
Subject: Urgent fixes in FairGeanePro.cxx needed
Posted by [Anonymous Poster](#) on Tue, 31 Mar 2009 13:26:38 GMT
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Dear Geane experts,

we found other floating point exceptions in FairGeanePro.cxx. I made a list of all divisions that need to be protected against division by zero. Thi is very important and in my opinion the main source of of instabilities in our tracking software. Please let me know about your progress. As I imagine error handling could be difficult in these cases, I want to suggest to use exceptions for that since they are so easy to use.

Cheers, Christian

line number and content:

```
762: a= 1./(x2-x1).Mag();
884: xpR[1] = 0.5*(xp32[0]*xp3[0]/xp3[1]+ xp3[1]);
919: it = t.SolveQuartic(d3/d4,d2/d4,d1/d4,d0/d4,sol4);
977: Angle = TMath::ACos((x1-xR).Dot(Pfinal-xR)/((x1-xR).Mag()*(Pfinal-xR).Mag()));
982: Double_t epsi = Radius*(1.-TMath::Cos(0.5*(x3-x1).Mag()/Radius));
1048: m1 = 1./x21.Mag();
1064: m3 = 1./e3.Mag();
1096: xpR[1] = 0.5*(xp32[0]*xp3[0]/xp3[1]+ xp3[1]);
1104: Rt = Radius/(wpt-xpR).Mag();
1127: Angle = TMath::ACos((x1-xR).Dot(Pfinal-xR)/((x1-xR).Mag()*(Pfinal-xR).Mag()));
1131: Double_t epsi = Radius*(1.-TMath::Cos(0.5*(x3-x1).Mag()/Radius));
```

Subject: Re: Urgent fixes in FairGeanePro.cxx needed
Posted by [Felix Boehmer](#) on Tue, 31 Mar 2009 14:16:55 GMT
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Hi all,

let me show you an example:

```
Quote:*** PndTpcSPHit positions ***
(16, -3.5, -5.6); (17, -3.8, -6); (18, -4.3, -6.3); (19, -4.9, -6.8); (20, -5.3, -7.1);
(21, -5.7, -7.4); (21, -5.9, -7.6); (22, -6.3, -7.8); (22, -6.5, -7.9);
(23, -6.7, -8.1); (23, -7, -8.3); (24, -7.5, -8.6); (25, -8.1, -9);
(26, -8.7, -9.4); (27, -9.3, -9.8); (27, -9.6, -10); (28, -9.9, -10);
(29, -11, -11); (29, -11, -11); (30, -12, -11); (31, -12, -11);
(31, -13, -12); (32, -13, -12); (33, -14, -12); (34, -15, -13);
(34, -15, -13); (34, -16, -13); (35, -16, -13); (36, -17, -14);
(36, -17, -14); (37, -18, -14); starting fit
Position : (5.2, -0.13, -1.9)
Slopes : dx/dz = -3.2e-17, dy/dz = 3.1e-17
q/p = 2.5
Propagate in flight direction
```

