun 2015 12:12:38 GMT
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Hi Liliana,

Thanks for the repsonse.

I'm sorry, I don't understand what you mean "we have more than one x and y for each TPC". I see only one x and y as the output of the processor, and don't see any xc or yc calculated. What does "c" stand for?

Thanks,
Tayfun

Subject: Re: FRS - TPC Calibrations
Posted by mlcortes on Wed, 03 Jun 2015 12:31:27 GMT
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Hi Tayfun,

In general, each TPC has 4 y outputs and 2 x outputs. You can check it more in detail in the TPC manual. So, with some hope you can still use at least one for each direction. The x and y outputs are the average of those values.
I just now noticed that we may be using different processors, so here I copy my config file:

```
processor Frs/TpcS41 FRS.TPC
 times[0:7]        <-  FrsTpcCrate.tdc1[0:7]
 amplitudes[0:7]    <-  FrsTpcCrate.adc1[0:7]
 fiber             <-  FrsTpcCrate.tdc1[23]
 display     x:y      500,-50,50:500,-50,50  in TPCs/TpcS41
 display     y        500,-50,50             in TPCs/TpcS41
 display     x        500,-50,50             in TPCs/TpcS41
 display     xs       500,-50,50             in TPCs/TpcS41
 display     ys       500,-50,50             in TPCs/TpcS41
# display     x_fiber:y_fiber                in TPCs/TpcS41
 display     checksums | gate_checksums  5000,-2000,3000    in TPCs/TpcS41/checksums
end
```

Here this different outputs are called xs and ys. I think for the processor called StandardTpc (and not TPC), the different xs and ys are called xc and yc.
Taking care about using the correct inputs, can you please try to run this and get the xs and ys? (And also the x vs y for the mask runs)

Liliana

Subject: Re: FRS - TPC Calibrations
Posted by thuyuk on Wed, 03 Jun 2015 13:05:58 GMT
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Hi Liliana,

thanks for the information and the processor that you use. the manual of TPC is a different story and it tells nothing more than what you wrote here: 2 outputs of x and 4 outputs of y Thank you anyway!

I just noticed that inside the source, there are the outputs xc and yc which are calibrated x and y outputs. I included them in the config file.

I think I should tell you more at this point for the sake of less complicity of the things:

1. The fiber mask signals are not processed in the prespec code, while they are visible in the previous "new_prespec_Go4" code.
2. The x:y of TPCs and the fiber mask plots are good and almost have fine calibration at new_prespec_Go4.
3. When I replay the experimental data, the calibration get lost at new_prespec_Go4.
4. I cannot do the calibration with the prespec code since I cannot see fiber mask signals when I replay the calibration data with mask.
5. The very same calibration coefficients which work in the new_prespec_Go4 code also work with the horizontal calibration but not for the vertical in the prespec code.

Now if we check out the plots under above circumstances:

TPC 4.2 at new_prespec_Go4:

