Subject: Problem with Xi(1820) in EvtGen
Posted by Jennifer Pütz on Wed, 14 Oct 2015 11:49:13 GMT
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Hi everyone,

I have a problem with EvtGen.

add p Particle Xi(1820)- 23314 1.8230000e+00 2.4000000e-02 2.0000000e-01 -3 3 0.0000000e+00 23314

Xi(1820)- has a mass of 1.823 GeV/c^2 and spin 3/2.
But if I run EvtGen the mass distribution of Xi(1820)- has a rectangular shape.

If I change the spin to 1/2 or 5/2 the mass distribution is looking fine (see plots below).

For other particles with spin 3/2 EvtGen is running fine.

I wrote already to the person who is responsible for the mass generation in EvtGen. But he is not answering.
Maybe there is someone of you having an idea how to fix this.

Cheers,

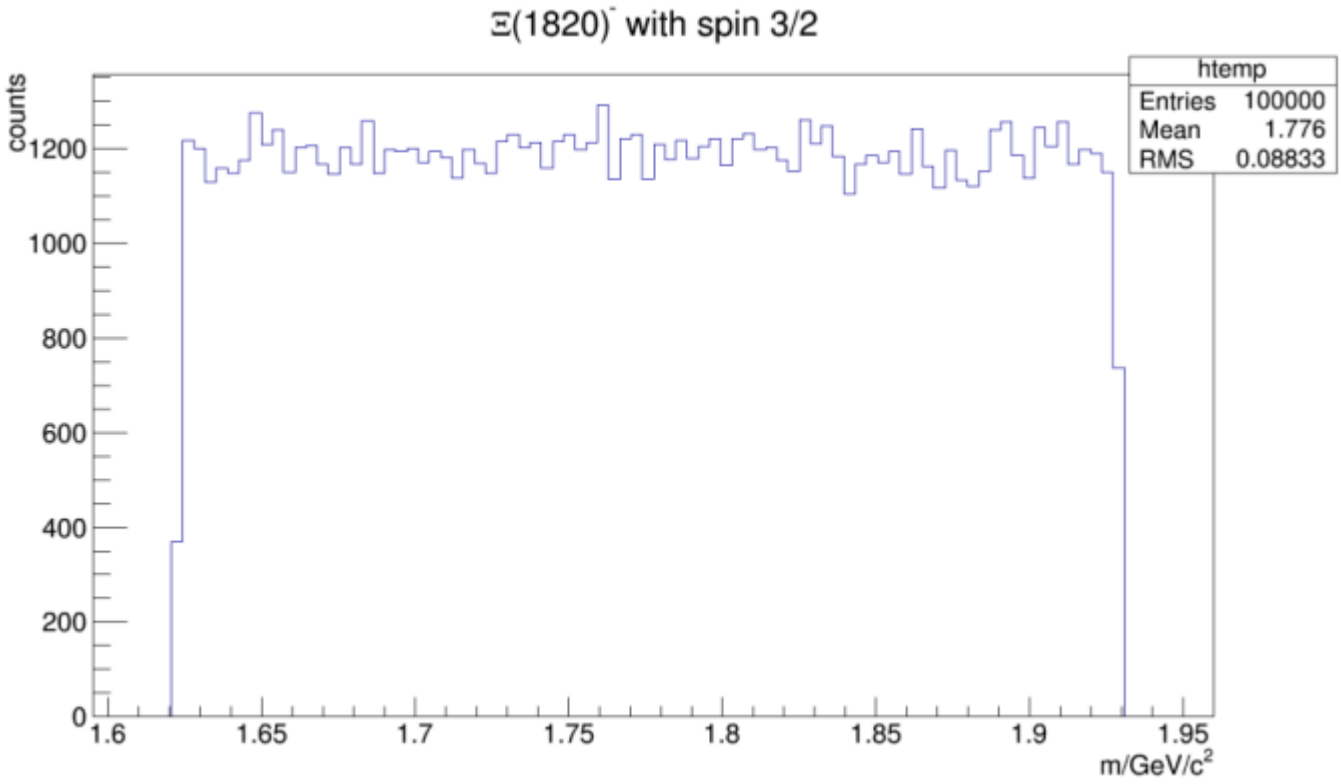
Jenny

I am using:

