LHRS Analysis for d_2^n

Acceptance Studies

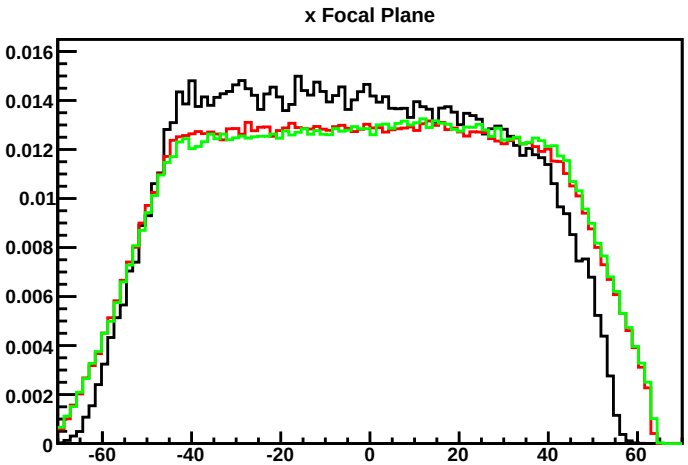
D. Flay

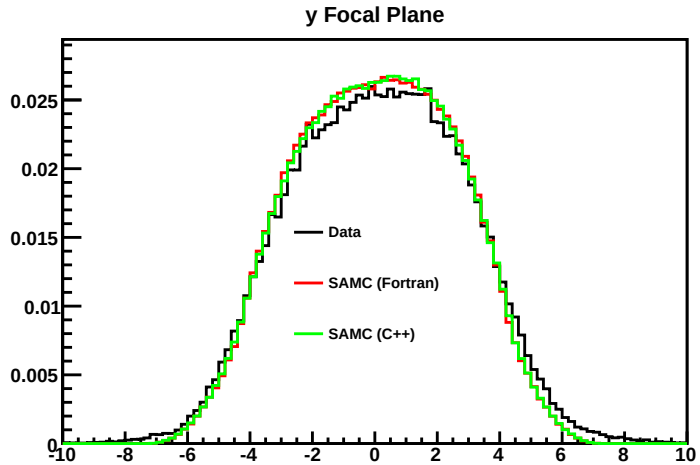
7/12/12

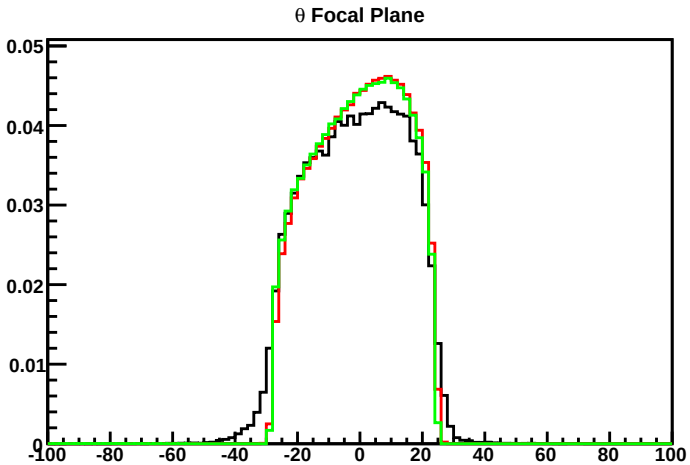
Outline

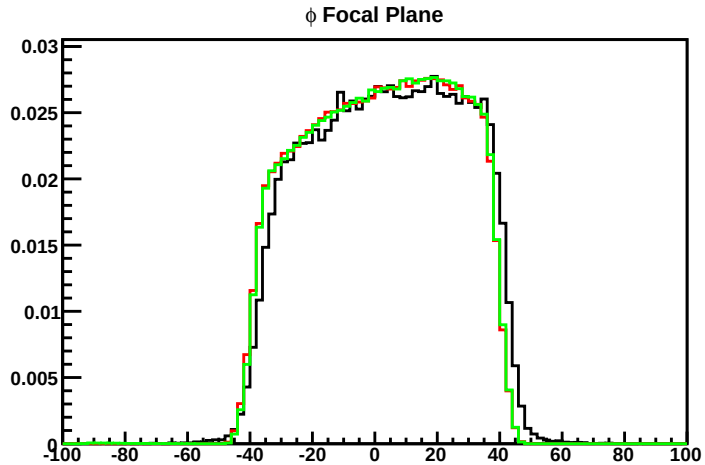
SAMC: Comparing C++, Fortran (1)

