

Heep Analysis

- Analyzing the KaonLT and PionLT experimental data at low Q^2 (0.5, 0.38 and 0.42 GeV^2).
- Currently working on the single and coin heap studies from the KaonLT data.

Single data:

$$\text{Experimental Yield} = N * PS/\epsilon_{\text{tot}} * Q_{\text{tot}}$$

Coin data:

$$\text{Experimental Yield} = N/\epsilon_{\text{tot}} * Q_{\text{tot}}$$

SIMC Normalization:

In this case, I made **weighted plots** to compare the experimental yield.

Weight = weight * normfact / genevents.

I ran all simc input files for **200,000** events.

Cut Information (HMS):

H_hod_goodscinhit == 1 && H_hod_goodstarttime == 1 && H_dc_InsideDipoleExit == 1

H_gtr_dp >= -8.0 && H_gtr_dp <= 8.0

H_gtr_xptar >= 0.08 && H_gtr_xptar <= 0.08

H_gtr_yptar >= -0.045 && H_gtr_yptar <= 0.045

H_cer_npeSum >= 0.5 && H_cal_etotnorm >= 0.8 && H_cal_etotnorm <= 1.2

W <= 1.0

Jan12, 2022

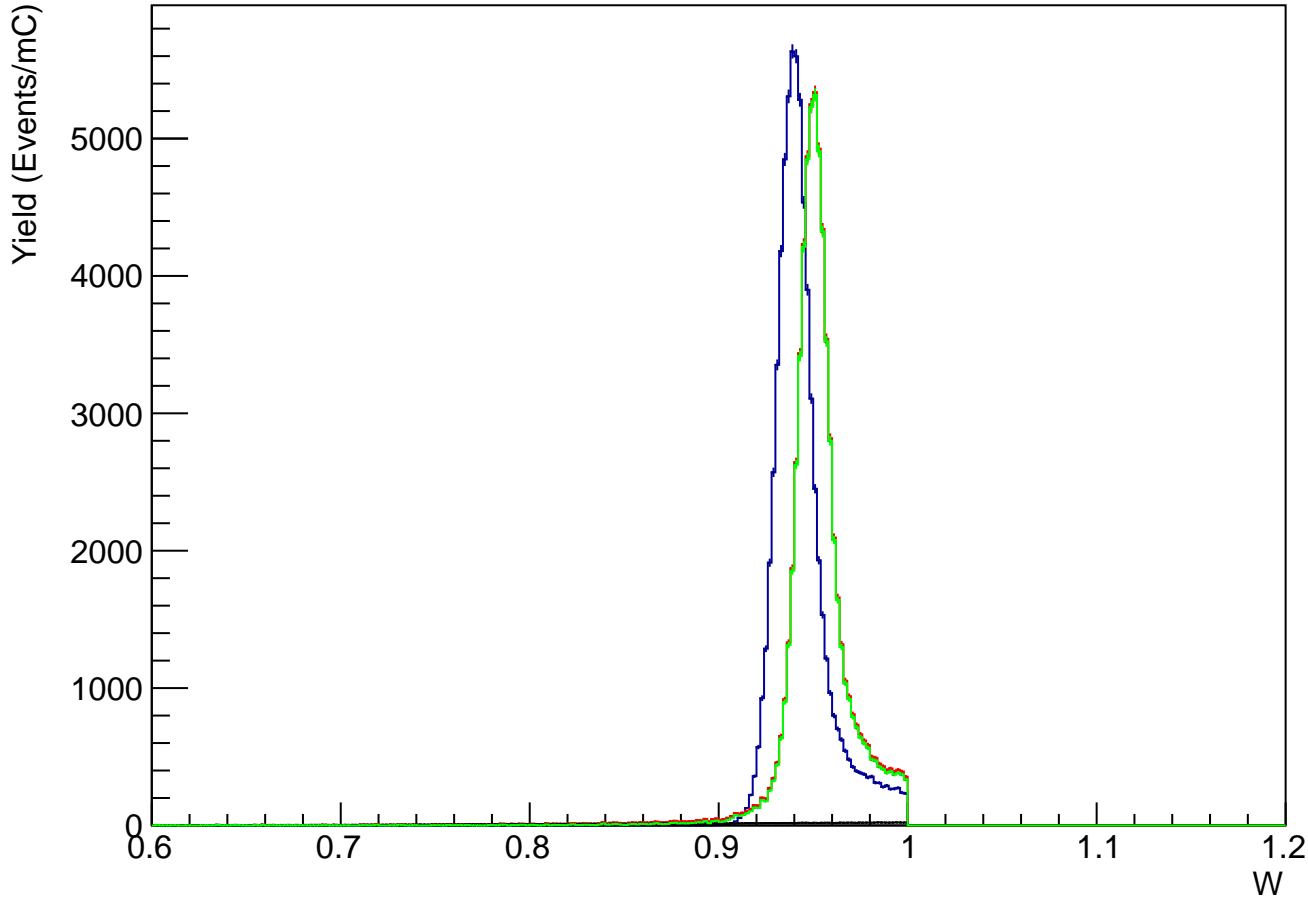
- Heep analysis scripts updated, removed the goodscinhit cut.
- HMS heap, **cer** and **cal** can be used to select electrons.
- SHMS heap, **hgcer** can NOT be used to select electrons.
- The target thickness in my SIMC input files is fixed. I've redone the HMS heap for all settings (5 settings in 3.9 GeV and 4 settings in 4.9 GeV). They all look good except one setting (setting no. 2) of 3.9 GeV.
- I've also redone the SHMS heap for all settings (5) of 3.9 GeV and two settings of 4.9 GeV data. They all look good except the first setting of 4.9 GeV, which is still not in good shape.
- I've calculated the HGC variables (xAtCer and yAtCer) in SIMC analysis. We'll use them for the geometrical cuts in our physics analysis.

