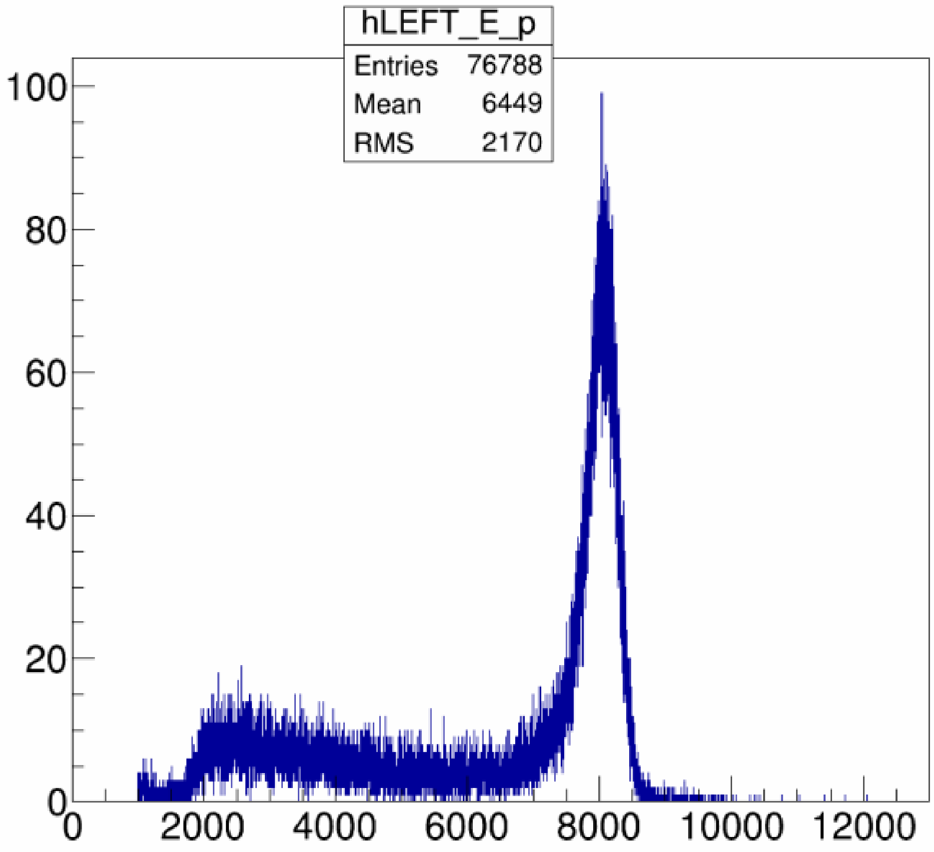
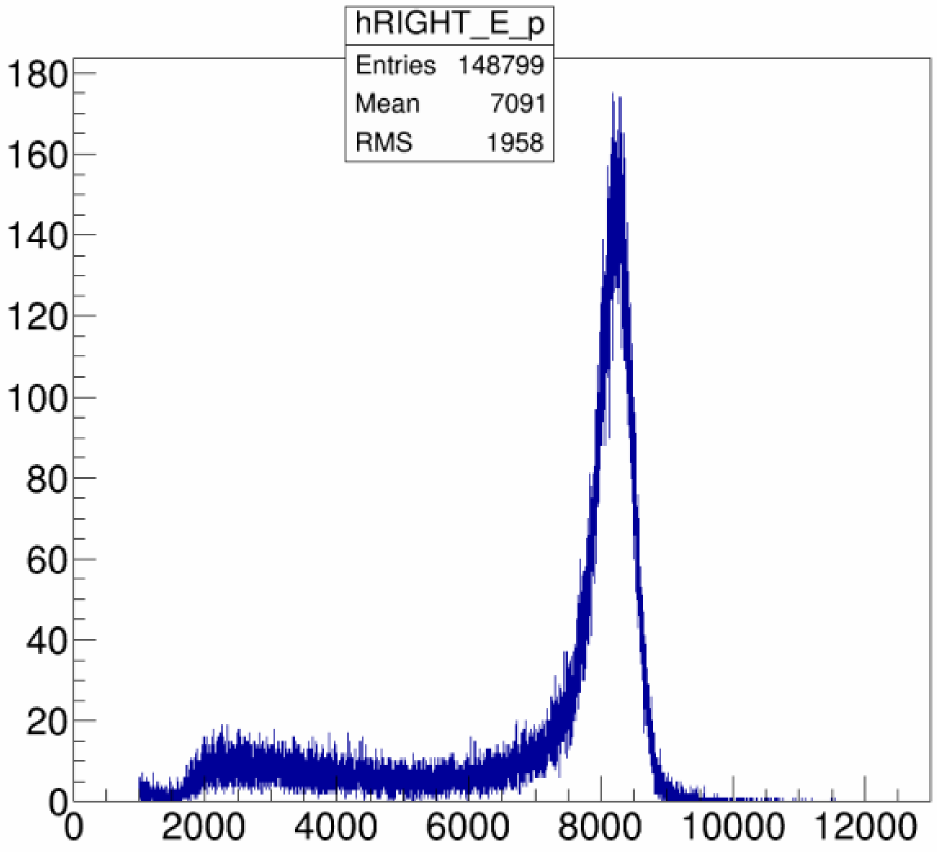
Mott Background Subtraction: Update