Focal Plane Variables: E_s = 4730 MeV, E_p = 600 MeV



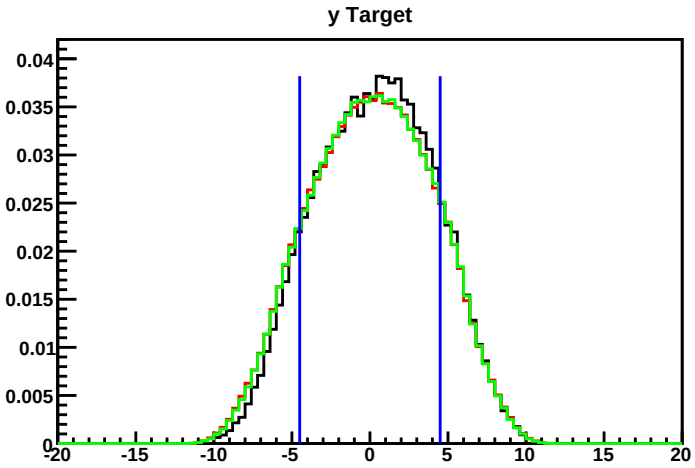


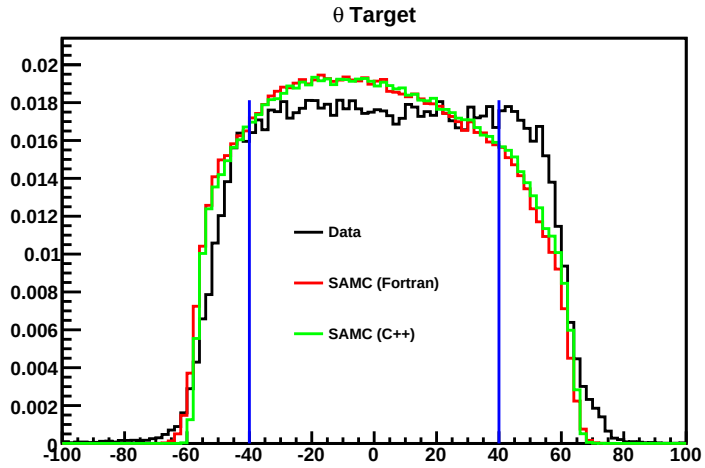


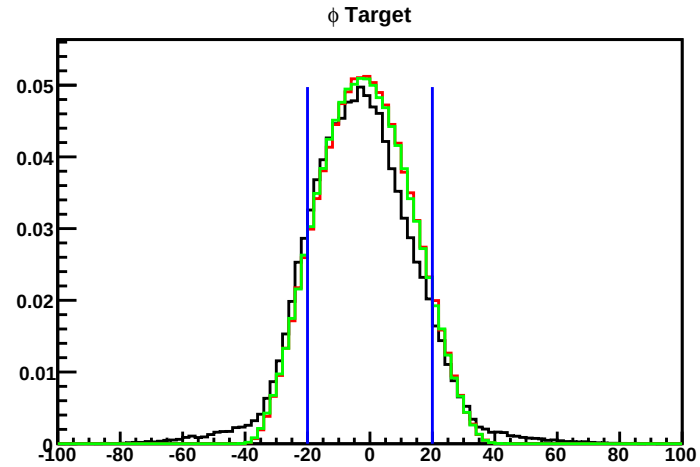


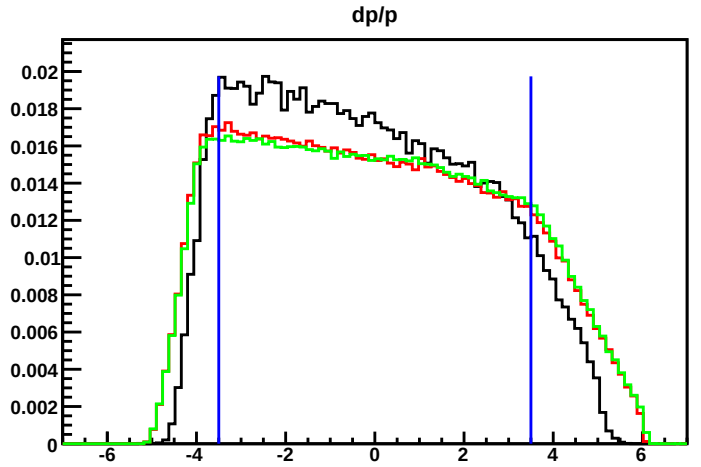
SAMC: Comparing C++, Fortran (2)

