
Subject: some options for eta_c analysis

Posted by [Dima Melnychuk](#) on Tue, 11 Oct 2011 12:55:01 GMT

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Hi,

I have tried several options in eta_c reconstruction as it was suggested by Stefano and here are the results.

I used for analysis data on grid run 925oldnocu (release july11).

1. Instead of selecting best eta_c candidate after vertex fit (using its chi2) I tried a preselection of best candidate using chi2 defined as

$$\frac{(\text{totalreco_mass} - \text{etac_mass})^2}{\sigma(\text{eta_c})^2} + \frac{(\text{phi1reco_mass} - \text{phimass})^2}{\sigma(\text{phi})} + \frac{(\text{phi2reco_mass} - \text{phimass})^2}{\sigma(\text{phi})}$$

And here there is a small improvement in efficiency and eta_c resolution and no improvement in phi mass resolution (efficiency 24.0%, $\sigma(\text{eta_c}) = 32.8$ MeV, $\sigma(\text{phi}) = 3.92$ MeV).

For comparison with selection of best candidate after vertex fit (efficiency 22.8%, $\sigma(\text{eta_c}) = 33.2$ MeV, $\sigma(\text{phi}) = 3.92$ MeV)

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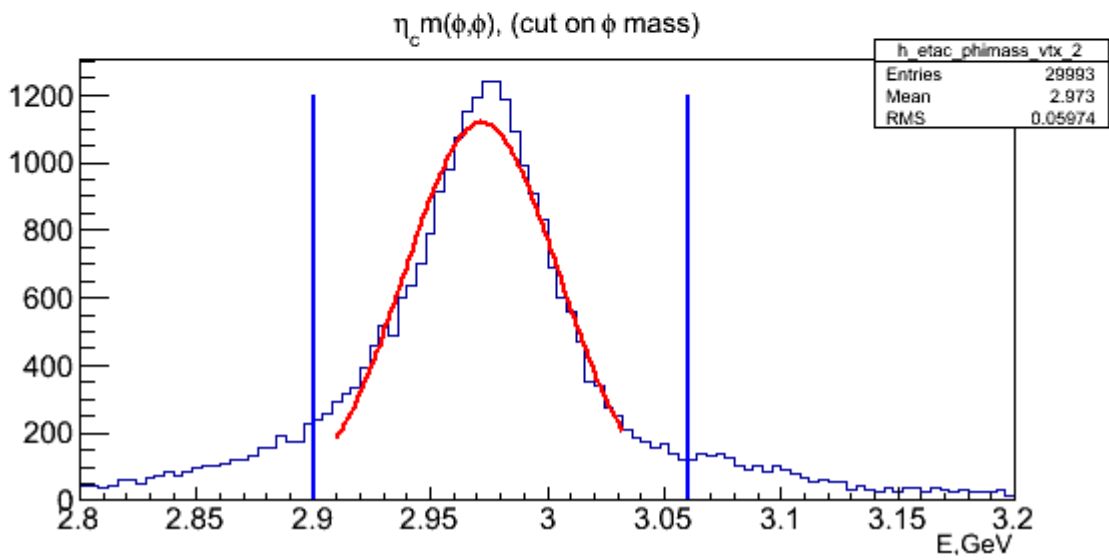
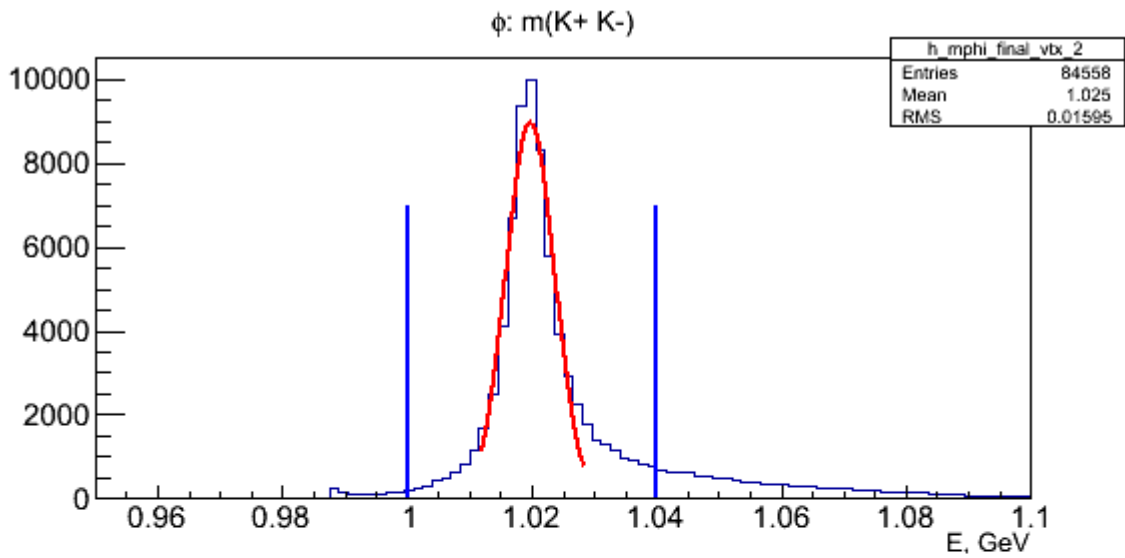
2. I also tried to perform a mass fitter for phi mass and here is the eta_c mass resolution after combining 2 phi after this fitter (PndKinFitter).