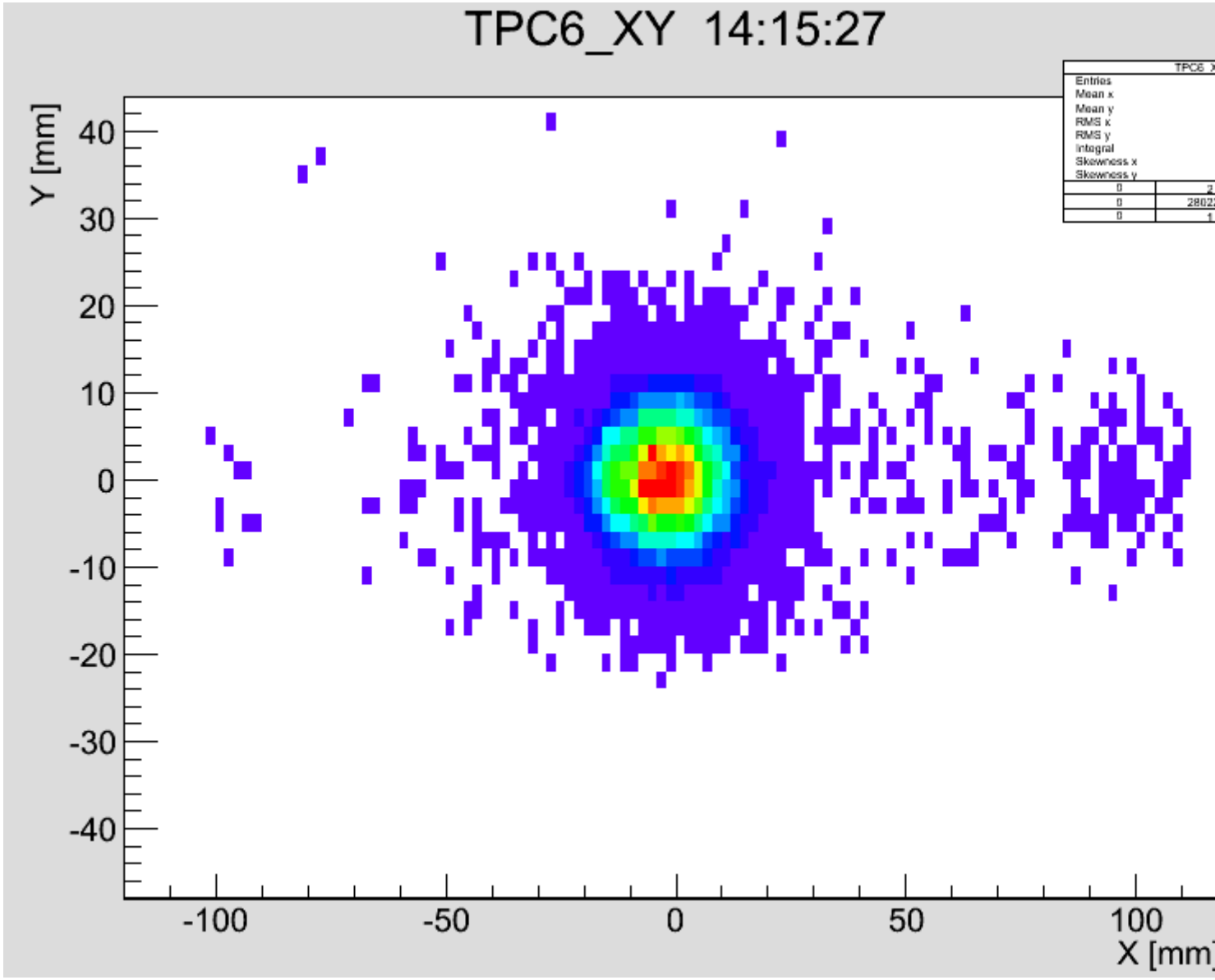
x:y and xc:yc at prespec (top: TPC 4.1; bottom: TPC 4.2):

Fiber Mask at new_prespec_Go4:

