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Subject: Re: Problem with mass constraint fit for two gamma

Posted by [Lu Cao](#) on Mon, 30 Jun 2014 14:51:42 GMT

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Hi Donghee and all,

this situation is the same in reconstructing  $\pi^0 \rightarrow \gamma \gamma$ , as I reported before.

In the fast sim, the invariant mass spectrum of the combination of two photons has a "nice" distribution peaked at  $\pi^0$  mass, so it's understandable that the mass constraint fit can work as expected. In the full sim, the invariant mass distribution is filled with a significant "background" which may cause problems of convergence in mass constraint fit, e.g. too small  $\chi^2$ , prob squeezed to 1.

Since the `PndKinFitter::AddMassConstraint()` works fine for charged particles as well as the neutral in the fast sim, I'd like to guess the tool itself has no problem but to understand why the two-photon invariant mass distribution has so much "background" in the full sim. Is there any possible incorrect combinatorics, or where're the extra photons coming from?

Donghee, could you also show the  $\gamma\gamma$  invariant mass spectrum in your case?

Best regards,

Lu

#### File Attachments

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1) [mass\\_two-photon.png](#), downloaded 898 times

# $\pi^0$ mass distribution (all)

