Subject: PndSttHitProducerRealFast() depends on event type?
Posted by donghee on Wed, 15 Apr 2009 14:23:34 GMT
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Dear all,

During the debugging of my code, I found that Stt part was problem in my code.
When I try to use hit provider for STT detector, following class is called to digitize

```
PndSttHitProducerRealFast* sttHitProducer = new PndSttHitProducerRealFast();
fRun->AddTask(sttHitProducer);
```

But run is stopped with below message at certain event.
If I don't use this class, I can go to the end.

```
---------------------------------------------
 DIGI EXECUTION **********************
Hit array contains 79 hits
 *** Break *** floating point exception
---------------------------------------------
```

And one more strange thing is that some event can passing through without error.
Here is the output before crashing

```
---------------------------------------------
DIGI EXECUTION **********************
Hit array contains 107 hits
Event Number 0
caution: wrong drift time
caution: wrong drift time
caution: wrong drift time
caution: wrong drift time
 Nr of Points: 4
-I- PndMvdHybridHitProducer: 4 PndMvdMCPoints, 3 Digi created. 3  (event 0)
-I- PndMvdNoiseProducer: Noise produced 0xStripRect 0xStripTrap 0xPixels
 Ideal Hit Producer -Point-: 0xb5d5f50
-I- PndTofHitProducerIdeal: 1 TofPoints, 1 Hits created.
-I- PndTofHitProducerIdeal: 0 SciFTofPoints, 0 sciF Hits created.
---------------------------------------------
```

So, I assume that STT hit producer give up some calculation. I don't know how they decide it.
Could anybody explain how STT class works?

Thank you!

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by Anonymous Poster on Wed, 15 Apr 2009 16:52:00 GMT

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Hi,

the floating point exception that happens should be easy to find. Dont you have more output when this crash happens? Usually the ROOT signal handler gives you a stack trace for such situations. If this is not the case by default, just run it in the debugger, i.e.:

gdb root.exe
Simply using root doesnt work, it needs to be root.exe

then inside gdb do (whatever options you usually use for your root call, e.g.)
run -b -q myMacro.C

Then when the crash happened, type

where

and then look more exactly at the frame where it happens (the one before 'signal handler' for example if it where 5) type

fr 5

what do you get? Probably some division be zero.

Cheers, Christian

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by StefanoSpataro on Thu, 16 Apr 2009 08:14:49 GMT
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Hi,
this is quite strange, considering that I have tested the stt reconstruction with more than 20k events with different momentum ranges.
Does the error appear at the first event, or after X events?
Which events are you running? The Box generator, or some EvtGen/DPM events?

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by donghee on Thu, 16 Apr 2009 08:27:20 GMT
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Stefano Spataro wrote on Thu, 16 April 2009 10:14Hi,
this is quite strange, considering that I have tested the stt reconstruction with more than 20k events with different momentum ranges.
Does the error appear at the first event, or after X events?
Which events are you running? The Box generator, or some EvtGen/DPM events?

My own generator for exclusive photon production is used.

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by donghee on Thu, 16 Apr 2009 08:28:46 GMT
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thank you christian,

I will try to test using your instruction.

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by Lia Lavezzi on Thu, 16 Apr 2009 09:47:10 GMT
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Hi,
sorry for the late reply but I was not in office in the last days...

I made a quick test (by running your macros) and I have a crash too... I need some time to make some checks... I will let you know as soon as I find something more precise!

The really weird thing, however, is that we did too test the STT with thousands of events and we never found such a problem

I will let you know soon.
Regards,
Lia.

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by Anonymous Poster on Thu, 16 Apr 2009 10:30:50 GMT
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Hi,

I dont find it strange that Lia and Stefano had no problems, but someone using different generators has them. This is to my mind a division by zero problem or similar, and there can be a million reasons, why certain event topologies trigger this problem while others dont.

I think we should try to be a bit more careful in general with numerics. If you write any new code at least, try to avoid divisions by zero.

Cheers, Christian

Subject: Re: PndSttHitProducerRealFast() depends on event type?

Posted by Lia Lavezzi on Thu, 16 Apr 2009 11:25:00 GMT
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Hi Donghee,
I see you run the simulation with both STT and TPC switched on, but this is not permitted since these two detectors both fill the same region (the central tracker region) and so you have to choose between them.

Can you please try the following:
1) switch off the TPC (commenting out the lines which concern it);
2) use the "straws_skewed_blocks_35cm_pipe.geo" insted of straws_skewed_blocks.geo" file as STT geometry file (since it contains the correct positioning of the tracker with respect to the interaction point, to avoid any overlap)
... and tell me if the problem persists?

Best regards,
Lia.

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by donghee on Thu, 16 Apr 2009 12:20:24 GMT
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Dear Lia,

TPC is now going outside of my task. Sorry TPC family.
New geometry file for STT looks fine and correctly(?) works in the simulation.

