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Subject: Small positive chi2 values in PndKinFitter  
Posted by [Lu Cao](#) on Tue, 30 Apr 2013 09:13:35 GMT  
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Dear all,

In the simulation (#18621) of  $p\bar{p} \rightarrow D_s^+ D_s^-; D_s^- \rightarrow K^+ K^- \pi^-; D_s^+ \rightarrow \eta e^+ \nu_e; \eta \rightarrow \pi^+ \pi^- \pi^0$ , I did the mass constraint fitting to the  $\pi^0$  candidates with PndKinFitter. All the chi2s are pretty small with the mean value of  $\sim 0.001$ . This also happens in the case of  $\eta$ .

I noticed the previous topic discussed by Albrecht about the negative and extremely small chi2 in PndKinVtxFitter.

<https://forum.gsi.de/index.php?t=tree&th=3385&start=0&rid=1979&S=7cee6febef5676d17dc9e3154e1269e2>

Considering the formula for chi2, the small values may be due to a large sigma in the denominator.

Does anybody have some solutions or hints to improve it?  
or is there any way else to understand this problem?

Thanks in advance.

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Subject: Re: Small positive chi2 values in PndKinFitter  
Posted by [Stefano Spataro](#) on Tue, 30 Apr 2013 12:13:33 GMT  
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Hi,  
we have seen the same problem analysing the  $D^{*+}D^{*-}$  channel, chi2 too small from the fitter.

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Subject: Re: Small positive chi2 values in PndKinFitter  
Posted by [Klaus Götzen](#) on Tue, 30 Apr 2013 15:41:29 GMT  
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Hi,

I don't know the reason for the problem, I just can imagine, that the covariance matrix for the neutrals/gammas might be incorrect. I actually don't know how to check.

Would be a question for the EMC experts...

Best regards,  
Klaus

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Subject: Re: Small positive chi2 values in PndKinFitter

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Posted by [Stefano Spataro](#) on Tue, 30 Apr 2013 16:44:21 GMT

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In our case, the used fitter was the 4C and the channel was completely charged (2 kaons + 4 pions).

I believe it is a problem of tracking errors.

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Subject: Re: Small positive chi2 values in PndKinFitter

Posted by [Klaus Götzen](#) on Tue, 30 Apr 2013 18:33:26 GMT

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Ralf actually is/was taking a close look to the fitters. Maybe that helps to solve the problem soon...

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Subject: Re: Small positive chi2 values in PndKinFitter

Posted by [Lu Cao](#) on Mon, 27 May 2013 11:14:04 GMT

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Hi,

In the simulation of  $D_s^- \rightarrow K^+ K^- \pi^-$ , I found the chi2 values are too small in the mass constraint fitting of  $D_s$  meson, as that in the  $D_s^+$  ( $\eta, e^+, \nu_e$ ) case I mentioned before. And it seems impossible to filter out the background completely with chi2 cutting to get a delta function shaped histo for the  $D_s$  mass.

If the problem related the fitter can not be solved at this moment, how can I improve the selection in the present situation?

