Subject: Re: Efficiency reduction of antiprotons above 20 degrees
Posted by Karin Schönning on Wed, 03 Dec 2014 14:55:45 GMT
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Hi Stefan, and thanks for your clarifications. Yes, there was a typo and you are correct that I meant 50 degrees. I wanted to, if not mimic, but at least cover the same range as i have for Lambda Lambdabar.

Further checks seems to boil down to two, possibly completely separate problems (or maybe issues rather than problems):

1. Something happened with the code during the summer which had the consequence that the reconstruction efficiency and resolution for antiprotons, not protons, becomes worse above ~20 degrees.
This can be seen in the attached files, where the black dots represent revision 24660 and the red revision 26319 (similar to the Oct2014 release in this sense as i understood from discussions with Albrecht).
Both plots show the acceptance as a function of the lab angle theta for protons (eff_24660_26319_p.pdf) and antiprotons (eff_24660_26319_pbar.pdf) from decays of Lambdas and anti-Lambdas from isotropically
generated pbar p -> Lambda Lambdabar at 1.64 GeV.

2. The reconstruction efficiency is smaller for antiprotons than for protons. This probably has a perfectly explanation - the antiproton may annihilate with detector material and escape detection. I am looking
into this to try to confirm it. In the attached plots theta_eff_p_pbar.pdf and theta_eff_p_pbar_24660.pdf, the efficiency for protons (black dots) and antiprotons (blue points) are shown as a function of
theta, for the 26319 revision (theta_eff_p_pbar.pdf) and the older 24660 revision (theta_eff_p_pbar_24660.pdf). The channel is the same as above. You can see that this effect is larger for particles going
through the target spectrometer than the forward tracker. In the late revision, there is an additional drop at ~20 degrees but also at other angles the antiproton yield is smaller. In revision 24660 the lower antiproton yield is evenly distributed in the target spectrometer.

Cheers,
/Karin

File Attachments

1) eff_24660_26319_pbar.pdf, downloaded 414 times
2) eff_24660_26319_p.pdf, downloaded 413 times
3) theta_eff_p_pbar.pdf, downloaded 395 times
4) theta_eff_p_pbar_24660.pdf, downloaded 408 times