SHMS heap (1st setting of 3.9 GeV)

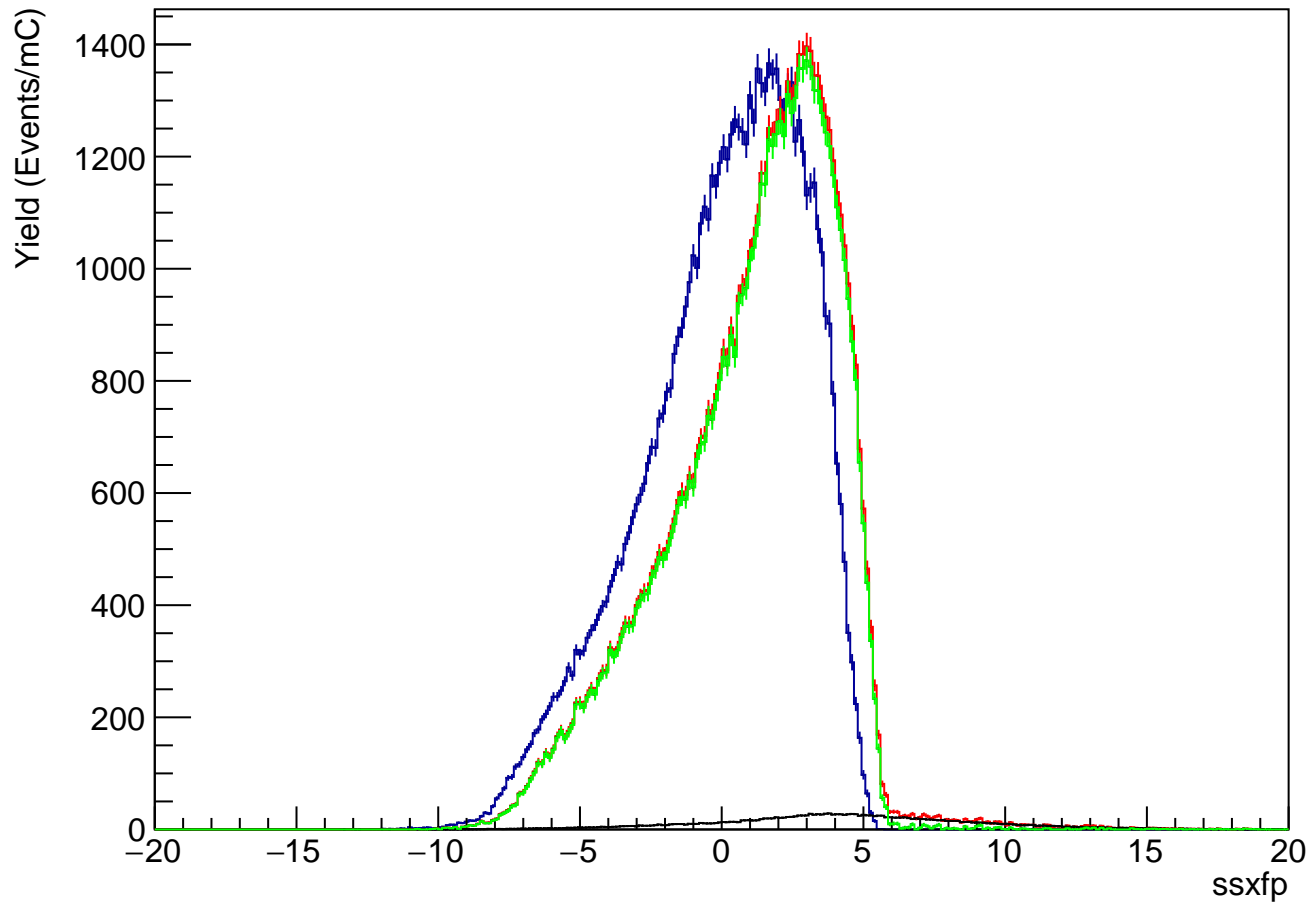
Ebeam = 3835.0 ; (MeV)
dEbeam = 0.05 ; beam energy variation (%)
electron_arm = 5 ; 1=hms,2=sos,3=hrsr,4=hrsl,5=shms
hadron_arm = 1 ; 1=hms,2=sos,3=hrsr,4=hrsl,5=shms
spec%e%P = 3007.0 ; e arm central momentum (MeV/c)
spec%e%theta = 21.14 ; e arm angle setting (degrees)
spec%p%P = 1496.0 ; p arm central momentum (MeV/c)
spec%p%theta = 46.476 ; p arm angle setting (degrees)

- The comparison output pdf file is attached below.