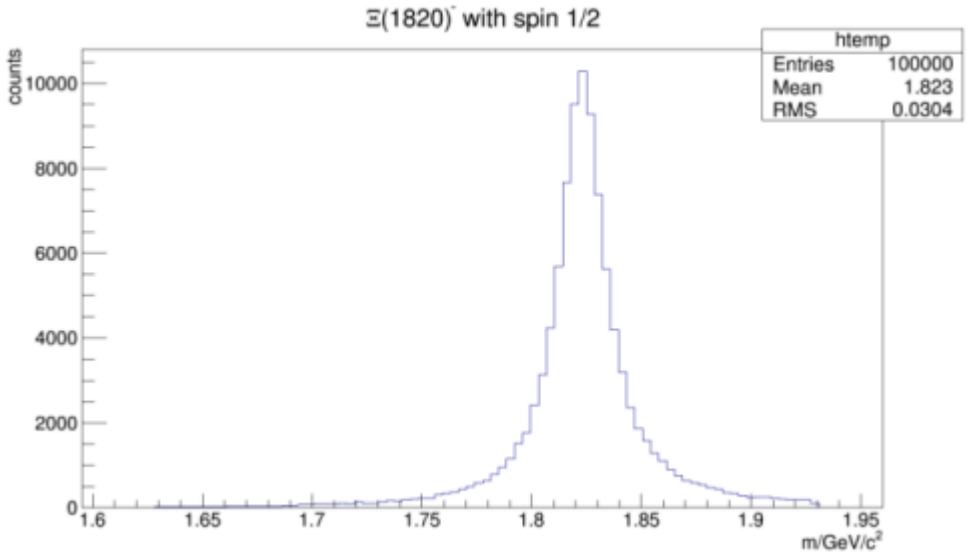
PandaROOT: trunk rev. 28555
FairSoft: mar15
FairRoot: v-15.03a

File Attachments

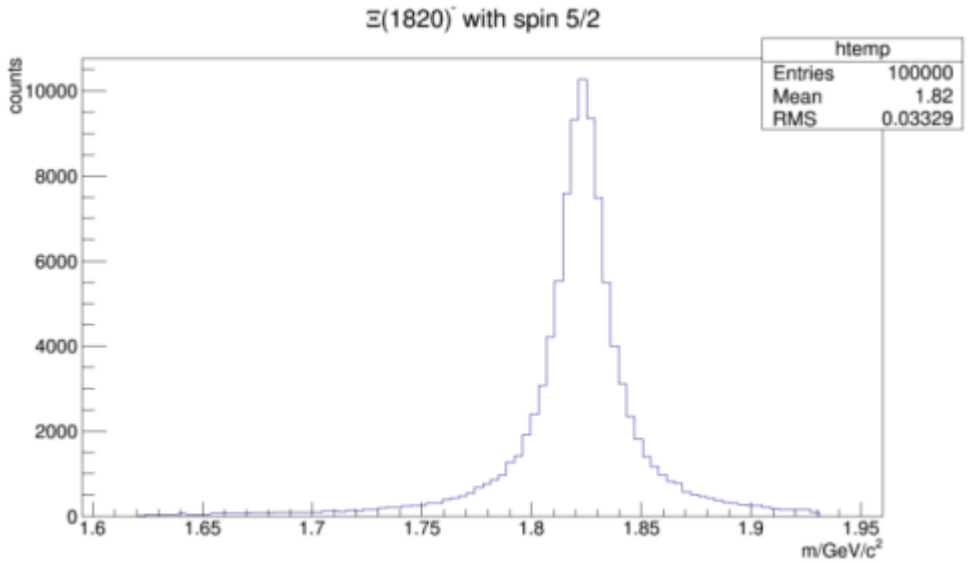
1) XiMinus1820_Spin_3half.png, downloaded 1140 times



2) XiMinus1820_Spin_1half.png, downloaded 1028 times



3) XiMinus1820_Spin_5half.png, downloaded 1147 times



4) evt.pdl, downloaded 495 times
5) XiMinus_1820_lambda0_K.dec, downloaded 484 times

Subject: Re: Problem with Xi(1820) in EvtGen
Posted by StefanoSpataro on Wed, 14 Oct 2015 13:30:58 GMT
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Can you provide also the dec file and the beam momentum you are using?