Target Variables: E_s = 4730 MeV, E_p = 600 MeV



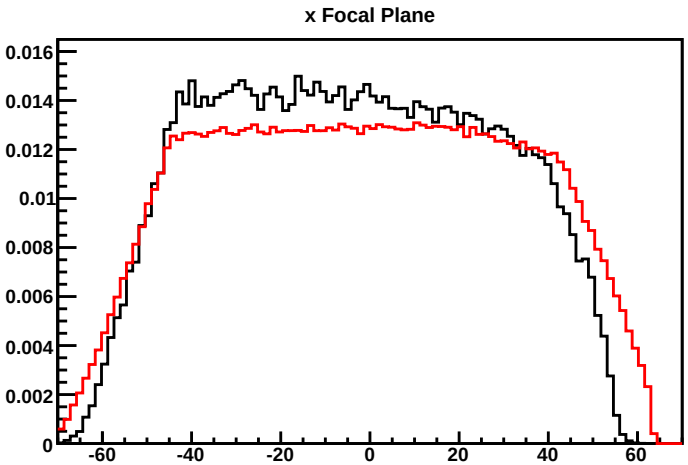


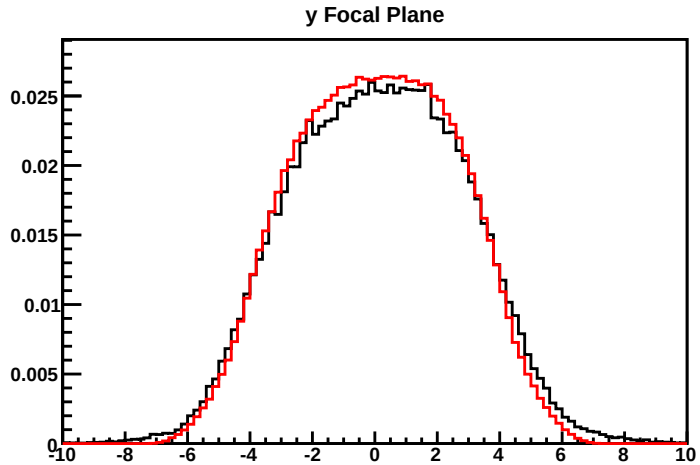


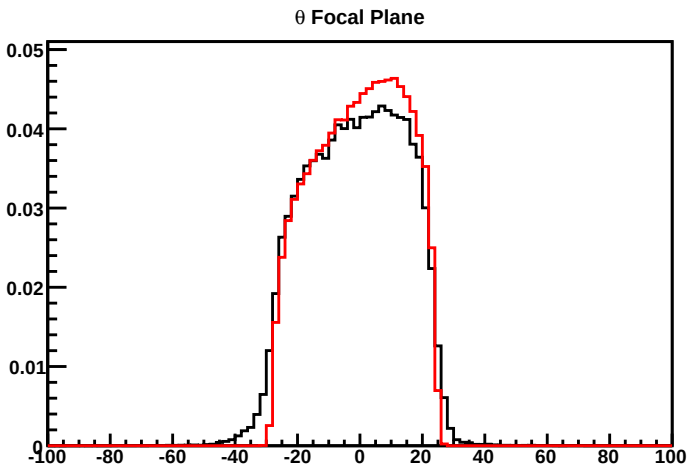


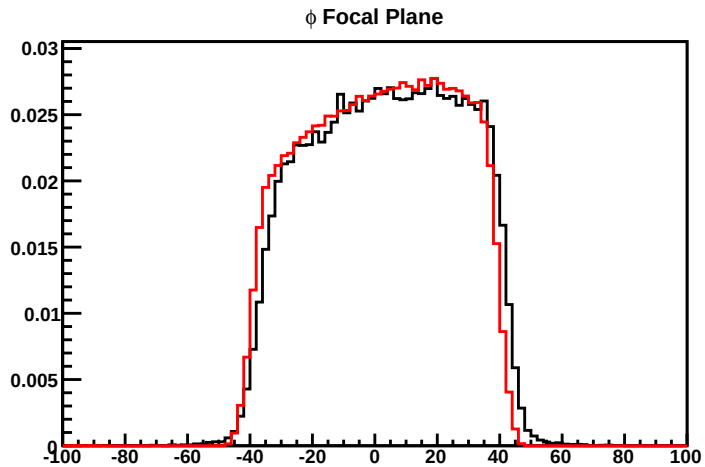
SAMC: Momentum Dependence (1)