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

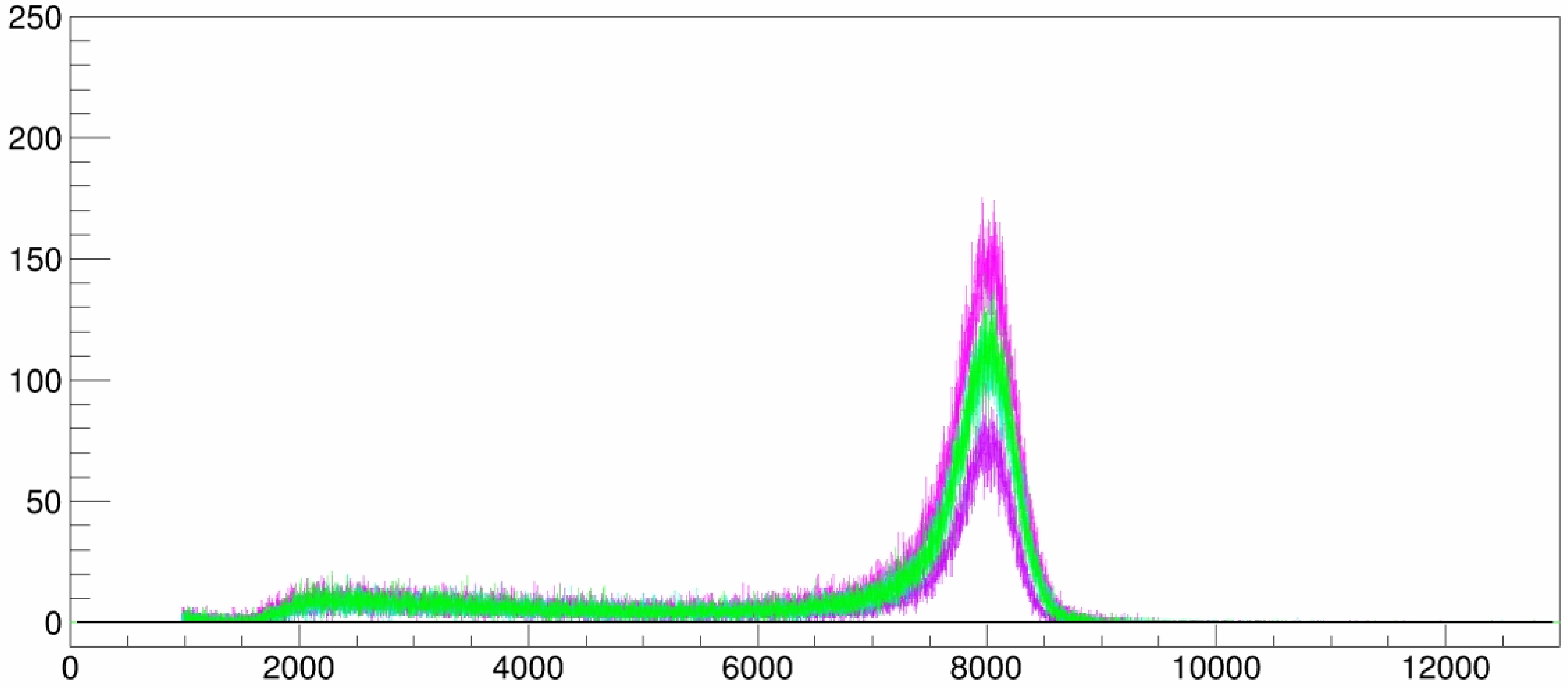
Where $$r_c = \frac{1-\varepsilon_c}{1+\varepsilon_c}$$

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

Known asymmetry calculated individually run-by-run.