I need to check it in the reconstruction part.
Stay tune!
Thank you, Lia

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by donghee on Thu, 16 Apr 2009 12:53:13 GMT
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Dear Lia,

Unfortunately, the problem of stt is still persisted
I followed your suggestion, removed tpc and exchanged geo file.
Simulation is OK, but when I try to reconstruct, stt has still some problem.

Best wishes,
Donghee Kang

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by Lia Lavezzi on Thu, 16 Apr 2009 13:59:23 GMT

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Hi,
can you please send me your last macros (with all the corrections), so that I can try to reproduce the problem? By changing the TPC and the geo file I don' t see the crash anymore, so I guess there must be something different between the macros that I' m using and your ones... Let' s start from scratch!

Thank you!
Lia.

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by donghee on Thu, 16 Apr 2009 14:19:52 GMT
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Dear Lia,

Here is tar ball including event file in hepevt/Panda_event_1.txt
And you can find 3 macros.

For simulation My_dvcs_full_run.C
For digitization My_dvcs_full_digi.C
For reconstruction My_dvcs_full_digi_reco.C

I tried to combine digi and reco macro, but I couldn't succeed for that. Thus I still need to run two macros separately.

If you inactive stt part, you can go to final event.
otherwise, if you want to use stt in digitization part.
you might have some problem.

Thank you for your help!

Best wishes,
Donghee Kang

File Attachments

1) dvcs2.tar.gz, downloaded 486 times

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by Lia Lavezzi on Thu, 16 Apr 2009 15:37:38 GMT
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Hi,
I tried running your macros but I can run the whole chain also with STT; I just had a problem with TOF, but after changing the geo file to tofbarrel.geo (as suggested by Alicia) it is working fine. Since I don' t see the crash, I think it would be useful if you could post the whole stack

trace that ROOT prints (or the debugger prints, if you use gdb) when the floating point exception shows up, in order to understand where exactly the error happens.

Regards,
Lia.

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by StefanoSpataro on Thu, 16 Apr 2009 16:13:48 GMT
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Hi,
why don't you try the macro tutorials/lhetrack/run_sim_tpccombi_pgun.C ? There the order of detectors is correct, with the correct file names, so in theory it should run. You could try to see the differencies between your code and this well tested one, just to isolate eventual problems of typo, wrong geometries or similar.
Unfortunately for the moment I cannot check your macro in my computer.

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by donghee on Thu, 16 Apr 2009 21:12:31 GMT
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Dear Stefano,

Until now, I was not aware of the location of well tested macros and good examples. I mean to say, I couldn't get all useful information as all experts know, therefore I have to ask to person, who are playing everyday in this wiki.
Thank you for your good info.

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by donghee on Thu, 16 Apr 2009 21:39:27 GMT
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Dear Lia and all pandaroot experts,

There is no improvement of my understanding, now I'm still confusing for all situation.

Let's considering only in the simulation level.
I prepare two output display in attached file.

I used two different *.geo cases with TOF.
```
Tof->SetGeometryFileName("tofSciF.geo");
Tof->SetGeometryFileName("tofbarrel.geo");
```

I didn't touch any other lines.
In 10th event, the run is stuck with tofbarrel.geo.

To see what here is happen, all messages are printed with gdb mode in the case of using tofbarrel.geo.

One more strange thing is...
If I try to use DIRC detector or dipole field, which is suggested
in the tutorial run_sim_tpccombi_pgun.C,
at the second or fouth event run was also broken.

I doubt whether I have recent pandaroot version, and pandaroot is working
in my laptop with ubuntu operation.
Or probably, christian hoeppner already pointed out, there is related on the event topology.
Such case, other person must report same problem. But it's not until now.

Best regards,
Donghee Kang

File Attachments

1) tofbarrel.geo.error.txt, downloaded 492 times
2) topSciF.geo.txt, downloaded 400 times

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by Ralf Kliemt on Fri, 17 Apr 2009 08:31:03 GMT
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Hello Donghee,

As I read in tofbarrel.geo.error.txt the transport code breaks while processing a proton, applying an elastic scattering. This is inside Geant4 and I cannot help here. Are you sure that your external packages are installed completely and clean?

Anyway I have some (hopefully useful) hints for you.

Try to have a clean build with using make clean inside the build directory every now or then. You could even just delete the whole directory and recompile pandaroot from scratch. It takes

a while, but it helped me once.

Be aware of your pandaroot version. svn info gives you the necessary details and svn status shows your changes. I recommond to use kdesvn or a similar graphics tool for the versioning and tracking changes.

Start first with an example like the above mentioned tutorial. This should run on your machine.