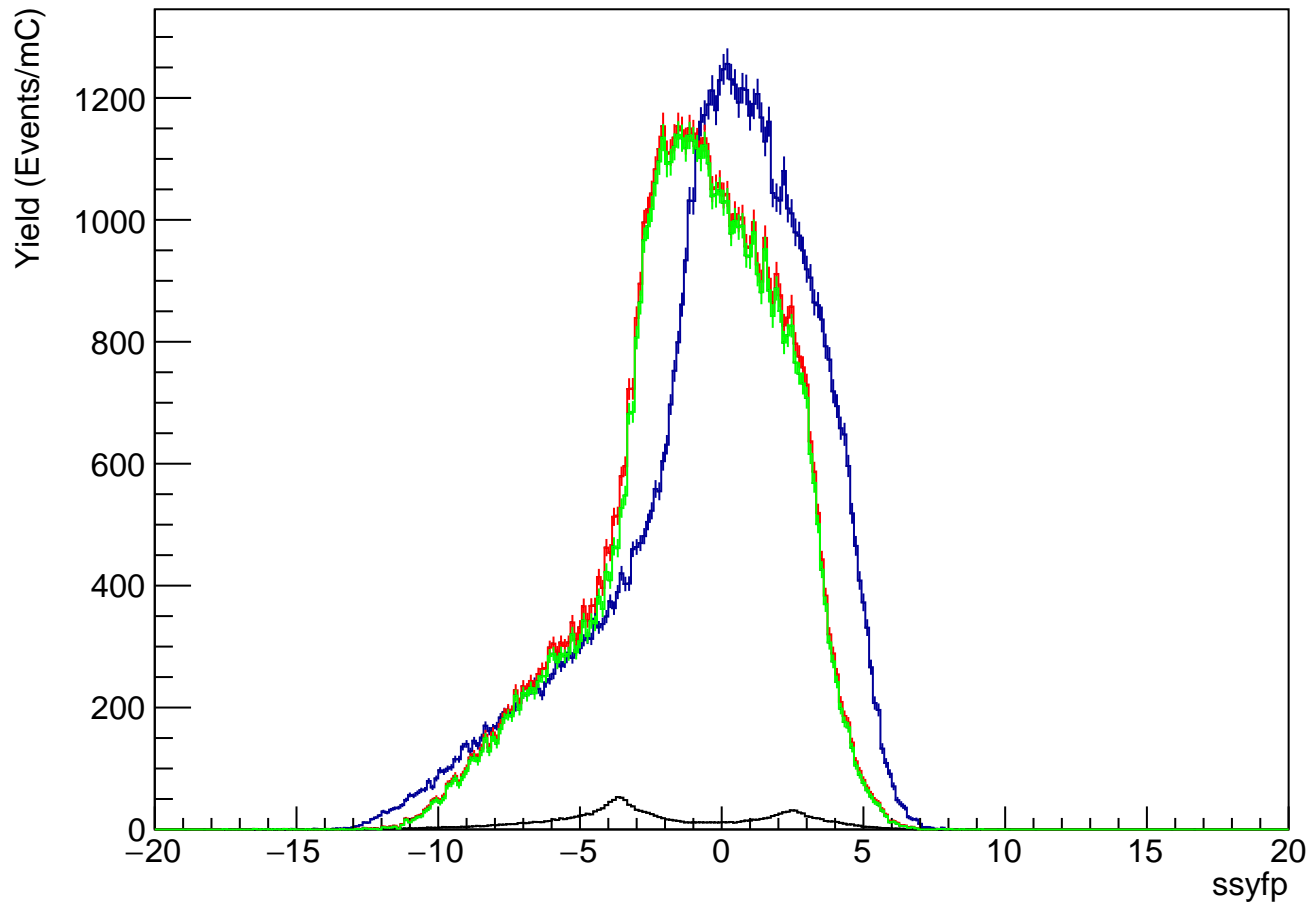
W



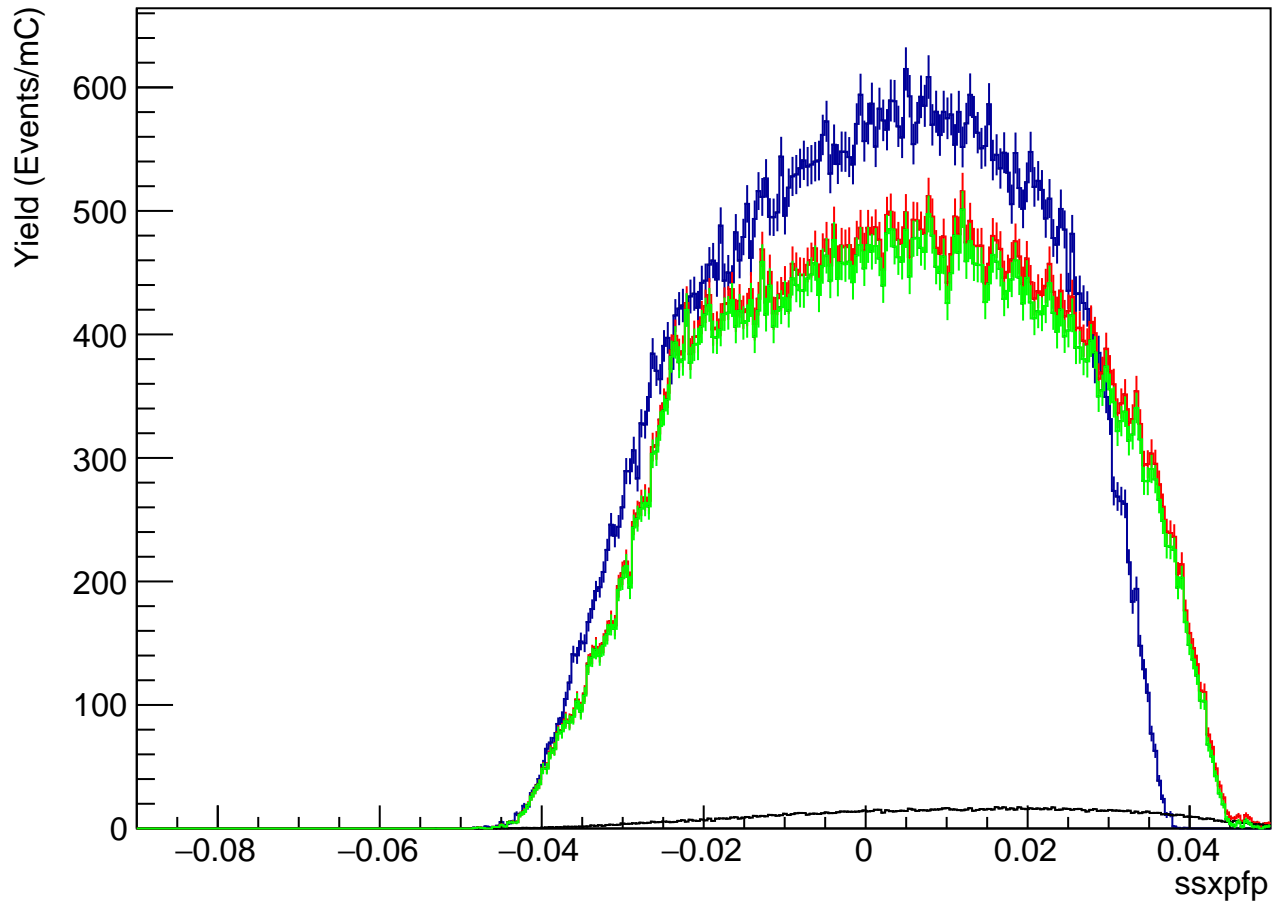