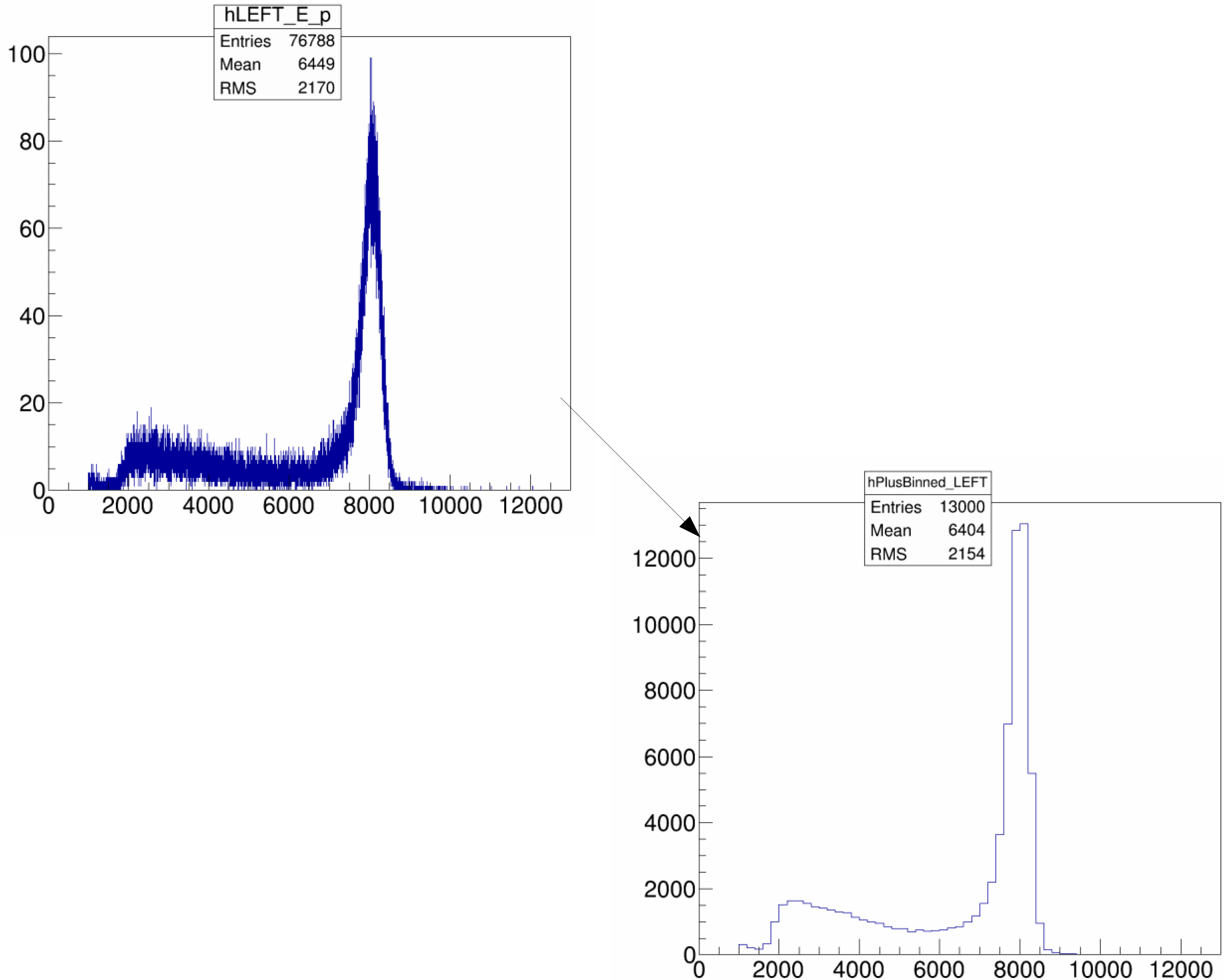
Outline of steps for determination of background function (all in second loop):