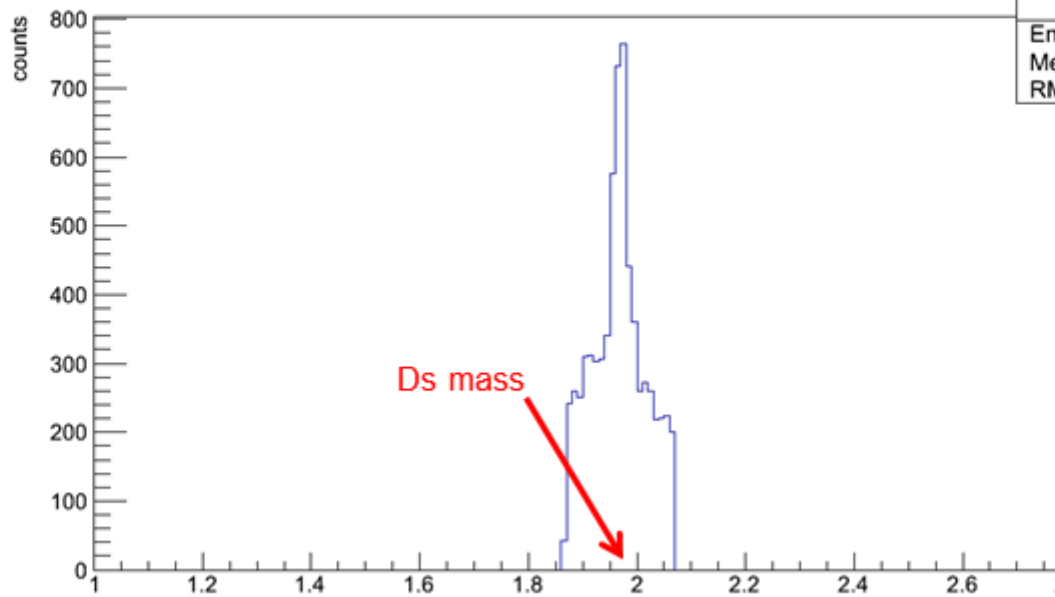
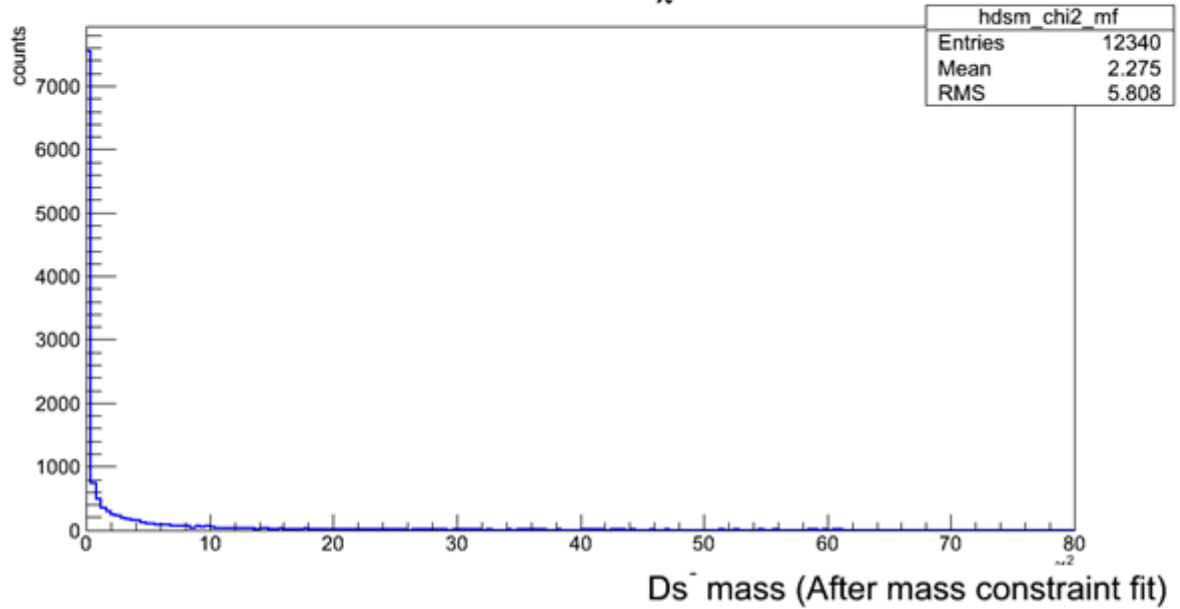
## File Attachments

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1) [Ds\\_mcf.png](#), downloaded 1104 times

# Reconstruction: $D_s^- \rightarrow K^+ K^- \pi^-$

Mass constraint fit  $\chi^2$  of  $D_s^-$



2013/5/27