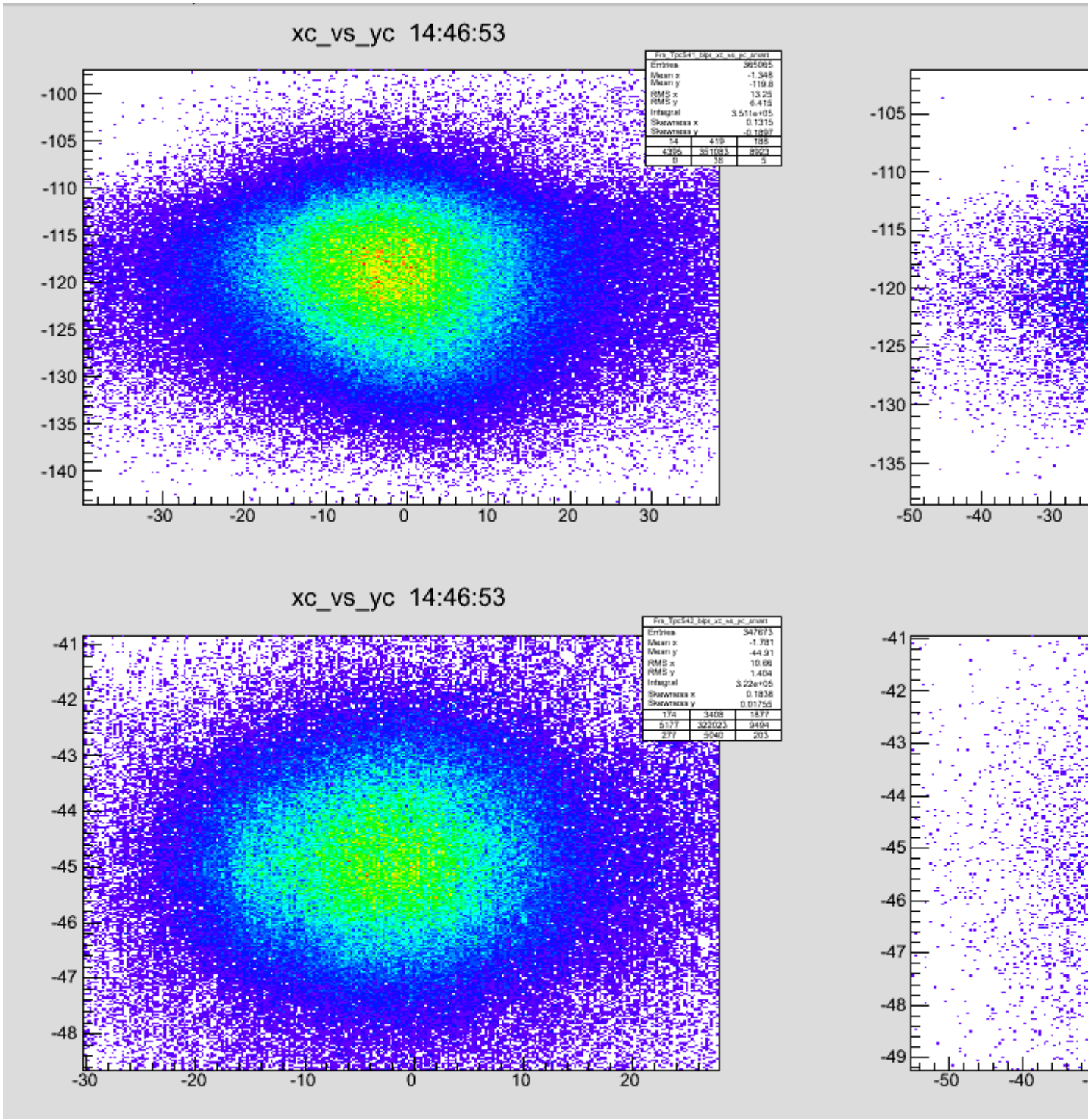
Thanks!
Tayfun

File Attachments

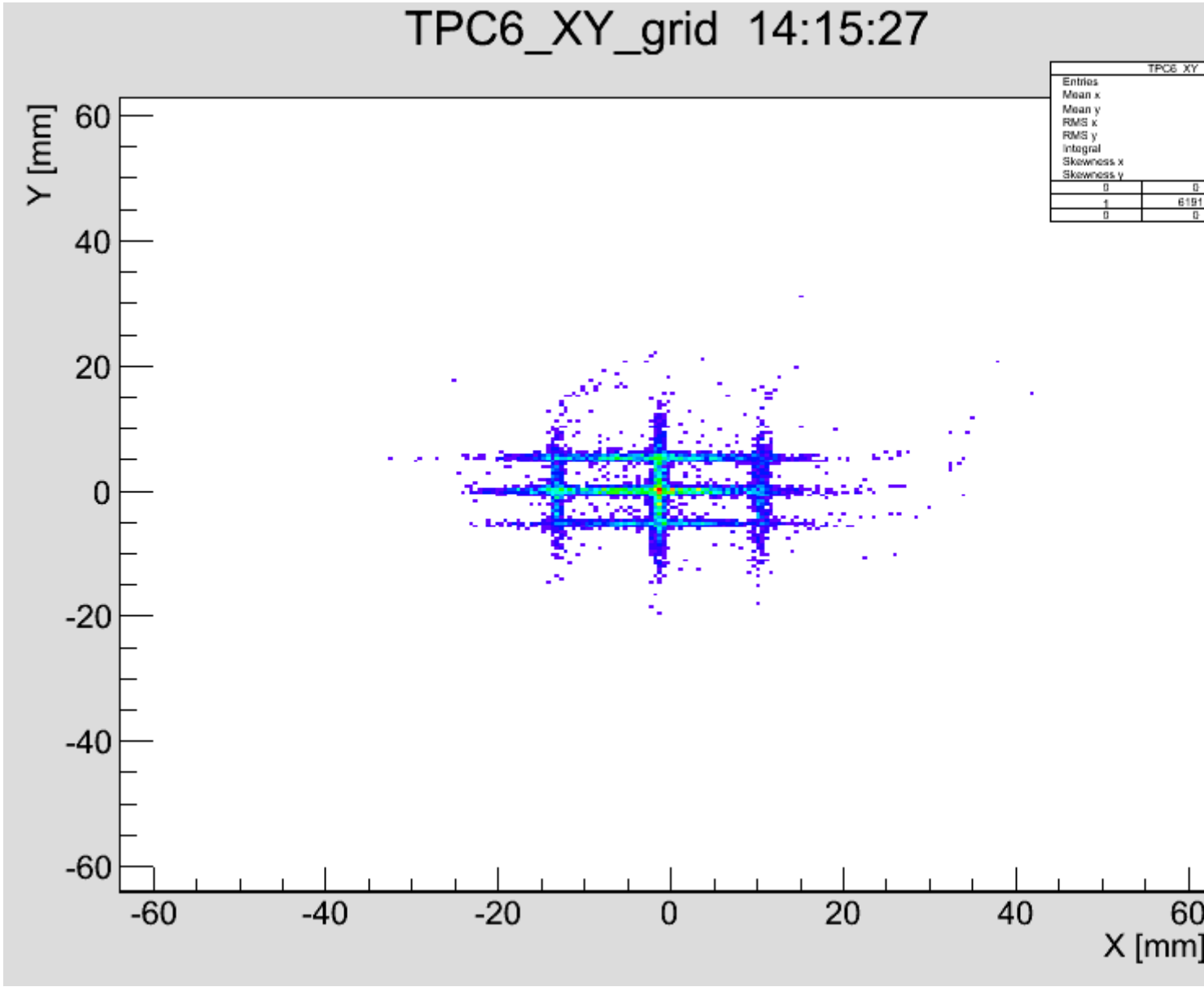
1) Screenshot from 2015-06-03 14:59:17.png, downloaded 1035 times



2) Screenshot from 2015-06-03 14:48:13.png, downloaded 1106 times



3) Screenshot from 2015-06-03 14:41:02.png, downloaded 979 times



Subject: Re: FRS - TPC Calibrations
Posted by mlcortes on Thu, 04 Jun 2015 07:27:37 GMT
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Hi Tayfun,

It looks like a weird problem.
To which data correspond the plots you sent (is it a primary beam and how long after the calibration runs?)?
If the new_prespec_Go4 plot is for the same data that the prespec code, can you please give them the same binning?
And also, can you please plot separately xc and yc. If you put them in a 2D plot they are plotted all vs all and then we cannot see if one of them is not fine. A plot with the supersposition of all xc and another plot wit all yc can possibly give us a hint.
So you say that in any case, the calibration that you make in the new_prespec_Go4 does not work for the experimental data inside the same code?

So it means that the calibration changed at some point. Have you checked when does this happen? Is it a clear difference or the first files are still working with the calibration?
About the prespec code, what do you mean by not being able to replay the mask files? Do you get an error message? Did you check that you have the correct channel for the mask input?
If you tell me the file name of the calibration mask at S4 I can run it with prespec code to try to understand what happens.

Liliana

Subject: Re: FRS - TPC Calibrations
Posted by thuyuk on Thu, 04 Jun 2015 08:51:23 GMT
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Hi Liliana,

Quote:To which data correspond the plots you sent (is it a primary beam and how long after the calibration runs?)?