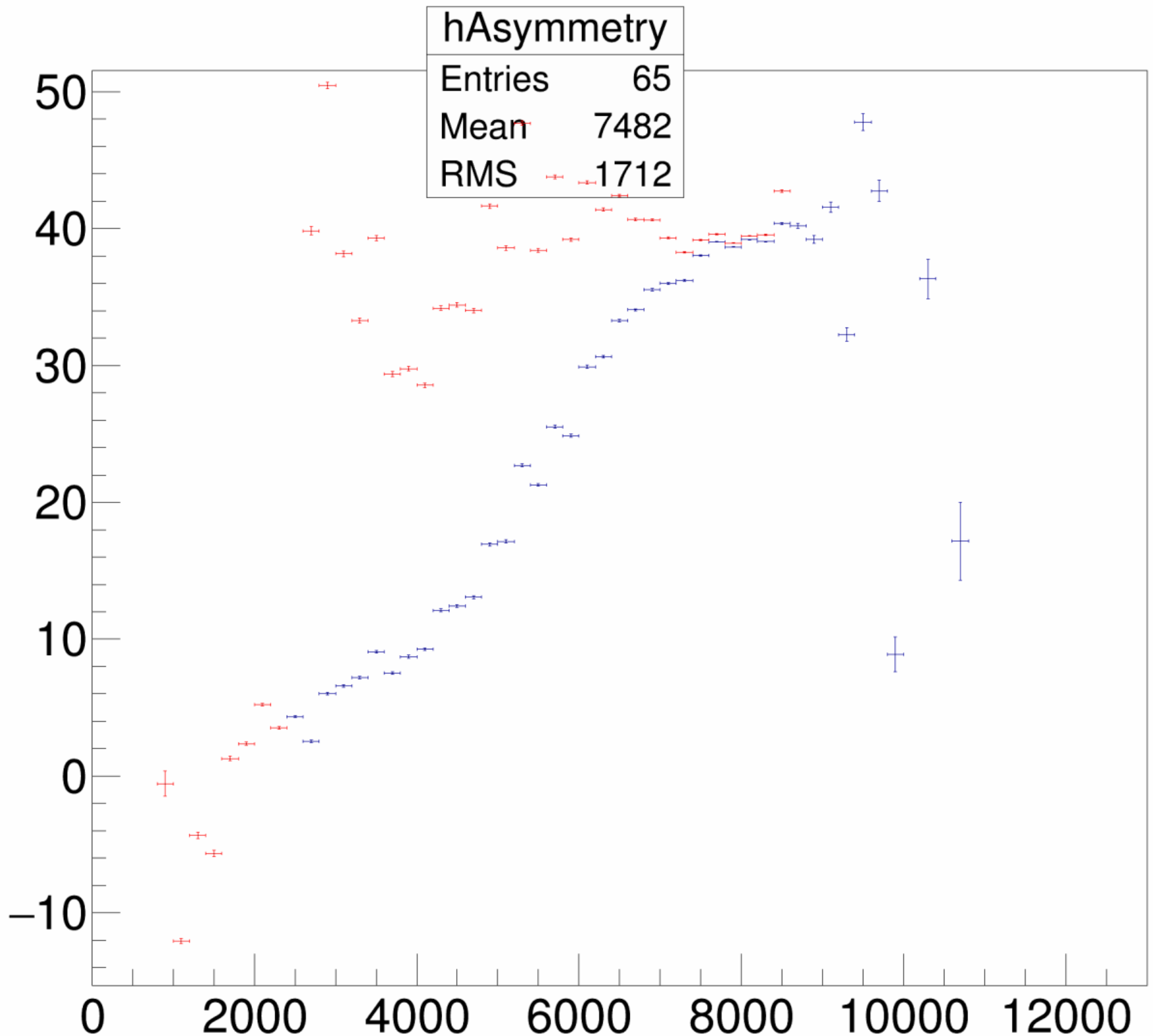
1) +/- Helicity-E-spectra for four spectra “squeezed” such that peaks all occur at 8000
2) +/- Helicity-E-spectra re-binned into larger bins = 200Channels
3) Asymmetry and background by bin calculated
4) Background fit with f(E) = A * exp(b * E); b<0; Range = CH[2500:6000]
5) f(E) subtracted from +/- Helicity-E-spectra



