Subject: Scattering Angle Cut
Posted by a_boso on Tue, 01 Sep 2015 10:16:54 GMT
View Forum Message <> Reply to Message

Hello everybody!

Hope everything is going well!

I have a little question for you:

In order to put a "safe Coulex" condition and avoid the nuclear contribution in the Coulex experiments a cut in the scattering angle from the direction before and after the secondary target is needed.

The scattering angle is obtained from position measurements before the target (tracking from TPCs or, in alternative, LYCCA ToF Start detector), in the target (Target DSSSD) and after the target (Wall DSSSD).

At the ACC in Orsay Christian pointed out that the uncertainties in the position measurements may cause a "bias" in the scattering angle estimation; indeed, if I look at the empty frame runs, I see that the distribution is not peaked at 0 degrees, as I may expect, but at a greater angle (see attachment). It looks like a sort of "offset" in the scattering angle.

It is a crucial point in the analysis since this cut decreases, of course, the number of counts in the peak!

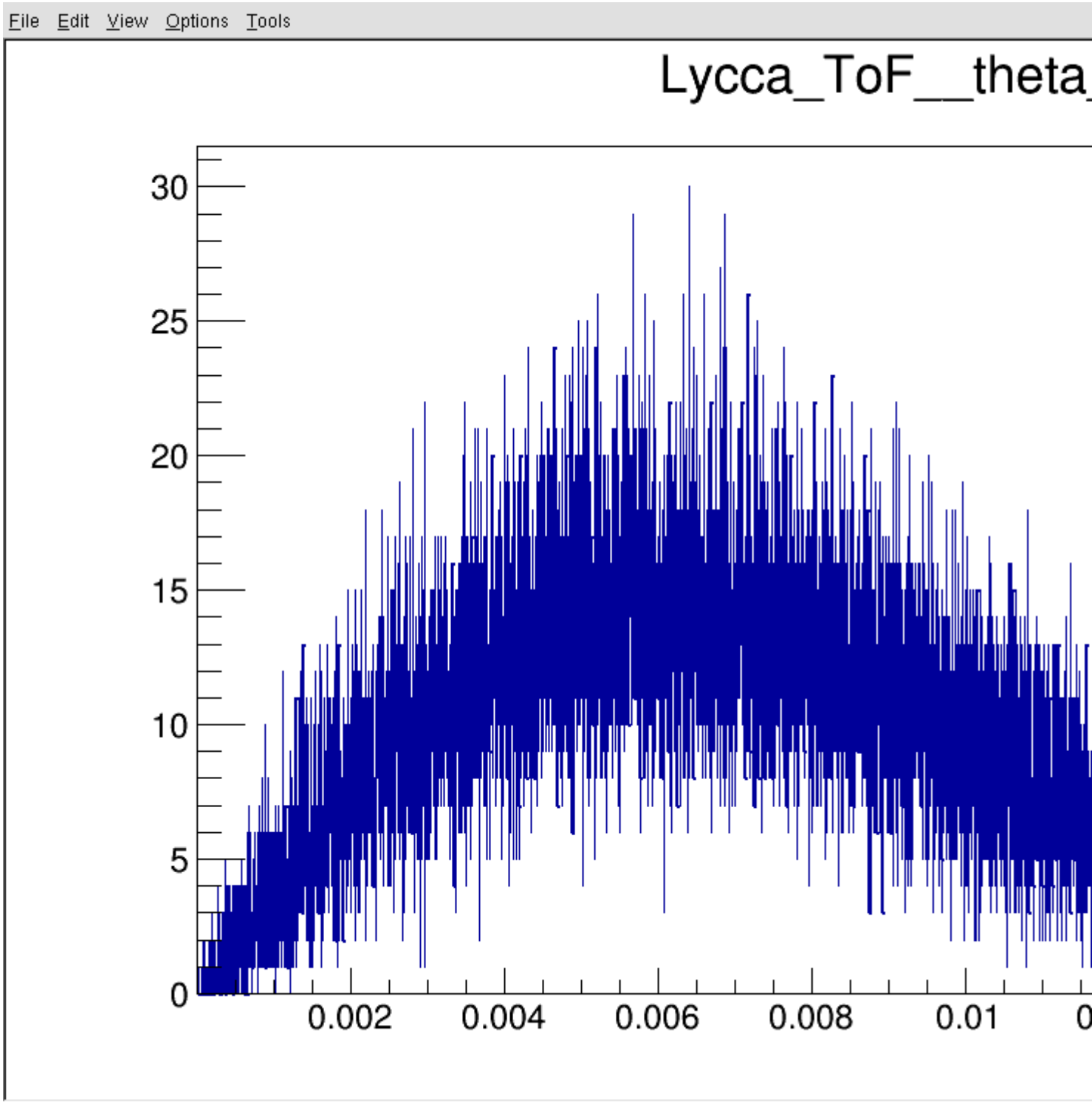
Do you know how to take into account this issue? Does anyone of you have the same problem?

Thank you very much!

Alberto

File Attachments

1) Screenshot from 2015-09-01 09:55:57.png, downloaded 1176 times



Subject: Re: Scattering Angle Cut
Posted by miree on Tue, 08 Sep 2015 13:24:03 GMT
View Forum Message <> Reply to Message

Hi Alberto,

I saw this as well. It always looks like this. The reason is (as Christian correctly mentioned) the uncertainty in the position measurement.
You have 3 (x,y) measurements (one before, one at , and one after the target), each with

measurement error. In order to get a scattering angle of 0, you need all errors to be 0. These are 6 random numbers that have to be exactly zero, for which the probability is 0.
Consequently, you will never measure scattering angle 0.
It is most insightful to do a small Monte-Carlo simulation where you simulate the three position measurement and reconstruct the scattering angle.
Once you introduce uncertainties in the position measurement, the reconstructed scattering angle will peak at values greater than zero.

Michael