Here the best candidate is selected by difference between reconstructed and nominal eta_c mass and resolution is 34.7 MeV, i.e worse than with vertex fit. So I would exclude this option in eta_c analysis.

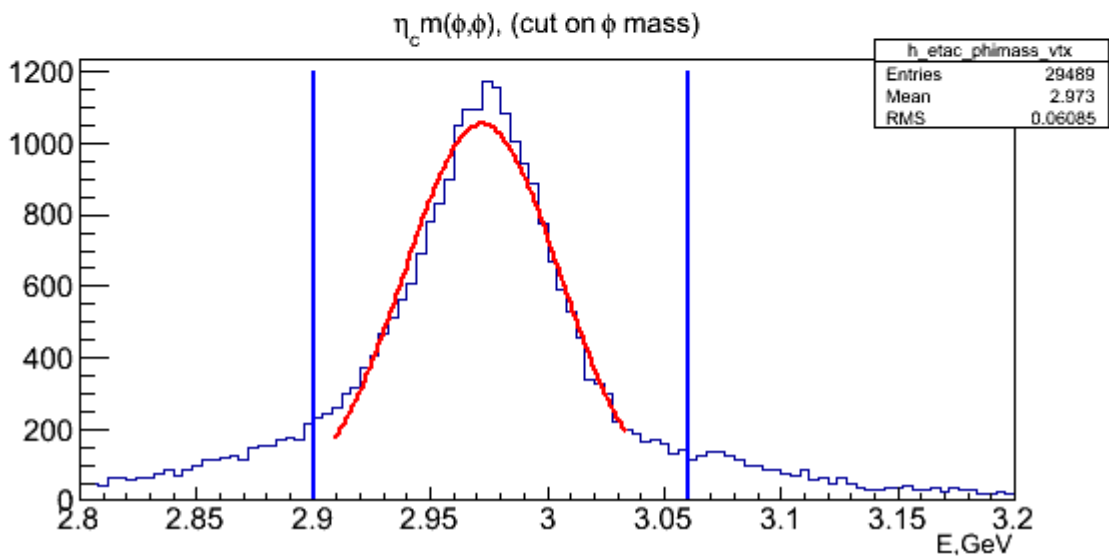
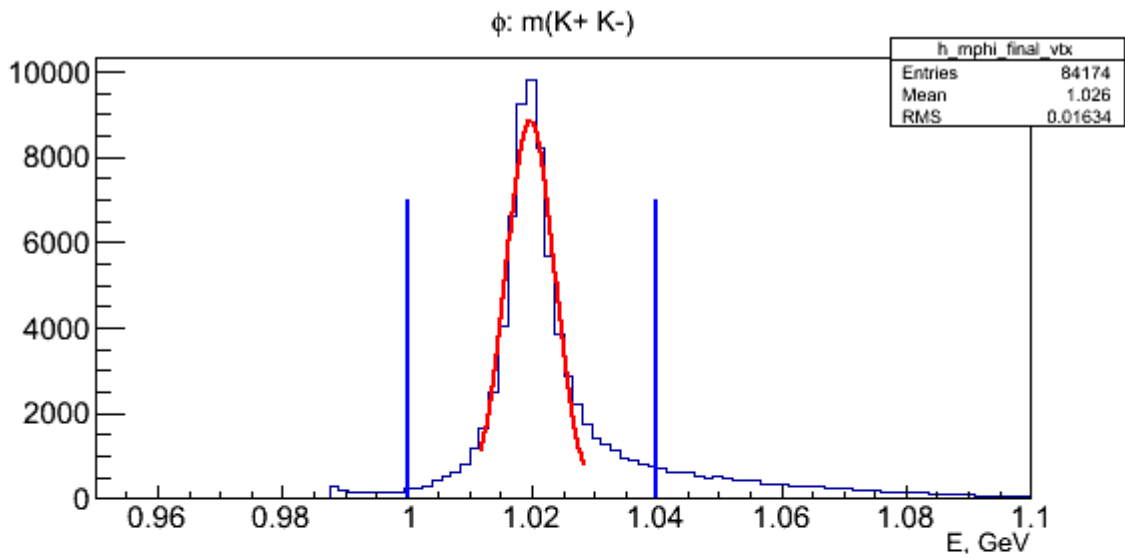
Dima