Those belong to one of the calibration data taken in August 2012, to be more precise, the plots that you are looking at are from:
TPC_cal_s4_mask_0131.lmd

Quote:If the new_prespec_Go4 plot is for the same data that the prespec code, can you please give them the same binning?

yes, sure, please check them out:

Quote:And also, can you please plot separately xc and yc. If you put them in a 2D plot they are plotted all vs all and then we cannot see if one of them is not fine. A plot with the supersposition of all xc and another plot wit all yc can possibly give us a hint.

Could you please be more specific? Did you mean I should plot xc and yc like one of these:
display xc::yc
display xc:::yc
and not display xc:yc?

Quote:So you say that in any case, the calibration that you make in the new_prespec_Go4 does not work for the experimental data inside the same code?

yes, exactly!

Quote:So it means that the calibration changed at some point. Have you checked when does this happen? Is it a clear difference or the first files are still working with the calibration?

This is my impression, yes... and I cannot tell you when it has been changed, because I see the same issue from the beginning of the experiment.

Quote:About the prespec code, what do you mean by not being able to replay the mask files?

Well, to be more precise, I can replay them, but I cannot see the mask signal in the corresponding crate and channel where it suppose to be.

Quote:Do you get an error message?

Yes and no. I tried with many calibration data which the names refer to the ones taken with the mask. Not all of them, but when some of them are replayed, I see the message something like this:
Unexpected geometry (0 instead of expected 9)...

Quote:Did you check that you have the correct channel for the mask input?

Yes, I checked and confirmed also with the ones that you suggested to Scott in the above threads. In addition, I don't see any other signal in any other channels of the TDCs of the TPCs which I could use and have the same shape as the fiber mask signals have. I could check the lookup table in new_prespec_Go4 where the fiber mask signals should be and then check whether they are there in prespec. This is an accurate way but it is also the long way, because it is somehow hard to follow the algorithms inside the new_prespec_Go4 code. But, I'm positive that I cannot get any fiber mask signal (of TPC S4, the TPC s2 signals are present) in any channel of the TDCs.

Quote:If you tell me the file name of the calibration mask at S4 I can run it with prespec code to try to understand what happens.

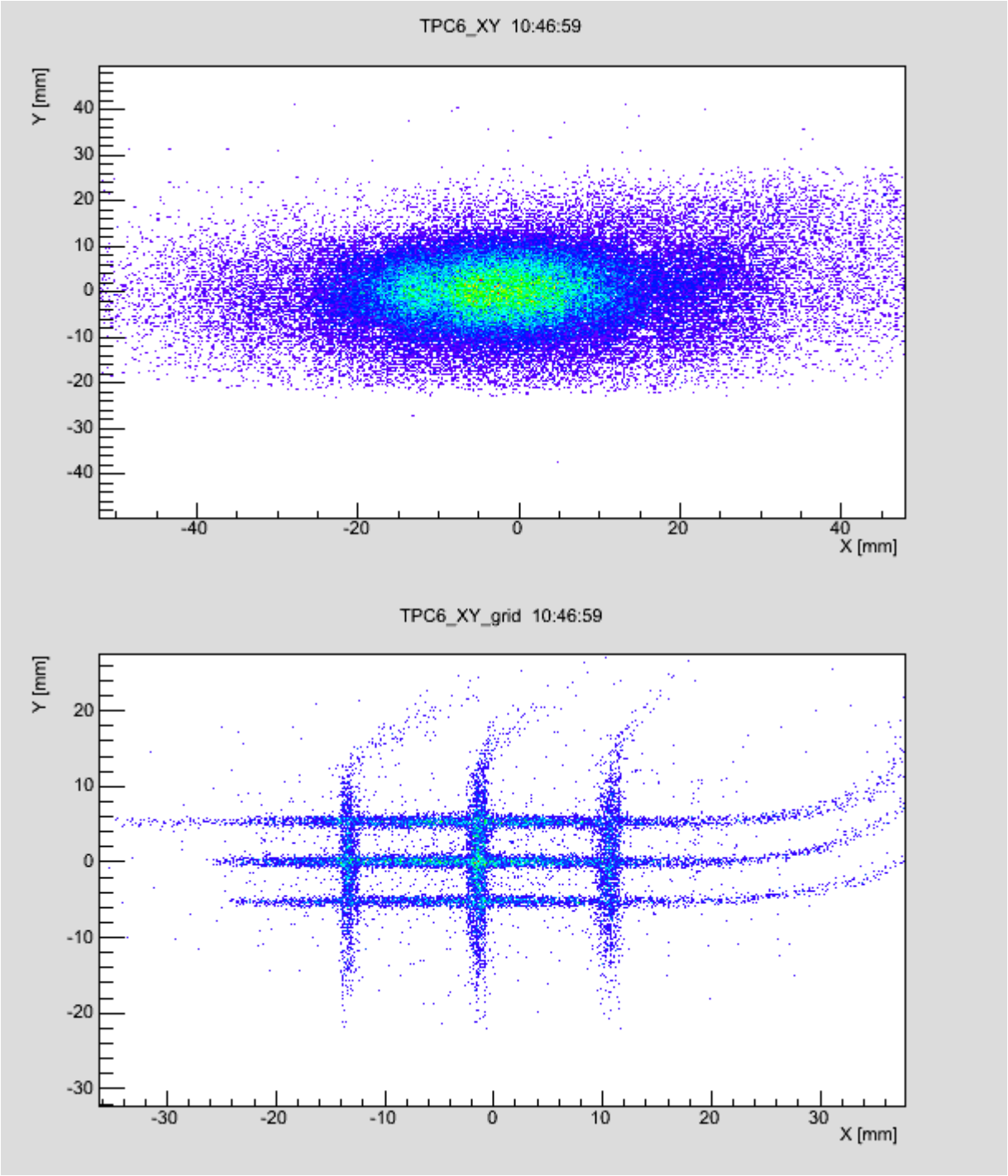
I already wrote it above, but I can put its name here again for convenience:
TPC_cal_s4_mask_0131.lmd