SHMS xfp



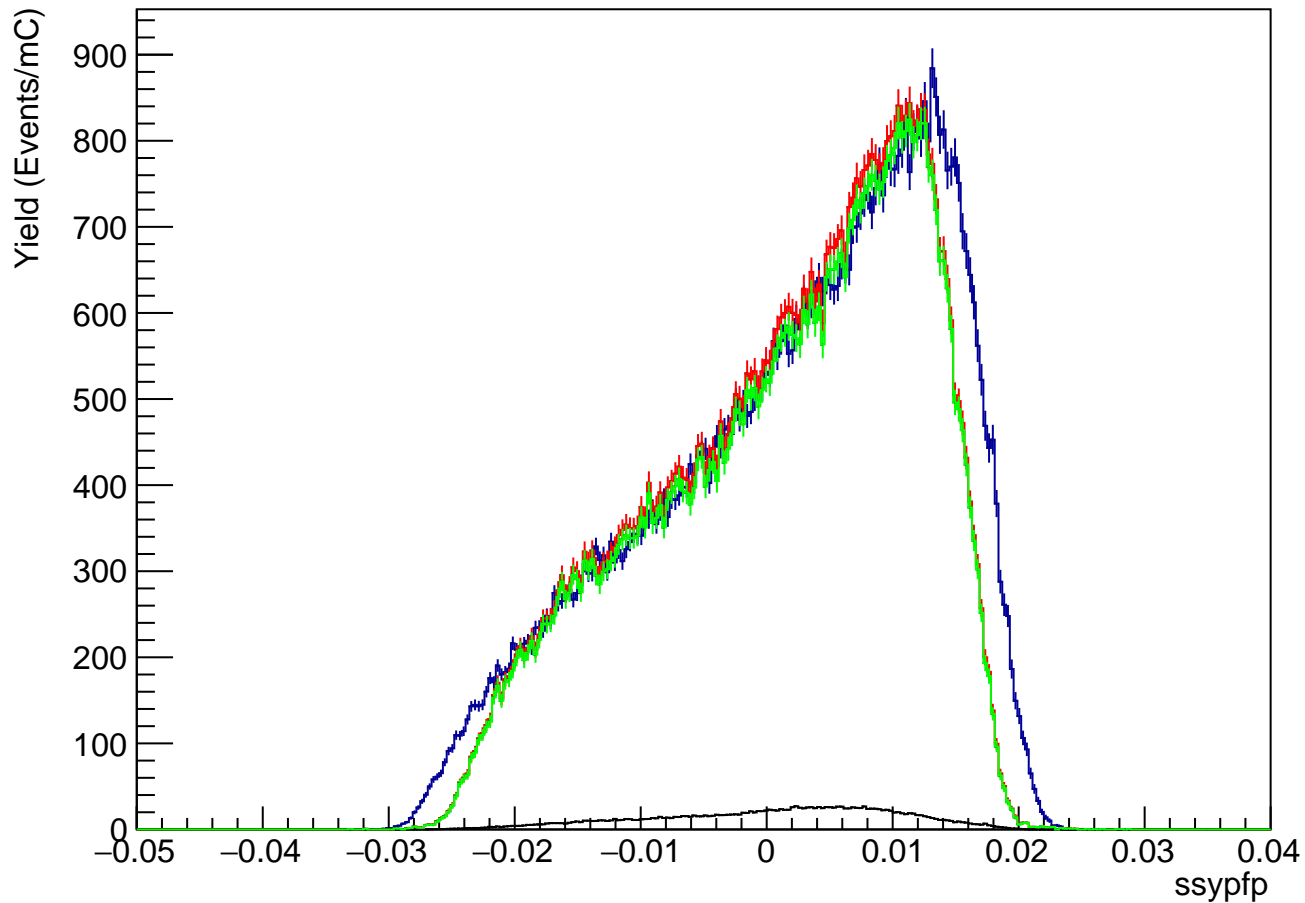
SHMS yfp