Subject: Re: Problem with Xi(1820) in EvtGen
Posted by Jennifer Pütz on Wed, 14 Oct 2015 13:35:05 GMT
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Hi Stefano,

I'm using a beam momentum of 4.6 GeV/c. The .dec file is attached.

File Attachments
1) XiMinus_1820_lambda0_K.dec, downloaded 404 times

Subject: Re: Problem with Xi(1820) in EvtGen
Posted by StefanoSpataro on Wed, 14 Oct 2015 15:25:11 GMT
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I can reproduce your problem. Moreover the centre of the square is not at the mass value but at higher position.
I suppose this is a problem of EvtGen, we should see if they answers. Whom did you contact?

Subject: Re: Problem with Xi(1820) in EvtGen

Posted by Jennifer Pütz on Thu, 15 Oct 2015 07:26:37 GMT
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Hi Stefano,

I contacted Anders Ryd, one of the guys who wrote the EvtGenGuide.

http://evtgen.warwick.ac.uk/static/docs/EvtGenGuide.pdf

He forwarded my message to David Lange who worked on the mass generation in EvtGen. This was 4 weeks ago.
I tried to contact David Lange again, but there is still no answer.
In the meanwhile I tried to contact the EvtGen guys from University of Warwick. But there is also no answer yet.

Subject: Re: Problem with Xi(1820) in EvtGen
Posted by StefanoSpataro on Thu, 15 Oct 2015 12:10:38 GMT
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It is interesting that, if you set the Xi(1820) particle to stable, it has the proper mass and width. It seems a problem of the decay itself.

Subject: Re: Problem with Xi(1820) in EvtGen
Posted by Jennifer Pütz on Thu, 15 Oct 2015 12:18:03 GMT
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I tried already a different decay model for the Xi(1820)- decay. But this had changed nothing.

Subject: Re: Problem with Xi(1820) in EvtGen
Posted by StefanoSpataro on Sun, 01 Nov 2015 12:50:45 GMT
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Could you please try to edit the mass of the pbarpsystem in evt.pdl:

add p Special pbarpSystem 88888 2.98 0.1 0 0 0 0 0
88888

into

add p Special pbarpSystem 88888 5.5 0.1 0 0 0 0 0
88888

and check if you obtain the same distribution?

Subject: Re: Problem with Xi(1820) in EvtGen

Posted by Elisabetta Prencipe (2) on Sun, 01 Nov 2015 16:03:35 GMT
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Hi Stefano,

Jenny and I have been thinking what would go wrong in that decay model. As apparently it looked everything correct, we have contacted the EvtGen developers. Effectively, it looks there is a bug in the model.
Briefly, the problem occur at the level of the class
src/EvtGenBase/EvtMassAmp.cpp::amplitude().
A quick fix suggested by the authors is the following: to comment out

if (_vb->L() != 0) {amp=0.;}

for the birth vertex factor (_vb) on line 78 in src/EvtGenBase/EvtMassAmp.cpp::amplitude() for the
case when the sum of the pole masses of the daughters is less than the parent pole mass.
Maybe Jenny can give a more detailed update during the next seevogh meeting. Now it looks working correctly.

cheers, Elisabetta

Subject: Re: Problem with Xi(1820) in EvtGen
Posted by StefanoSpataro on Sun, 01 Nov 2015 16:11:27 GMT
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In any case I would like to see what happens setting the mass to 5.5, without the suggested patch.

Subject: Re: Problem with Xi(1820) in EvtGen
Posted by Jennifer Pütz on Mon, 02 Nov 2015 08:52:11 GMT
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Hi Stefano,

I tried out what happens, if I use the mass of 5.5 without the suggested patch. Going to higher pbarpsystem masses seems to fix the problem (see plot below).