When you are debugging with running small ammounts of events I usually delete the *.root files before the next test. I can see from the output that your parameter file contains already a lot of enties. This should do nothing in theory, but I like to have it clean.

Greetings, Ralf.

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by asanchez on Fri, 17 Apr 2009 09:33:11 GMT
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Hi
i have been testing the tof
code with the tofbarrel for along time, and i cannot reproduce
your error.

Actually the tofsciF and the tofbarrel contains the same geometry
for tof barrel with the only difference that tofsciF contains also geometry for fiber detector which are used for the hypernuclei setup.

So after having run the sim_complete.c digi_complete.C
where the tof tasks are used
i don't get any problem .

my best regrads
Alicia.

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by donghee on Sat, 23 May 2009 14:41:17 GMT
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Dear all,

I would like to conclude my problem for STT class in pandaroot.
If you have some idea and suggestion, it would be very helpful.
I want to change TPC to STT mode, since the STT is planned to install as default detector system for central tracking.

Now, I explain again what my problem is for STT study.
In order to use STT detector I have introduced below line with correct geo metry in my

Simulation "run" code, which you can also find in attached file, the name is test_run.C, To simply no interesting part took out, only STT part is used.

Quote:
```
  FairDetector *Stt= new PndStt("STT", kTRUE);
  Stt->SetGeometryFileName("straws_skewed_blocks_35cm_pipe.geo");
  fRun->AddModule(Stt);
```

Then, I'm going to digi tasks with following line
Quote:
```
  // -----   STT analysis tasks   -----------------------------------------
  PndSttHitProducerRealFast* sttHitProducer = new PndSttHitProducerRealFast();
  fRun->AddTask(sttHitProducer);

  // trackfinding ....
  PndSttTrackFinderIdeal* sttTrackFinder = new PndSttTrackFinderIdeal(1);
  PndSttFindTracks* sttFindTracks = new PndSttFindTracks("Track Finder", "FairTask",
sttTrackFinder, 1);
  sttFindTracks->AddHitCollectionName("STTHit", "STTPoint");
  fRun->AddTask(sttFindTracks);
```

In this stage, the stt track finder cannot perform the tracking from porduced hit.
If you try to run test_digi.C, you can clearly see why the digitization is stopped.
This is not correlated geometry, because I exclude all other detector component to make a debug.
The problem is purely trackfinding of STT for my special event.
If I use this code with box generator, all process including run and digi can pass through at the end.
If I use TPC, the event can be reconstructed with TPC detectors.
Few event give some reasonable return values, for example,
Quote:
```
-----------------------------------------------------
-I-          Ideal STT track finding              -I-
Hits: 53
MCTracks: total 5, accepted 2, reconstructable: 2
SttHits not found   : 0
SttPoints not found : 0
MCTracks not found  : 0
SttTracks not found : 0
-----------------------------------------------------
-I- PndSttHitProducerIdeal: 5 SttPoints, 5 Hits created.
```

You can also check this number from test_digi.C file at first and second event.
I want to know that if PndSttTrackFinderIdeal.cxx code check hit threshold or true MC information, or if they don't find some expected number, do they return stop signal?
Also, I assume that STT class return the floating exception, when there are not enough hits, thus they give up some kind of difficult tracking.
STT expert can give more infomation, when they can fail to calucalte in the

PndSttTrackFinderIdeal.cxx code.

I'm so sorry for inconvenient discussion.
This is my working environment.
Pandaroot v5476
Event : exclusive compton scattering with three outgoing particle (electron, photon, proton)

File Attachments

1) test_digi.C, downloaded 483 times
2) test_run.C, downloaded 499 times
3) test_3.txt, downloaded 495 times

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by StefanoSpataro on Sat, 23 May 2009 15:12:22 GMT
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I have not understood,
if I run stt reconstruction with the macros:

tutorials/lhetrack/run_sim_sttcombi.C & run_digi_sttcombi.C

everything runs fine.
Have you tried to compare your macros with those? Maybe you are missing something important there. From here I cannot check, not at least before monday.

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by Lia Lavezzi on Mon, 25 May 2009 10:26:02 GMT
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Hi,
I will have a look to the macros you attached as soon as possible (sorry but these are very busy weeks...).

In PndSttTrackFinderIdeal just a match of the hits to the track, starting from the MC truth, is made, so no cut should be there, but I will check it more deeply what causes the problem.

Sorry for not being more detailed here, but I need to test directly the code to understand what happens.
I will keep you informed!

Best regards,
Lia.

