Mott Background Subtraction

$$b_i = \frac{r_c^2(L_i^- + R_i^+) - (L_i^+ + R_i^-) \pm \sqrt{(L_i^+ + R_i^- - r_c^2(L_i^- + R_i^+))^2 - 4(r_c^2 - 1)(r_c^2 L_i^- R_i^+ - L_i^+ R_i^-)}}{2(r_c^2 - 1)}$$

Where $$r_c = \frac{1 - \varepsilon_c}{1 + \varepsilon_c}$$

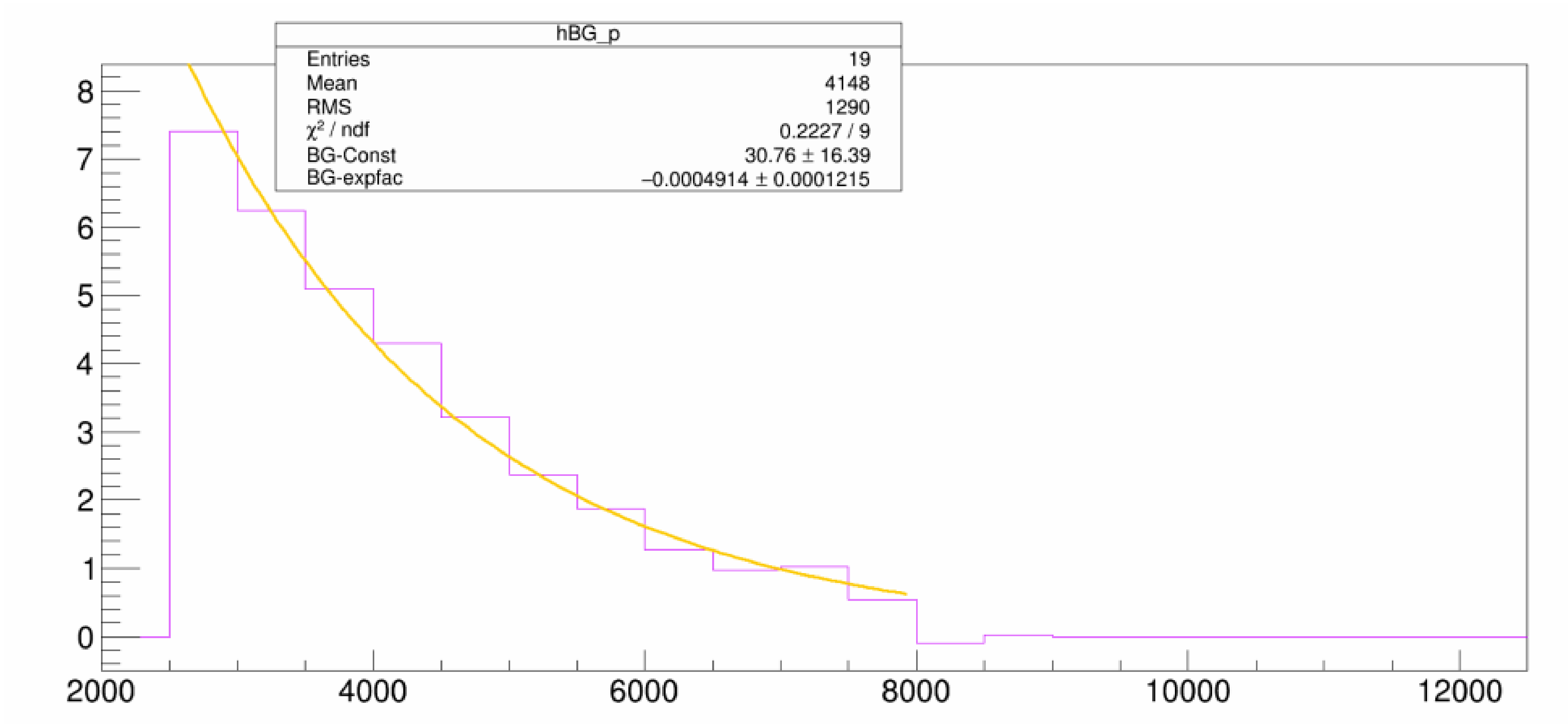
Assuming a known asymmetry (epsilon_c) for a given foil across all energies we can derive a background function.

Known asymmetry now calculated individually run-by-run rather than using average on a foil.