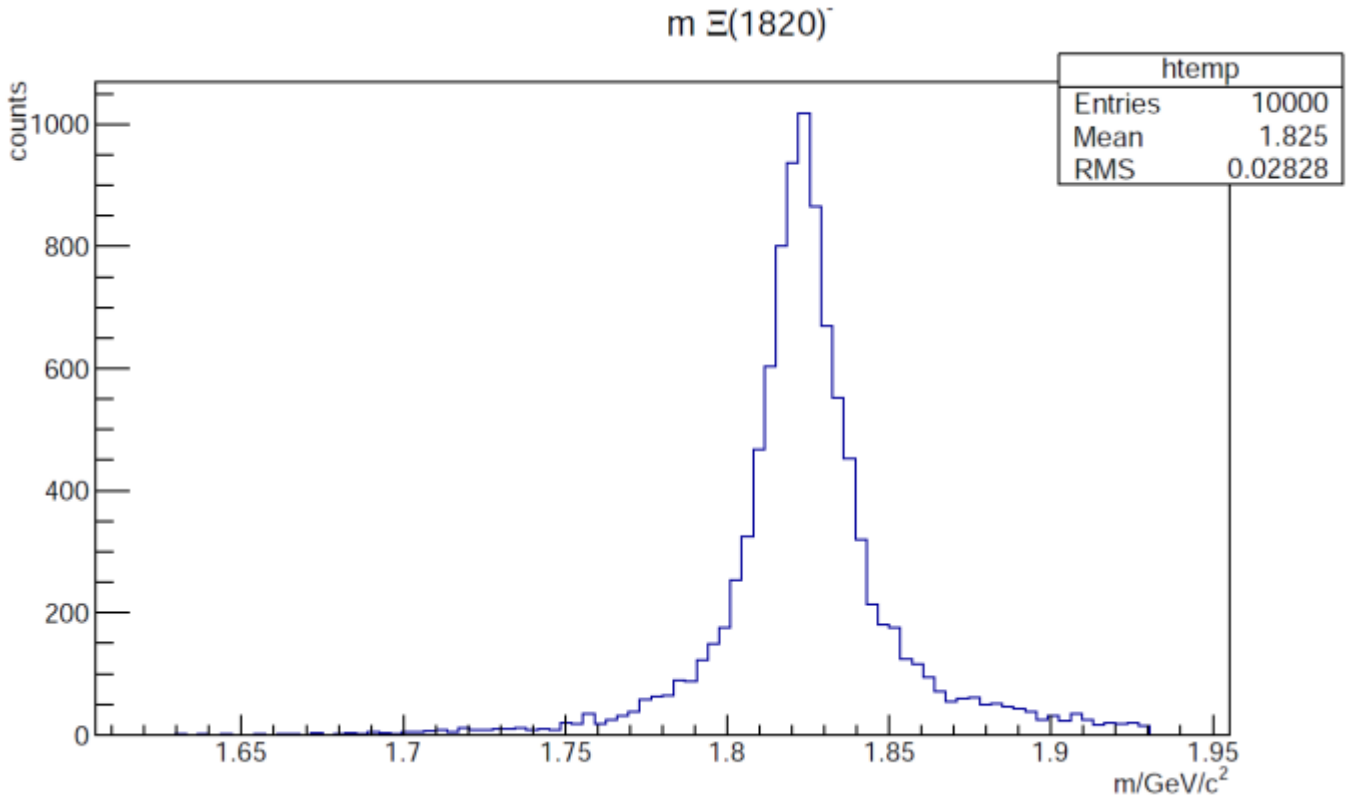
This is similiar to the observations of the EvtGen guys.
If I understood them correct, the code of src/EvtGenBase/EvtMassAmp.cpp::amplitude() checks first, if the pbarpSystem mass is bigger than the sum of the mass of the daughters. In my case the masses of Xi(1820)- and Xi+ are 1.823 + 1.322 = 3.145 which is much higher than the mass of the pbarpSystem. This seems to cause - together with L!=0 - that the mass distribution is flat.

Best,

Jenny

File Attachments

1) XiMinus1820_Spin_3half_higher_pbarpSys_mass.png, downloaded 792 times



Subject: Re: Problem with Xi(1820) in EvtGen
Posted by StefanoSpataro on Mon, 02 Nov 2015 09:49:09 GMT
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Could you please prepare a couple of slides for the next software SeeVogh, on Tuesday 10th October at 14?

Subject: Re: Problem with Xi(1820) in EvtGen
Posted by Jennifer Pütz on Mon, 02 Nov 2015 09:50:45 GMT
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yes, sure.