Subject: Re: PndSttHitProducerRealFast() depends on event type?
Posted by Lia Lavezzi on Tue, 26 May 2009 15:03:49 GMT
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Hi,
I ran your macros: they both run to the end without problems.
Did you see also some crash of the code or is it just a matter of the results?
Concerning the ouput, here is what I get:
Event Number 0
-I- PndSttTrackFinderIdeal: STTTrack 0 created from MCTrack 3 (3 STTPoints)
-I- PndSttTrackFinderIdeal: STTTrack 1 created from MCTrack 4 (3 STTPoints)

-I- Ideal STT track finding -I-
Hits: 53
MCTracks: total 5, accepted 2, reconstructable: 2
SttHits not found : 0
SttPoints not found : 0
MCTracks not found : 0
SttTracks not found : 0

Event Number 1

-I- Ideal STT track finding -I-
Hits: 5
MCTracks: total 6, accepted 0, reconstructable: 0
SttHits not found : 0
SttPoints not found : 0
MCTracks not found : 0
SttTracks not found : 0

Event Number 2
-I- PndSttTrackFinderIdeal: STTTrack 0 created from MCTrack 0 (3 STTPoints)
-I- PndSttTrackFinderIdeal: STTTrack 1 created from MCTrack 3 (3 STTPoints)
-I- PndSttTrackFinderIdeal: STTTrack 2 created from MCTrack 4 (3 STTPoints)

-I- Ideal STT track finding -I-
Hits: 56
MCTracks: total 5, accepted 3, reconstructable: 3
SttHits not found : 0
SttPoints not found : 0
MCTracks not found : 0
SttTracks not found : 0

Event Number 3
-I- PndSttTrackFinderIdeal: STTTrack 0 created from MCTrack 0 (3 STTPoints)

-I- Ideal STT track finding -I-
Hits: 26

MCTracks: total 3, accepted 1, reconstructable: 1
SttHits not found : 0
SttPoints not found : 0
MCTracks not found : 0
SttTracks not found : 0

Event Number 4

-I- Ideal STT track finding -I-
Hits: 7
MCTracks: total 8, accepted 0, reconstructable: 0
SttHits not found : 0
SttPoints not found : 0
MCTracks not found : 0
SttTracks not found : 0

Event Number 5

-I- Ideal STT track finding -I-
Hits: 1
MCTracks: total 3, accepted 0, reconstructable: 0
SttHits not found : 0
SttPoints not found : 0
MCTracks not found : 0
SttTracks not found : 0

Event Number 6

-I- Ideal STT track finding -I-
Hits: 0
MCTracks: total 3, accepted 0, reconstructable: 0
SttHits not found : 0
SttPoints not found : 0
MCTracks not found : 0
SttTracks not found : 0

Event Number 7

-I- Ideal STT track finding -I-
Hits: 0
MCTracks: total 3, accepted 0, reconstructable: 0
SttHits not found : 0
SttPoints not found : 0
MCTracks not found : 0
SttTracks not found : 0

Event Number 8

```
------------------------------------------------------------
-I-          Ideal STT track finding              -I-
Hits: 5
MCTracks: total 5, accepted 0, reconstructable: 0
SttHits not found   : 0
SttPoints not found : 0
MCTracks not found  : 0
SttTracks not found : 0
------------------------------------------------------------
Event Number 9

------------------------------------------------------------
-I-          Ideal STT track finding              -I-
Hits: 1
MCTracks: total 3, accepted 0, reconstructable: 0
SttHits not found   : 0
SttPoints not found : 0
MCTracks not found  : 0
SttTracks not found : 0
```

So basically I see it can reconstruct: 2 tracks in evt 0, 3 tracks in evt 2 and 1 track in evt 3.

I checked the number of hits per track in the simulation stage and what I get is:
evt 0 track 4 hits 27
evt 0 track 3 hits 26
evt 1 track 0 hits 3
evt 1 track 5 hits 2
evt 2 track 4 hits 27
evt 2 track 3 hits 25
evt 2 track 0 hits 4
evt 3 track 0 hits 26
evt 4 track 7 hits 7
evt 5 track 0 hits 1
evt 8 track 4 hits 3
evt 8 track 3 hits 2
evt 9 track 0 hits 1

I looked into the PndSttTrackFinderIdeal and I found that there is actually a cut for tracks with less than 3 hits, so we expect the finder to reconstruct only the blue colored lines in the above list, which correspond to the events and number of tracks the track finder was actually able to reconstruct, except for the event number 4 (I have to understand it, because I see several hits in the same tube and this is strange, since we register an hit each time the particles leaves the volume, so a track should leave only one hit in each tube, with an entrance and en exit position... I will investigate this).

The problem I see is that there are too few hits in the stt to construct a track (even if we throw away the cut on the number of hits, the helix construction will fail) and I think this is due to the particular kind of events (this would also explain why everything runs fine with the box generator).
Can you try to generate particles only in the transverse plane for example, in such a way that they enter the stt and leave more hits? In this case everything should run fine.

Please let me know if there are still problems or if I didn' t answer properly to your questions.

Best regards,
Lia.

File Attachments

1) numhits.C, downloaded 457 times