Nonlinearity correction from digi spectra using Bhabha events
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(Status report)
Comparison of spectra

Apr2003

May2003

Jun2003

\( \theta = 10 \)

\( \theta = 20 \)
\( i_\theta = 30 \)

\( i_\theta = 40 \)
π^0 mass fits

Apr2003

May2003

Jun2003

\[ \mu \text{ (corrected)} \]

\[ \sigma \text{ (corrected)} \]
uncorrected

\[ \mu = 125.587 \text{ MeV} \]
\[ \sigma = 5.886 \text{ MeV} \]
\[ R = 4.687\% \]

\[ \mu = 126.305 \text{ MeV} \]
\[ \sigma = 5.854 \text{ MeV} \]
\[ R = 4.635\% \]

corrected

\[ \mu = 125.088 \text{ MeV} \]
\[ \sigma = 5.849 \text{ MeV} \]
\[ R = 4.676\% \]

\[ \mu = 125.595 \text{ MeV} \]
\[ \sigma = 5.878 \text{ MeV} \]
\[ R = 4.680\% \]
uncorrected

 corrected

 May 2003

 \[ \mu = 125.089 \text{ MeV} \]

 \[ \sigma = 5.927 \text{ MeV} \]

 \[ R = 4.738 \% \]

 \[ \mu = 126.601 \text{ MeV} \]

 \[ \sigma = 5.918 \text{ MeV} \]

 \[ R = 4.750 \% \]
uncorrected

\[ \mu = 125.190 \text{ MeV} \]
\[ \sigma = 5.917 \text{ MeV} \]
\[ R = 4.726 \% \]

\[ \mu = 125.896 \text{ MeV} \]
\[ \sigma = 5.779 \text{ MeV} \]
\[ R = 4.590 \% \]

\[ \mu = 125.140 \text{ MeV} \]
\[ \sigma = 5.827 \text{ MeV} \]
\[ R = 4.657 \% \]

corrected

\[ \mu = 124.754 \text{ MeV} \]
\[ \sigma = 5.965 \text{ MeV} \]
\[ R = 4.781 \% \]

\[ \mu = 125.140 \text{ MeV} \]
\[ \sigma = 5.827 \text{ MeV} \]
\[ R = 4.657 \% \]
(my personal) Conclusions

1. in general, the correction works, but ...

2. ... actually it would be necessary to determine correction functions for every month

3. we get NO improvement of the $\pi^0$ width
   $\rightarrow$ The nonlinearities are not the source of the differences in the $\pi^0$ width between MC and data!