Magenta = Left
Purple = Right
Teal = Up
Green = Down

All spectra squeezed so that peak occurs at CH:8000

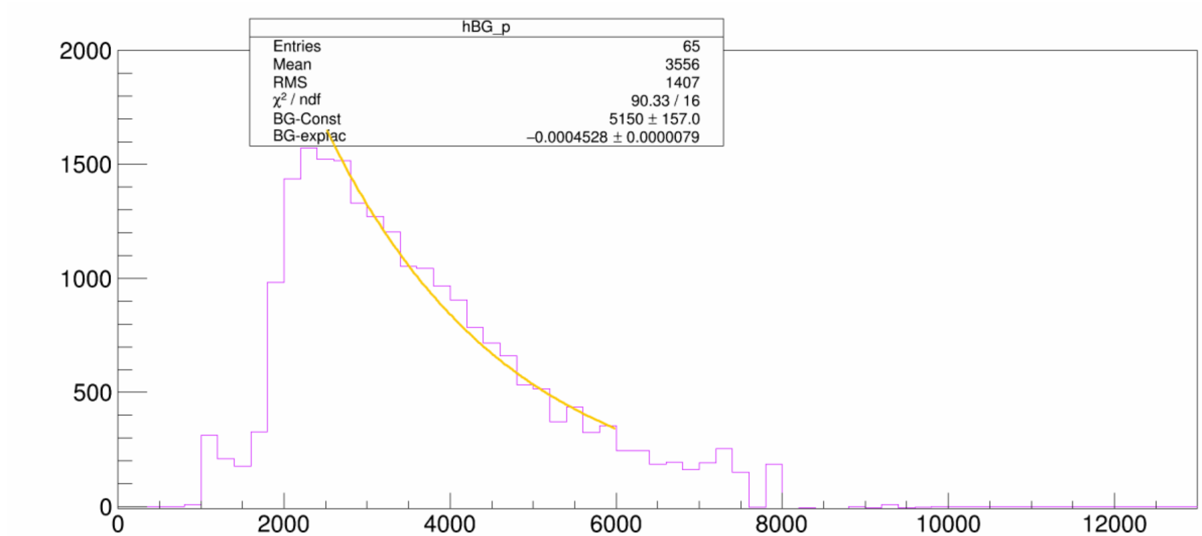

hLEFT_E_p
Entries 76788
Mean 6449
RMS 2170
hPlusBinned_LEFT
Entries 13000
Mean 6404
RMS 2154

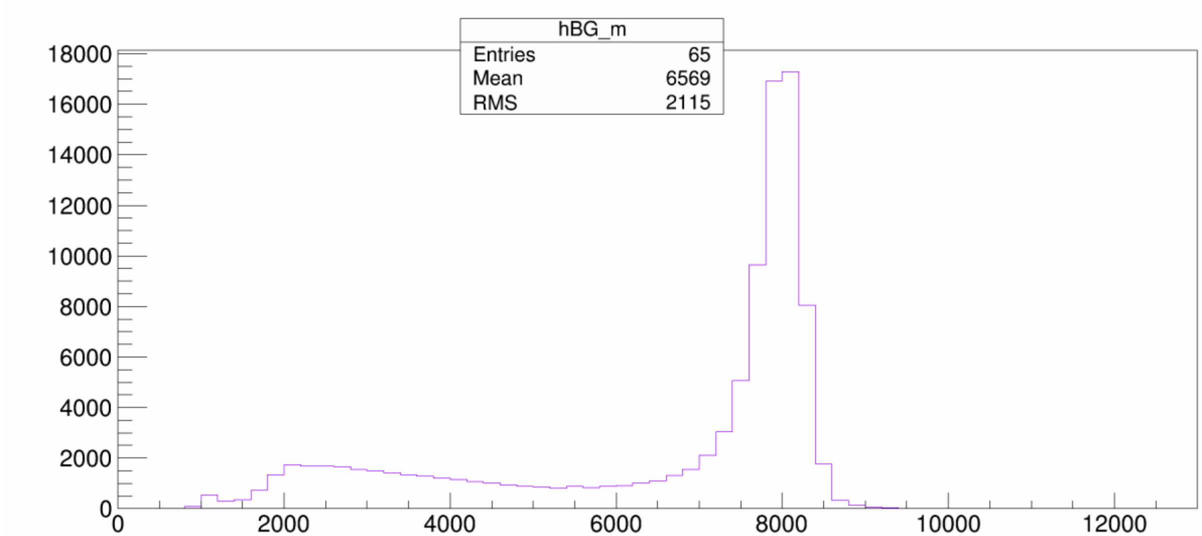


hAsymmetry
Entries 65
Mean 7482
RMS 1712
50
40
30
20
10
0
−10
0
2000
4000
6000
8000
10000
12000