Error in ERTRAK : particle type 0 unknown in GEANT
sighandler for sig 8

This is the associated backtrace from the core dump:

```
Quote:#0 0xffffe410 in __kernel_vsyscall ()
#1 0xb6d72811 in raise () from /lib/tls/i686/cmov/libc.so.6
#2 0xb6d73fb9 in abort () from /lib/tls/i686/cmov/libc.so.6
#3 0xb31e67c4 in sighandler (sig=8) at
/afs/e18/panda/SIM/fboehmer/trunk/recotasks/KalmanTask.cxx:56
#4 <signal handler called>
#5 0xb2b1162d in FairGeanePro::Track2ToPoint (this=0xe106188, x1=@0xbfdcdde28,
x2=@0xbfdcdde04, w1=@0xbfdcdde0, Pfinal=@0xe106388,
Dist=@0xe106380, Length=@0xbfdcd70) at
/afs/e18/panda/SIM/fboehmer/trunk/geane/FairGeanePro.cxx:762
#6 0xb2b14ca2 in FairGeanePro::FindPCA (this=0xe106188, pca=1, PDGCode=1000010020,
point=@0xbfdceb84, wire1=@0xbfdceb60,
wire2=@0xbfdceb3c, maxdistance=23.679142069207522, Rad=@0xe106378,
vpf=@0xe106388, vwi=@0xe1063ac, Di=@0xe106380, trklength=@0xe1063d0)
at /afs/e18/panda/SIM/fboehmer/trunk/geane/FairGeanePro.cxx:554
#7 0xb2b180f5 in FairGeanePro::Propagate (this=0xe106188, TStart=0xbfdcf18c,
TEnd=0xbfdced60, PDG=1000010020)
at /afs/e18/panda/SIM/fboehmer/trunk/geane/FairGeanePro.cxx:180
#8 0xb394482e in GeaneTrackRep::extrapolateToPoca (this=0x119f2268, pos=@0xbfdcfdf0c,
poca=@0xbfdcfce8, dirInPoca=@0xbfdcfcc4)
at /afs/e18/panda/SIM/fboehmer/trunk/trackrep/GeaneTrackRep.cxx:272
```

Specifically, in frame 5:

```
Quote:#5 0xb2b1162d in FairGeanePro::Track2ToPoint (this=0xe106188, x1=@0xbfdcdde28,
x2=@0xbfdcdde04, w1=@0xbfdcdde0, Pfinal=@0xe106388,
Dist=@0xe106380, Length=@0xbfdcd70) at
/afs/e18/panda/SIM/fboehmer/trunk/geane/FairGeanePro.cxx:762
762     a = 1./(x2-x1).Mag();
(gdb) print x1
$4 = (class TVector3 &) @0xbfdcdde28: {<TObject> = {_vptr.TObject = 0xb4ae6b88, fUniqueID
= 0, fBits = 33554432, static fgDtorOnly = 0,
static fgObjectStat = false, static fgIsA = 0x84367d8}, fX = 0, fY = 0, fZ = 0, static fgIsA =
0x88ba2b8}
(gdb) print x2
$5 = (class TVector3 &) @0xbfdcdde04: {<TObject> = {_vptr.TObject = 0xb4ae6b88, fUniqueID
= 0, fBits = 33554432, static fgDtorOnly = 0,
static fgObjectStat = false, static fgIsA = 0x84367d8}, fX = 0, fY = 0, fZ = 0, static fgIsA =
0x88ba2b8}
```

As you can see, at FairGeanePro.cxx:762 division by zero is performed, both x1 and x2 are zero in all coordinates. I don't know if this is associated with the error message directly above the crash concerning an unknown particle type. Looking at frame 6 of the backtrace, the pdg ID appears to be 1000010020, which is the one of the deuteron, I think.

So it looks like GEANE doesn't recognize the deuteron (as it probably doesn't have to) but

does not treat the case of an unidentified particle correctly ...

Thanks for your effort and any replies in advance

Felix

Subject: Re: Urgent fixes in FairGeanePro.cxx needed
Posted by [Sebastian Neubert](#) on Tue, 31 Mar 2009 14:19:38 GMT
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Hi!

I have write permissions on GeanePro. If you like we can also do this.

Sebastian.

Subject: Re: Urgent fixes in FairGeanePro.cxx needed
Posted by [Sebastian Neubert](#) on Tue, 31 Mar 2009 14:47:51 GMT
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Hi!

I will take care of these issues. Let's see what I can do.

Cheers! Sebastian.