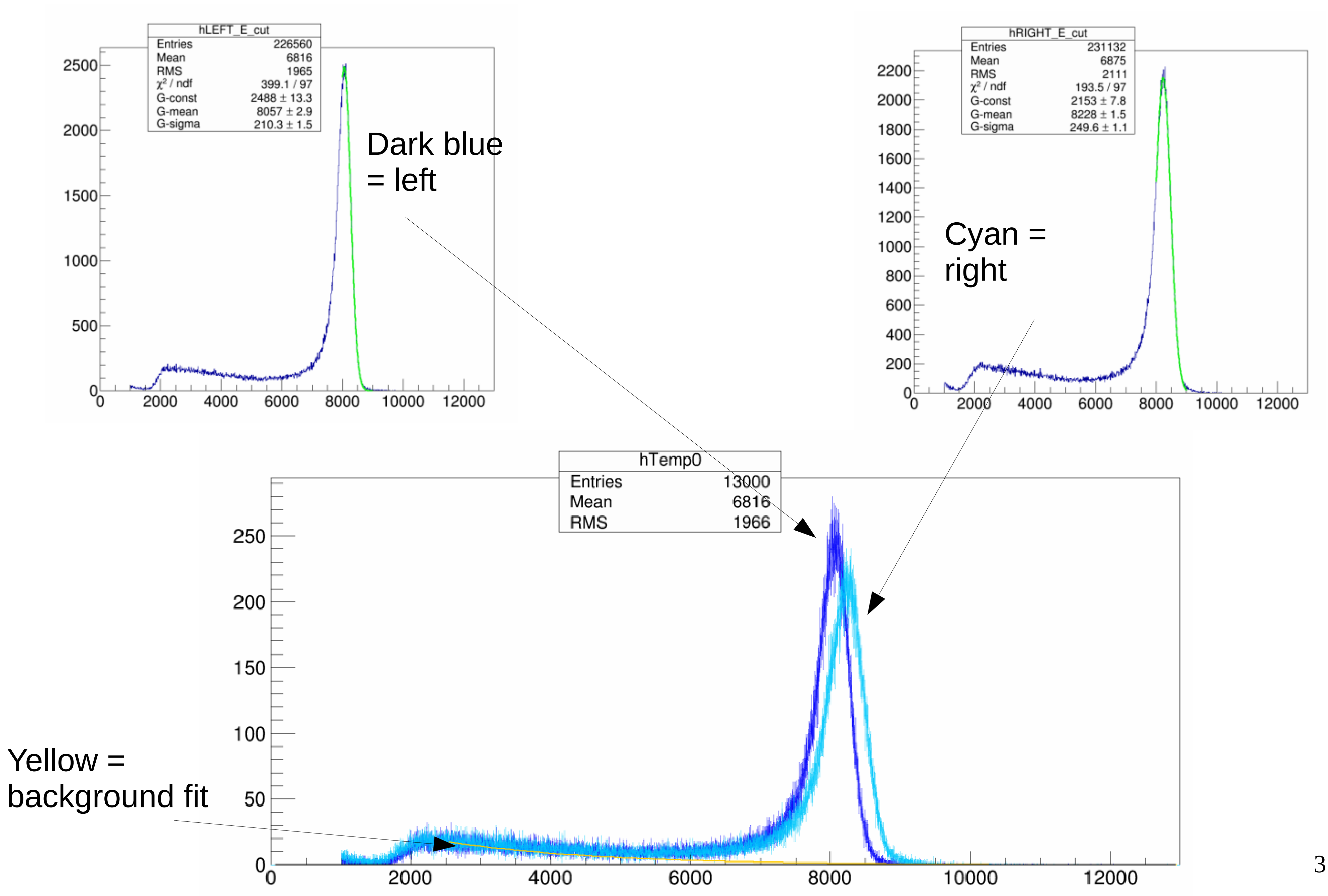
Outline of steps for determination of background function (all in second loop):

- +/- Helicity-E-spectra for four detectors re-binned into larger bins and then normalized
- Asymmetry and background by bin calculated
- Background fit up to E-cut-low (determined from first loop) with decaying exponential f(E) = A * exp(b * E); b<0
- f(E) (already normalized) subtracted from +/- Helicity-E-spectra in up to bin E-cut-low
- New background-subtracted E-spectra used to calculate asymmetry (both integral and by bin)