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

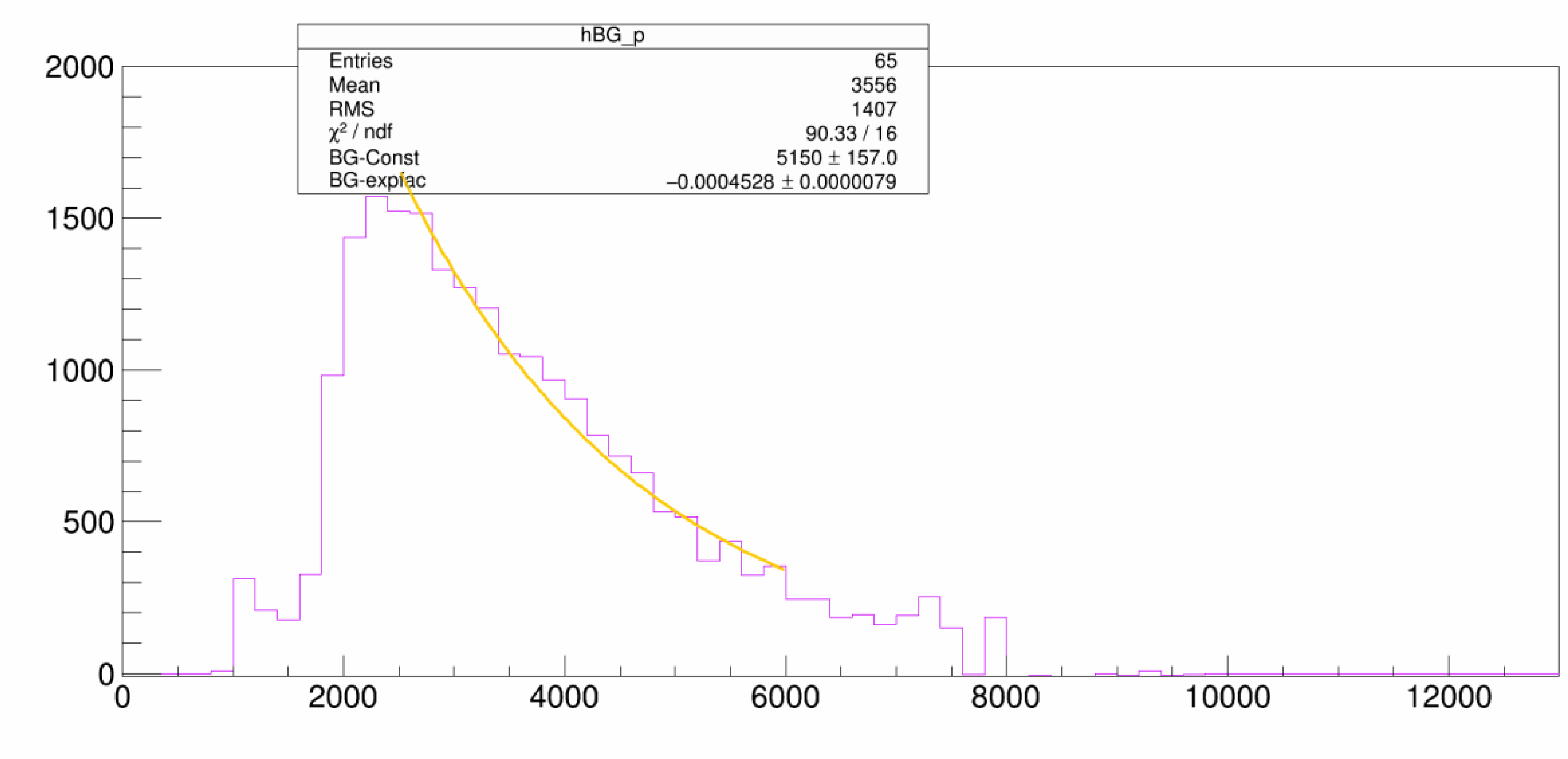
Where $$r_c = \frac{1 - \varepsilon_c}{1 + \varepsilon_c}$$