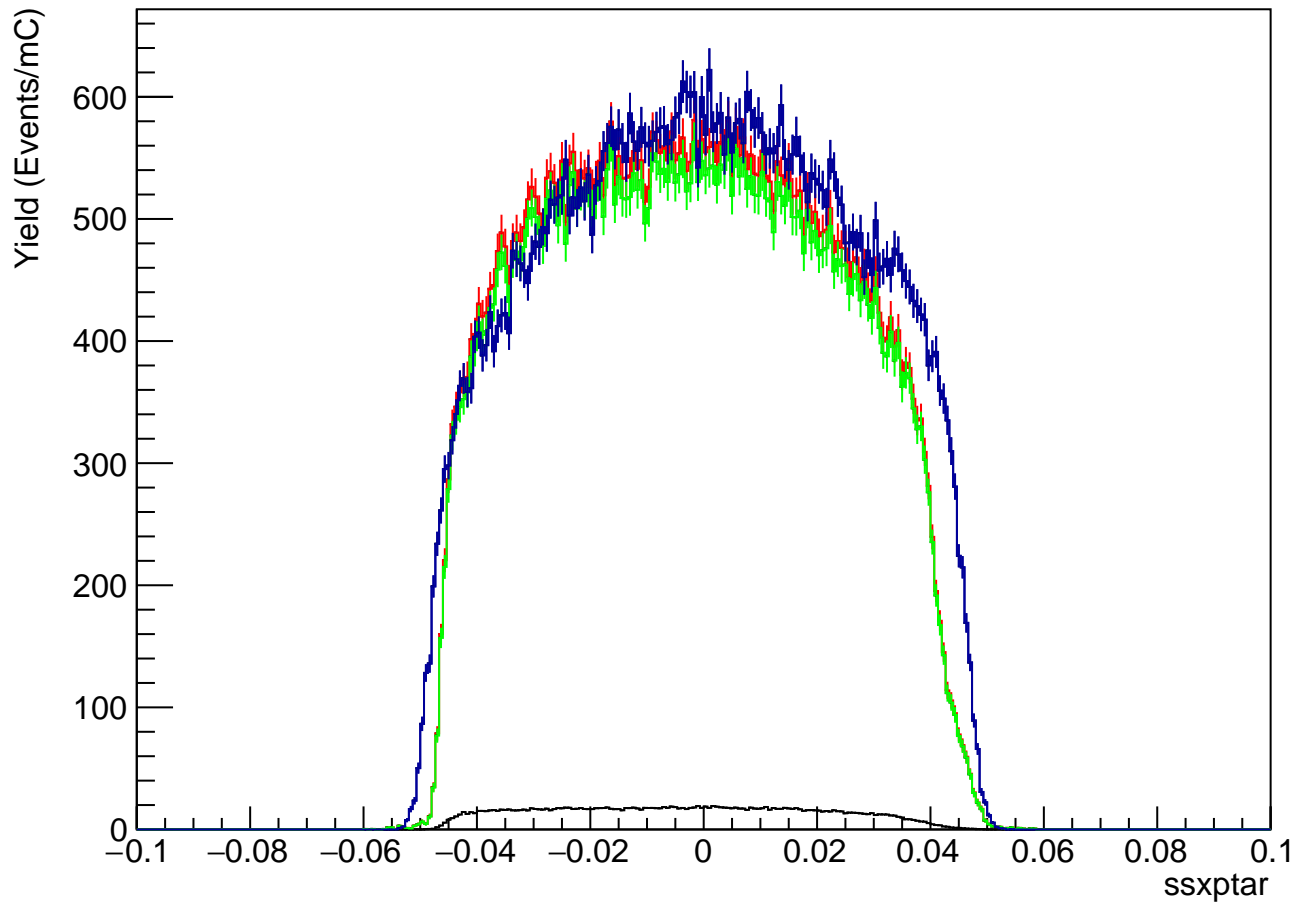
SHMS xfp