File Attachments

1) [m_vertex_fit_preselection.png](#), downloaded 1169 times

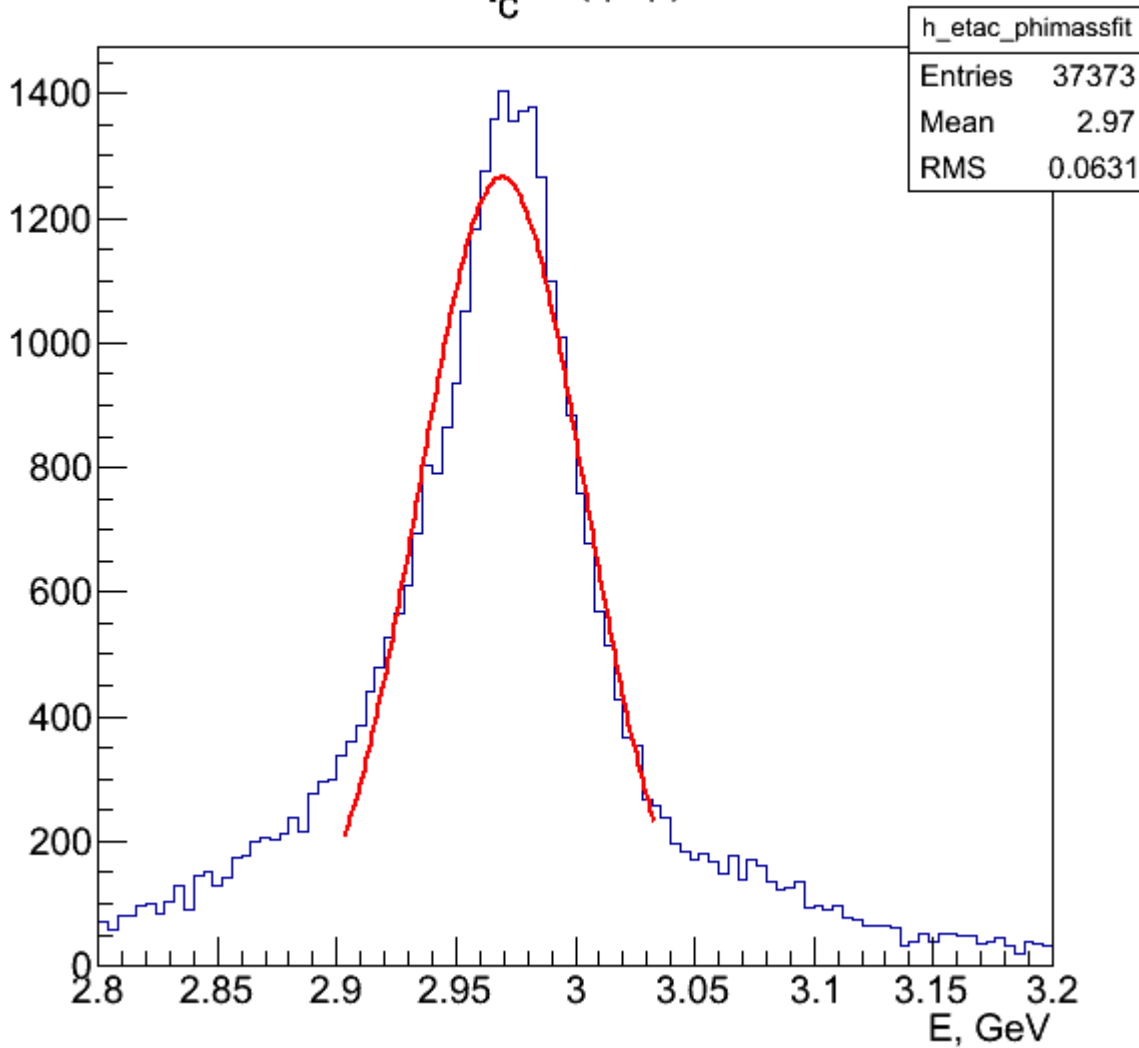


2) [m_vertex_fit.png](#), downloaded 1185 times



3) [m_mass_fit.png](#), downloaded 1153 times

$$\eta_c m(\phi, \phi)$$



Subject: Re: some options for eta_c analysis

Posted by [Stefano Spataro](#) on Tue, 11 Oct 2011 13:28:28 GMT

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Hi Dima,

thanks for the checks.

If I compare the maximum of etac peaks with the last plot, it seems to me that with the mass fitter you have higher statistics (or maybe higher bg). Quite strange...