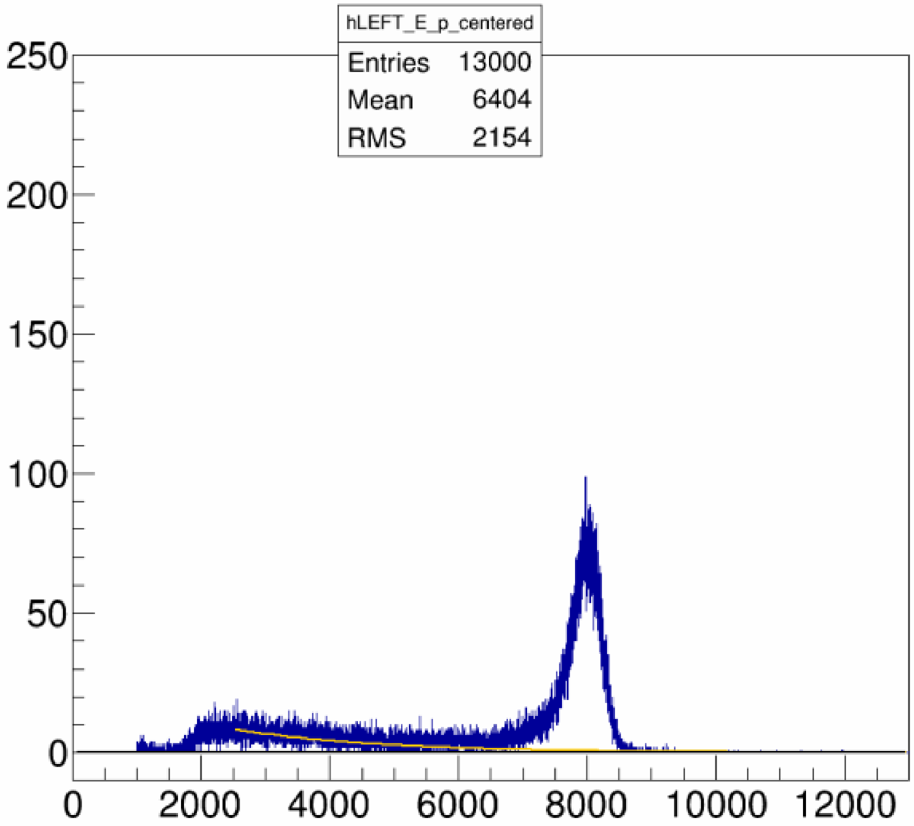


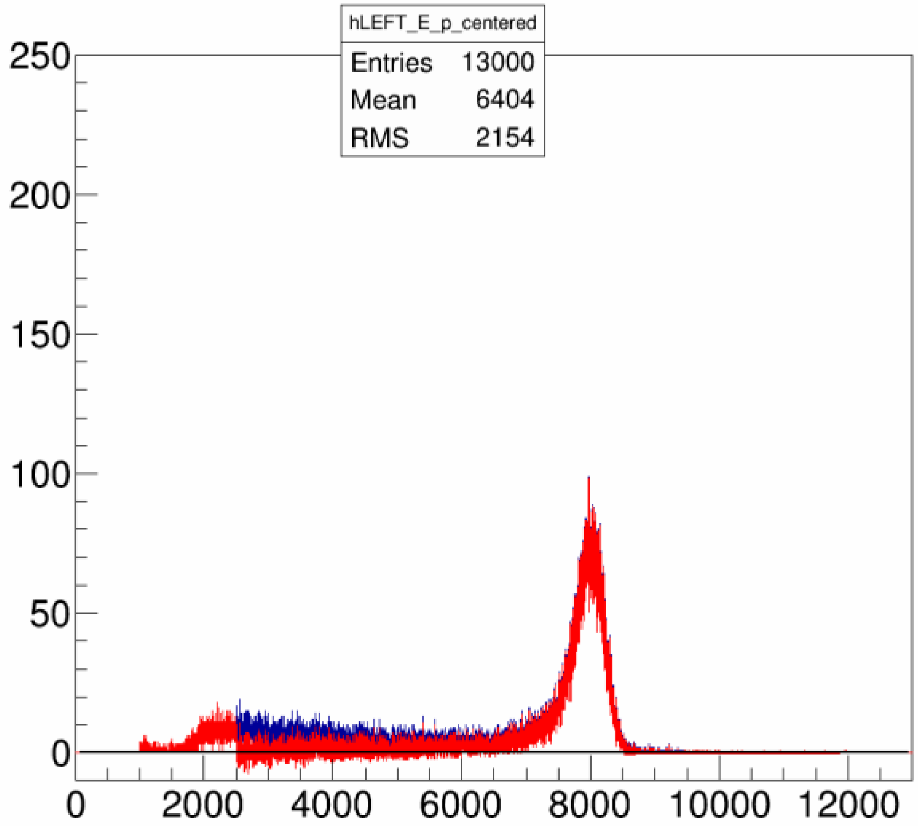


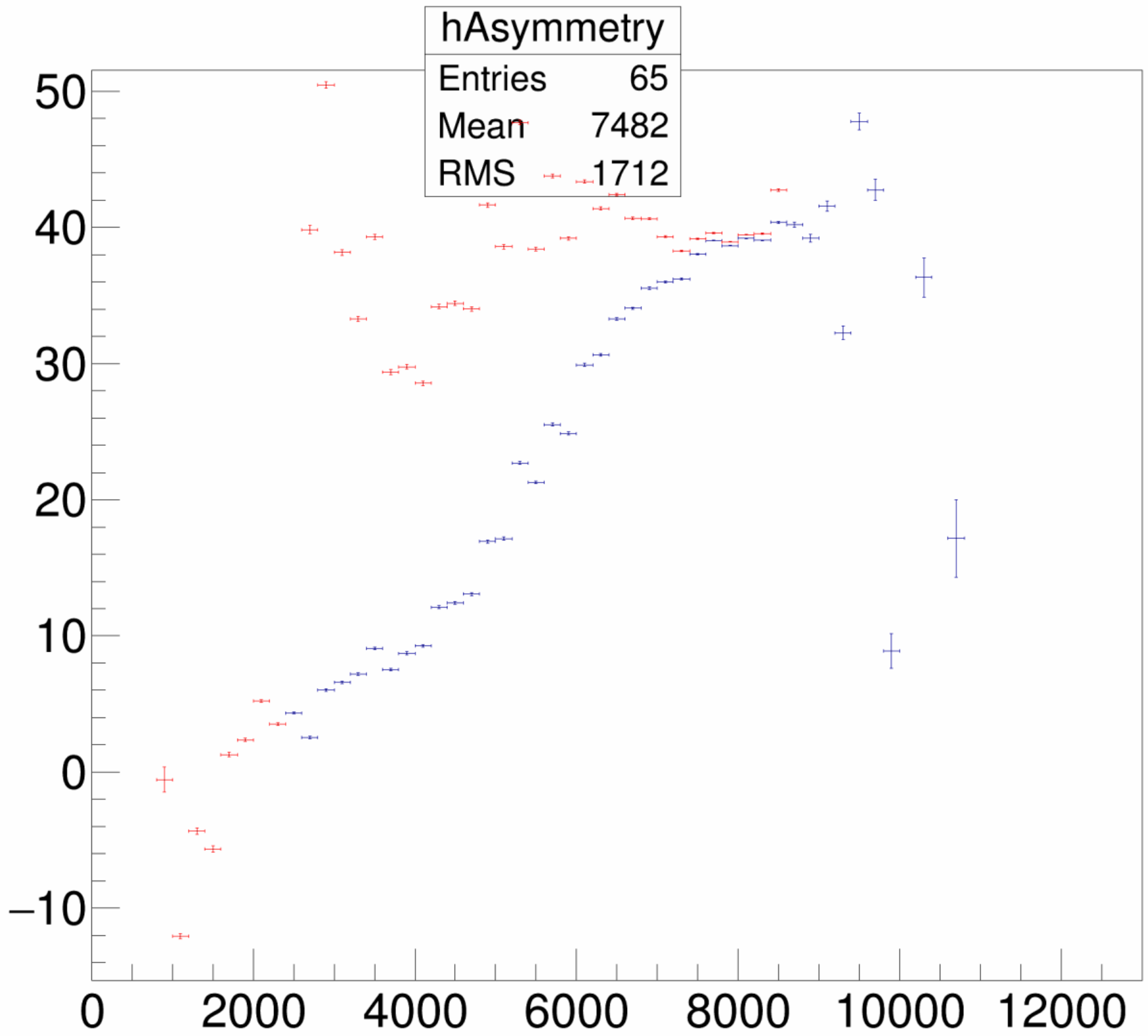
$$b_i = \frac{r_c^2(L_i^- + R_i^+) - (L_i^+ + R_i^-) \pm \sqrt{(L_i^+ + R_i^- - r_c^2(L_i^- + R_i^+))^2 - 4(r_c^2 - 1)(r_c^2 L_i^- R_i^+ - L_i^+ R_i^-)}}{2(r_c^2 - 1)}$$

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




hLEFT_E_p_centered
Entries 13000
Mean 6404
RMS 2154
250
200
150
100
50
0
0
2000
4000
6000
8000
10000
12000


hLEFT_E_p_centered
Entries 13000
Mean 6404
RMS 2154
250
200
150
100
50
0
0
2000
4000
6000
8000
10000
12000


hAsymmetry
Entries 65
Mean 7482
RMS 1712
50
40
30
20
10
0
−10
0
2000
4000
6000
8000
10000
12000