Subject: Re: Urgent fixes in FairGeanePro.cxx needed
Posted by [asanchez](#) on Tue, 31 Mar 2009 15:06:34 GMT
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Hi Felix,
maybe you can use the following function
for those particles whose pdg is larger than 5000
,namely, ions. i have some time ago problems
also to extract the charge using the
TDatabasePDG::Instance()->GetParticle(pdg)->Charge()/3..

the variable ion corresponds to the pdg code of the
particle, for example, 1000010020.

```
Int_t PndHypDPatternRecoTask::GetChargeIon(Int_t ion)
261 {
262   Int_t A,Z,L;
263
264   if(ion>10000000000&&(ion<10100000000))
265     { ion -= 10000000000;
```

```
266     Z = ion/10000;  
267     ion -= 10000*Z;  
268     A = ion/10;  
269     cout<<" ion charge "<<Z<<endl;  
270  
271     return Z;  
272  
273 }
```

I hope it can help you,
best regrads
Alicia S.

Subject: Re: Urgent fixes in FairGeanePro.cxx needed
Posted by [Lia Lavezzi](#) on Tue, 31 Mar 2009 15:21:35 GMT
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Hi,
sorry if I didn' t reply soon...
I want to thank you, Sebastian, if you can take care of this
If on the contrary you cannot (or you need info/help) please let me know, I will have a look to
that but it will take some time since I am busy in other issues at the moment...

Bye,
Lia.

Subject: Re: Urgent fixes in FairGeanePro.cxx needed
Posted by [Sebastian Neubert](#) on Tue, 31 Mar 2009 16:02:03 GMT
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Hi!

The above mentioned place where a division by 0 could happen have been protected now.
Please try if it works!

Cheers! Sebastian.

Subject: Re: Urgent fixes in FairGeanePro.cxx needed
Posted by [Anonymous Poster](#) on Tue, 31 Mar 2009 21:15:33 GMT
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Wow, looks like we're becoming a good team! Way to go!!!

Subject: Re: Urgent fixes in FairGeanePro.cxx needed
Posted by [Anonymous Poster](#) on Tue, 31 Mar 2009 22:19:18 GMT

Hi,

shouldnt the ClassDef macro in FairGeanePro.h be public. Well I think I know it should. Can somebody fix it?

Christian

Subject: Re: Urgent fixes in FairGeanePro.cxx needed
Posted by [Anonymous Poster](#) on Tue, 31 Mar 2009 22:25:20 GMT
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Hi,

there is another place I dont like in FairGeanePro which I forgot earlier. Please someone apply the following diff:

hoeppi@hoeppi-MacBook:~/pandaroot/geane\$ svn diff FairGeanePro.cxx
Index: FairGeanePro.cxx

```
=====
--- FairGeanePro.cxx (revision 5184)
+++ FairGeanePro.cxx (working copy)
@@ -66,7 +66,7 @@
```

```
    Init(TParam);
    Double_t Q = TParam->GetQ();
-   if (Q!=0)ch= Q/TMath::Abs(Q);
+   if (fabs(Q)<1.E-8)ch= Q/TMath::Abs(Q);
    if (ProMode==1){ //Propagate to Volume
        //***** We have the right representation go further
        for(Int_t i=0;i<15;i++) {
```

Q is a double, so we dont want to use == or != on it.

Cheers, Christian

Subject: Re: Urgent fixes in FairGeanePro.cxx needed
Posted by [Anonymous Poster](#) on Tue, 31 Mar 2009 22:27:20 GMT
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Oops the < should be a >

Index: FairGeanePro.cxx

```
=====
--- FairGeanePro.cxx (revision 5184)
+++ FairGeanePro.cxx (working copy)
@@ -66,7 +66,7 @@
```

```
Init(TParam);  
Double_t Q = TParam->GetQ();  
- if (Q!=0)ch= Q/TMath::Abs(Q);  
+ if (fabs(Q)>1.E-8)ch= Q/TMath::Abs(Q);  
if (ProMode==1){ //Propagate to Volume  
  //***** We have the right representation go further  
  for(Int_t i=0;i<15;i++) {
```

Sleep tight!

Christian