Thanks Liliana!

Tayfun

File Attachments

1) Screenshot from 2015-06-04 10:47:09.png, downloaded 990 times



Subject: Re: FRS - TPC Calibrations
Posted by mlcortes on Sat, 06 Jun 2015 10:09:38 GMT
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Hi Tayfun,

Sorry for the delay in replying, it has been a busy week.

First, just as you said, I didn't manage to run the file you are using with prespec code. I do not understand why it runs in the new_prespec_Go4 code, but for the calibration I used file 132. For that file, ones sees a kind of double grid in y direction. I think this was related to some

problem in the delays used for y, but I am not sure. This was the main problem we had to fix. As this files are the same used for the calibration of the Pb experiment, I think you can give it a try to our calibration parameters
I want to point out that the calibration was made by Pico, by calibrating individually each y with the grid and after fixing them, calibrating x. Apart from that, he included a y offset to align the TPCs with the TargetDSSD.
So I would suggest that you put this parameters and give it a try.... Hopefully you will see y calibrated. Let me know how it goes

For TPC41:

```
##  Original calibration X (-5.45941 offset -left)
##
cal_x[0]                    6.9059240       0.071844
cal_x[1]                     2.565379       0.073667

##
## for S429 file 7 TPC projected at TARGET DSSSD were Y-centered at +25.6522
##
## Target DSSSD was Y-centered at -1.51222 so the offset was set to match
##
cal_y[0]              30.523964       -0.036214
cal_y[1]              30.971966       -0.036226
cal_y[2]              32.407504       -0.036935
cal_y[3]              32.488682       -0.036932
```

For TPC 42

```
##  Original calibration (+1.3447 offset -right)
##
cal_x[0]            -1.708523    0.073670
cal_x[1]            0.423916    0.074975

##
## for S429 file 7 TPC projected at TARGET DSSSD were Y-centered at +25.6522
##
## Target DSSSD was Y-centered at -1.51222 so the offset was set to match
##
cal_y[0]            22.986629    -0.038519
cal_y[1]            22.733846    -0.038766
cal_y[2]                    21.329802    -0.038116
cal_y[3]            20.819015    -0.037600
```