Mott Background Subtraction

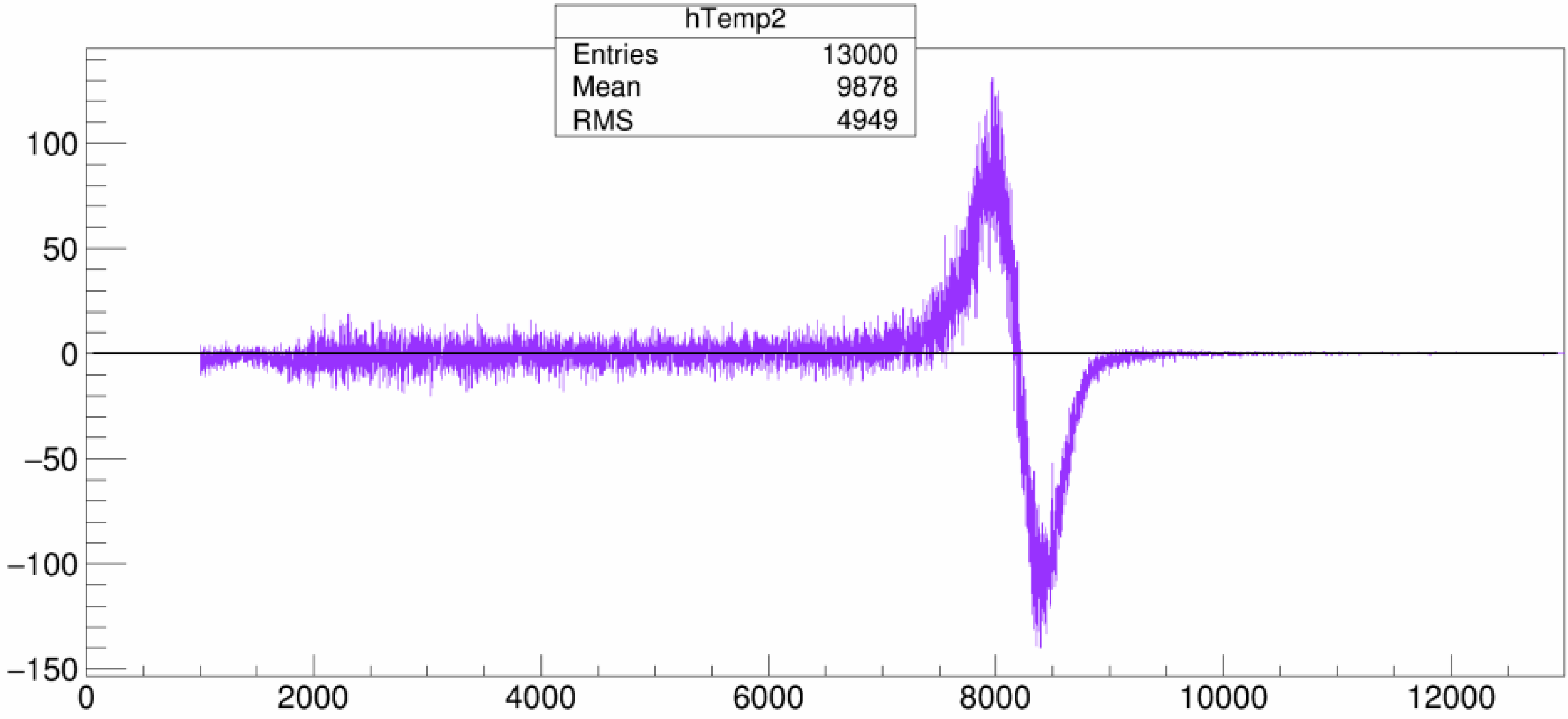


Mott Background Subtraction

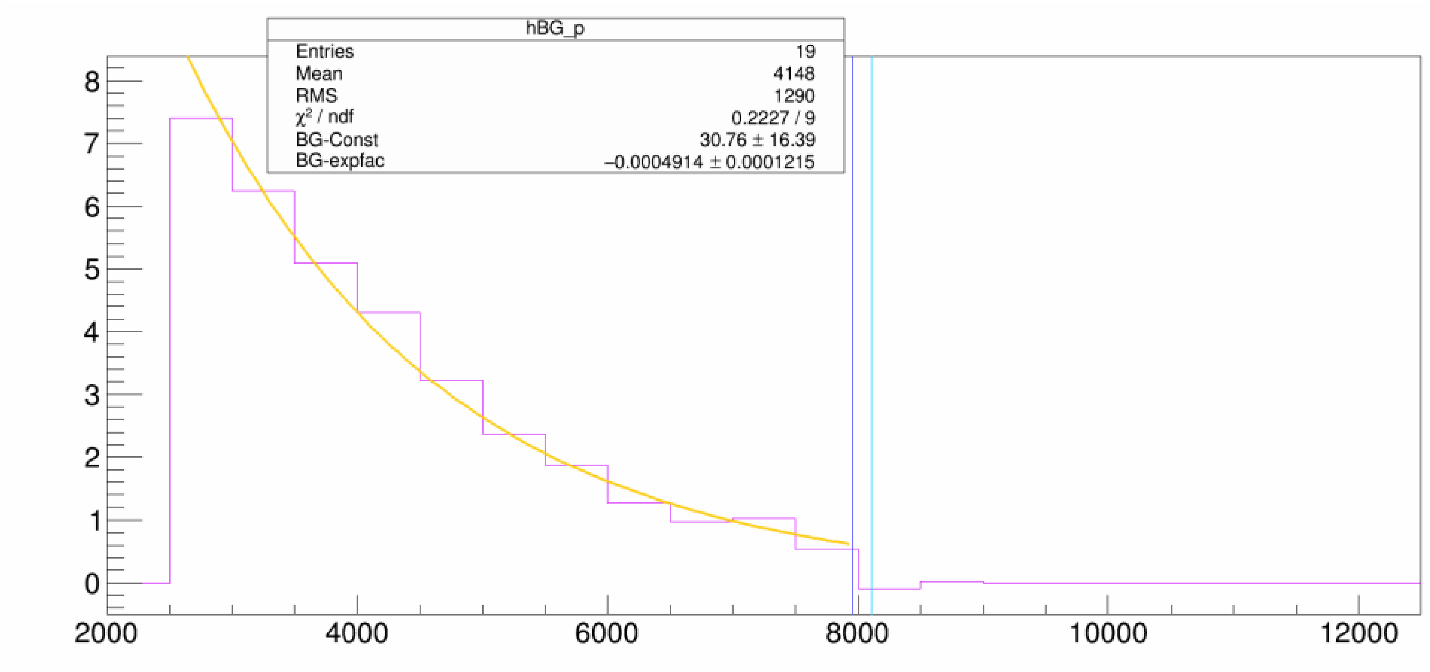


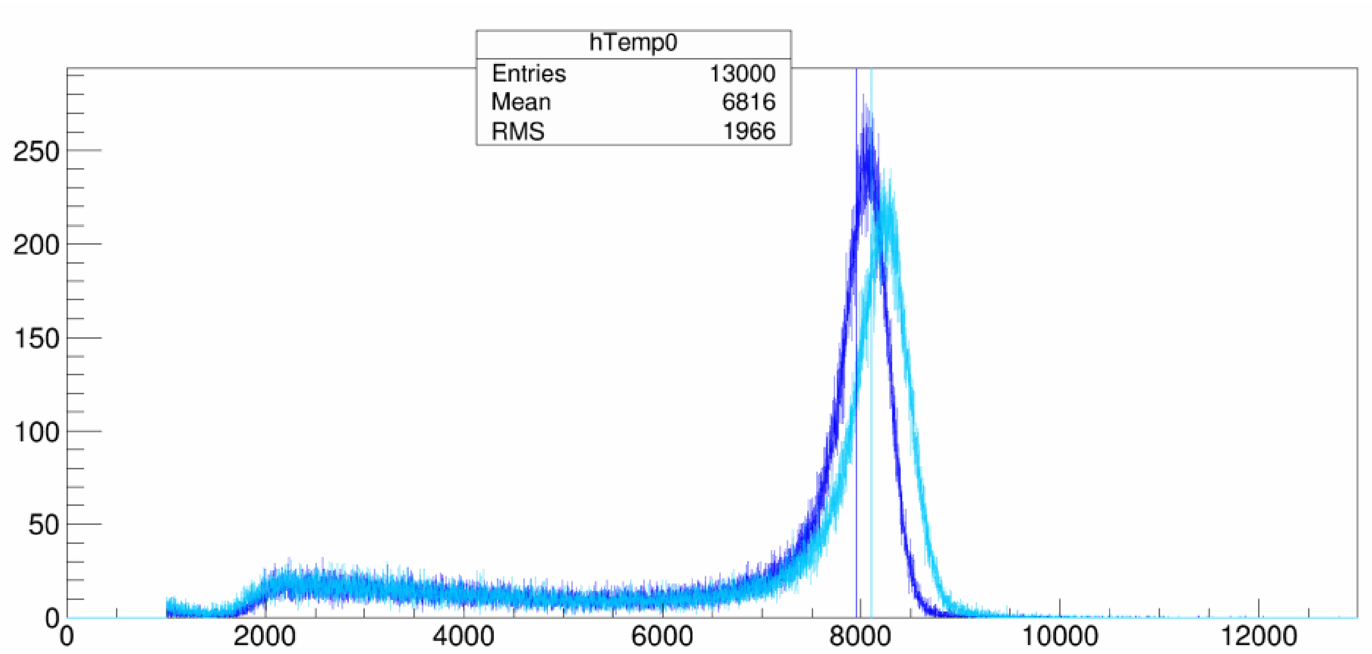
Mott Background Subtraction

Left detector – right detector (both helicities)



Mott Background Subtraction





Mott Background Subtraction

Solution : *Normalize*

That is, when binning +/- helicity E-spectra for each detector, do so in unique bin size E-spectra-fit-with-gaussian-sigma

use these bins for background calculations

Run 8545:

LEFT Energy cuts from 7952.16 : 8477.83;   sigma = 210

RIGHT Energy cuts from 8103.25 : 8727.13;   sigma = 250

UP Energy cuts from 8104.64 : 8731.5

DOWN Energy cuts from 7933.92 : 8531.34