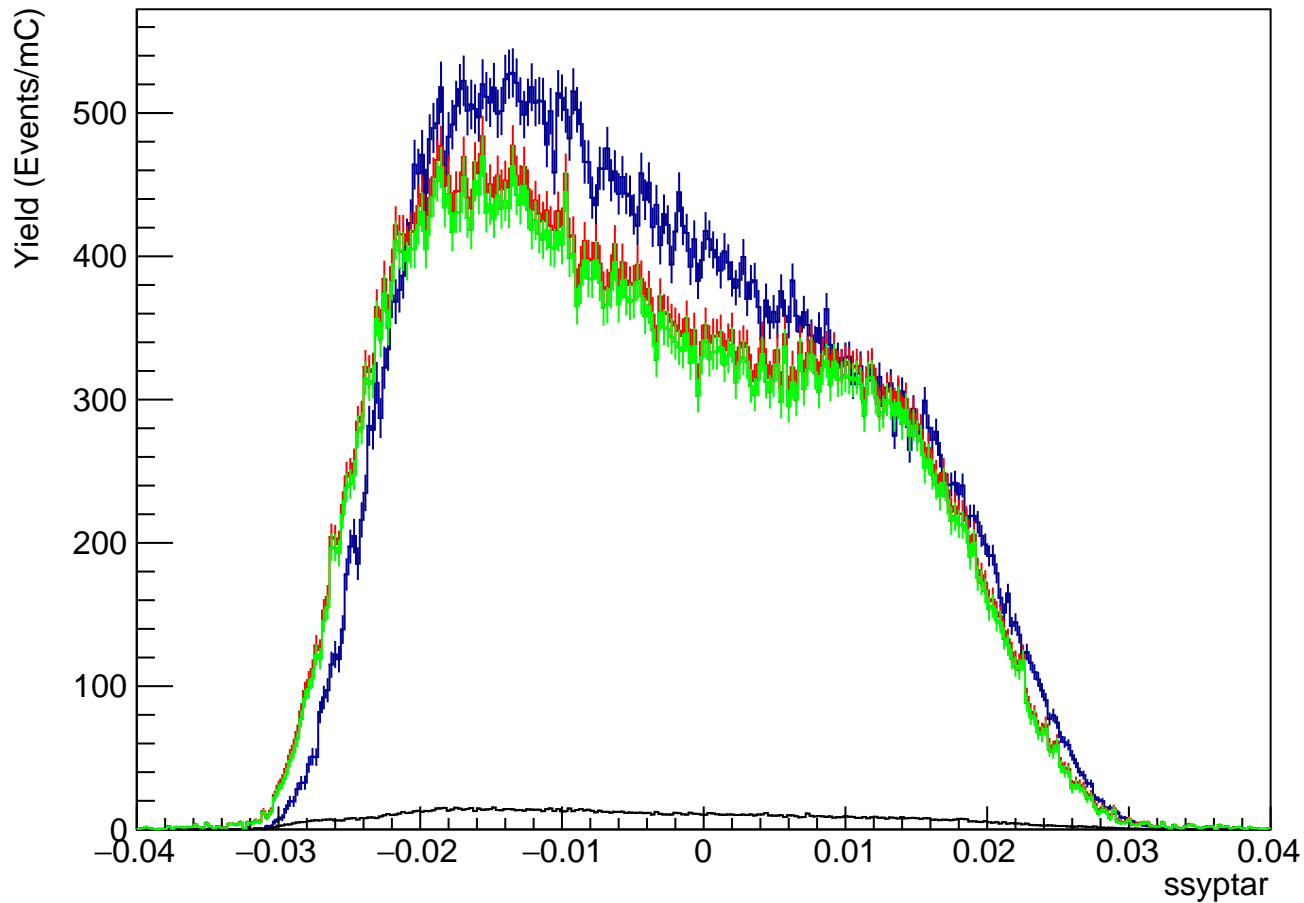
SHMS yfp



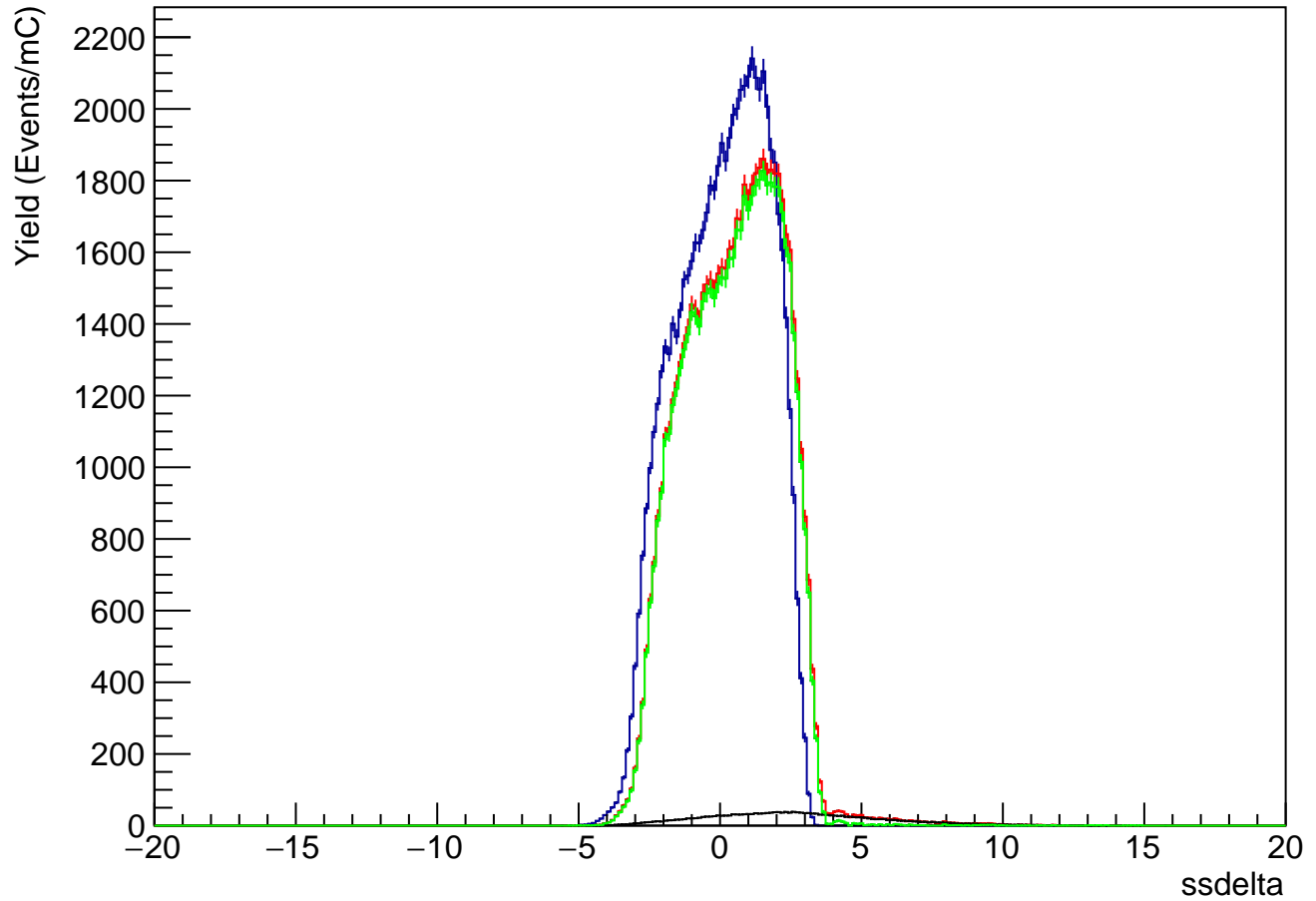