Focal Plane Variables: E_s = 4730 MeV, E_p = 600 MeV



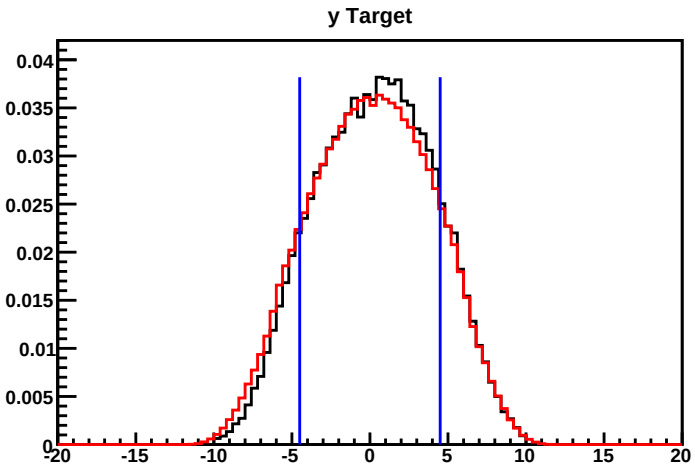


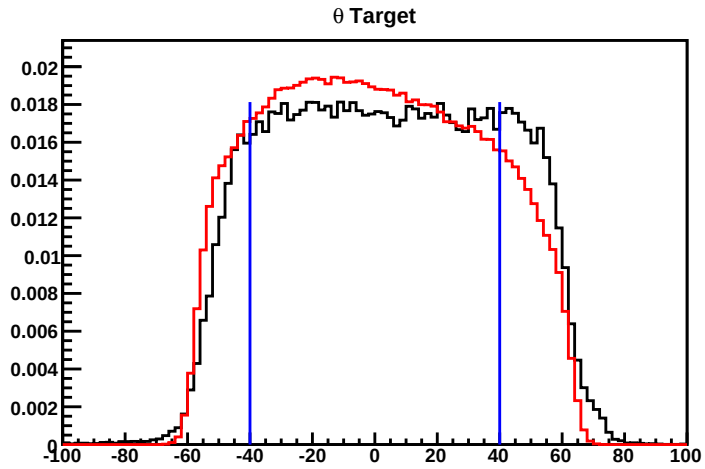


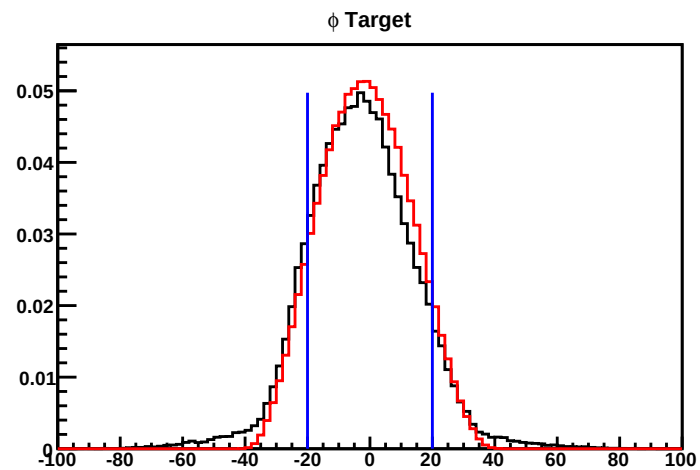