SHMS xptar



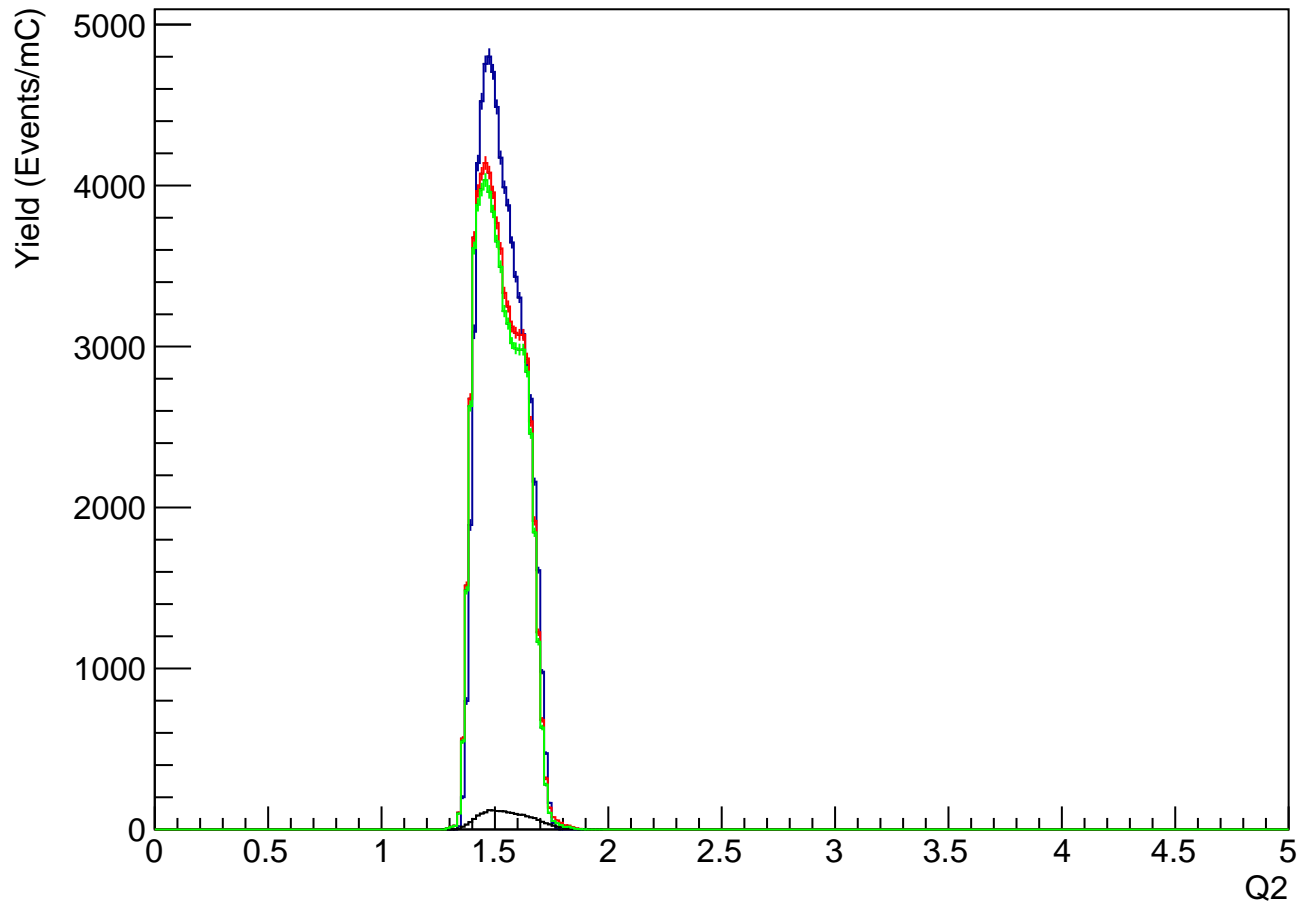
SHMS yptar



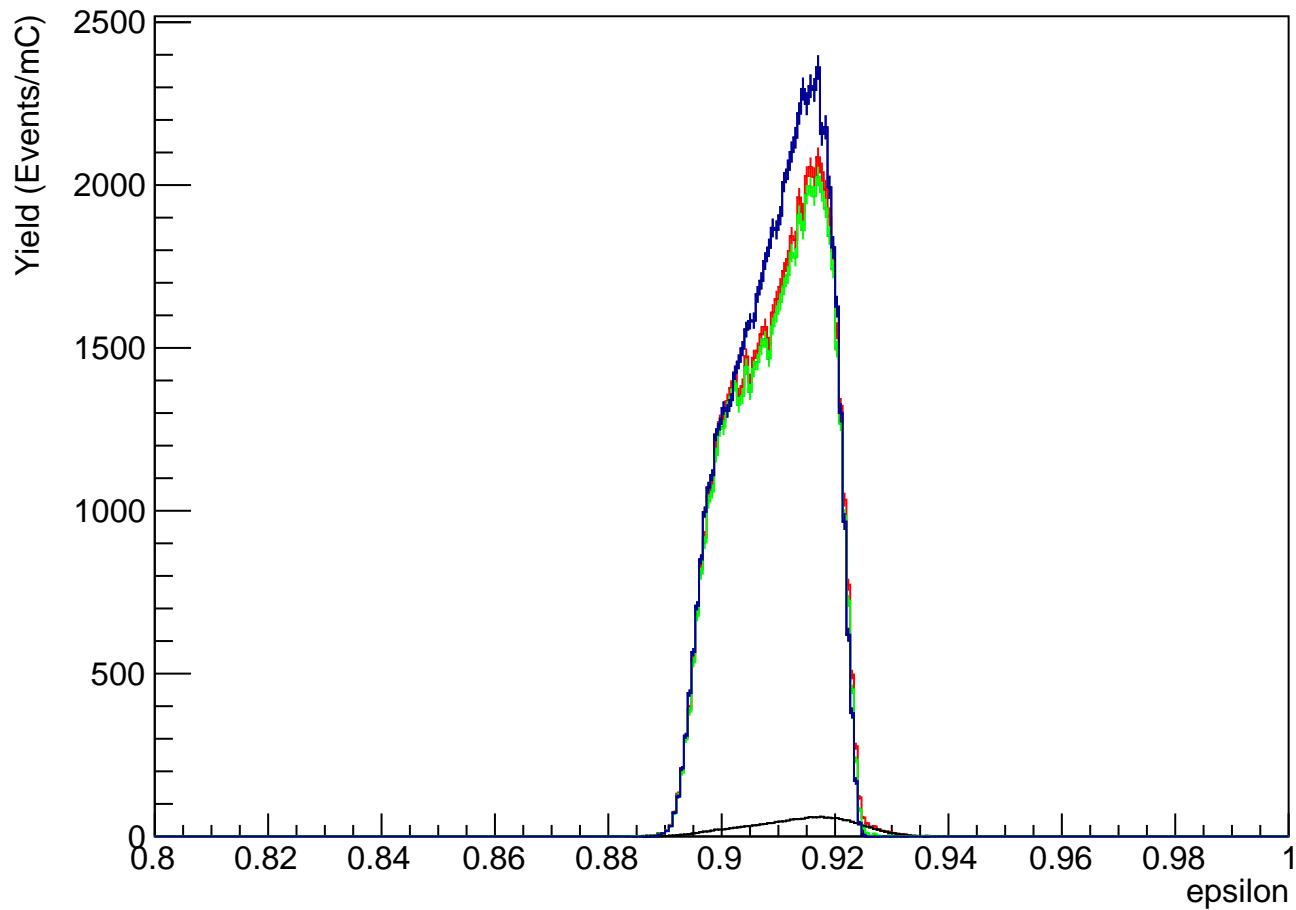
SHMS delta



Q2



epsilon



XY HGC