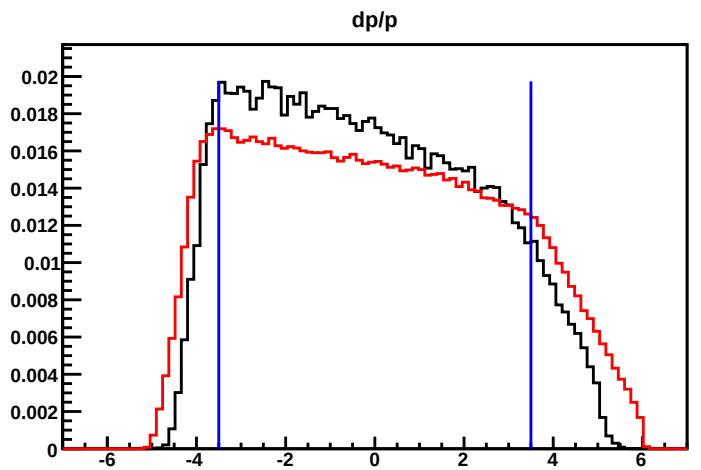
SAMC: Momentum Dependence (2)

Target Variables: E_s = 4730 MeV, E_p = 600 MeV



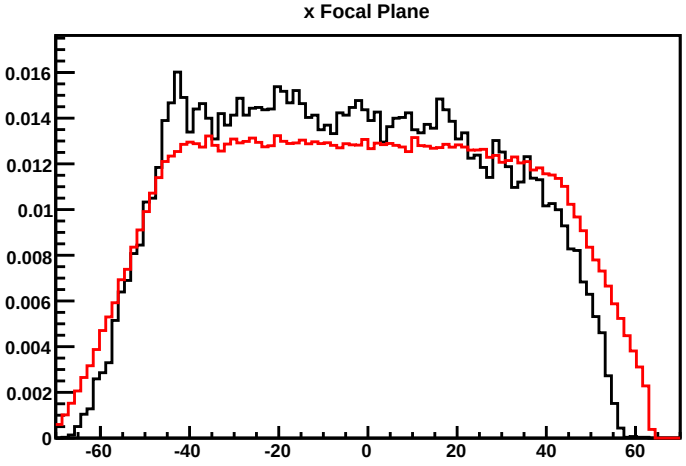


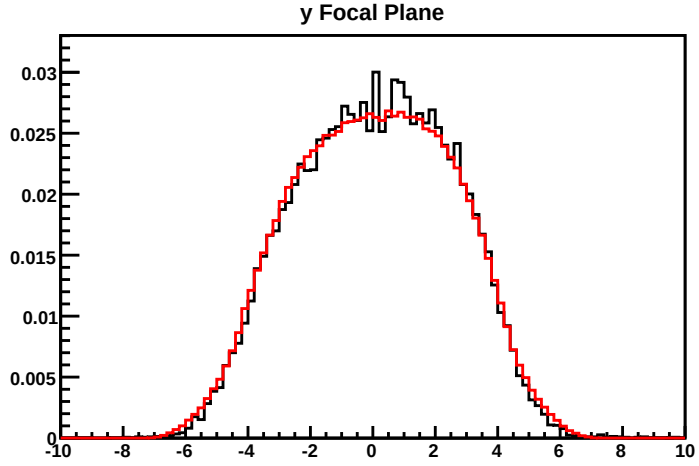


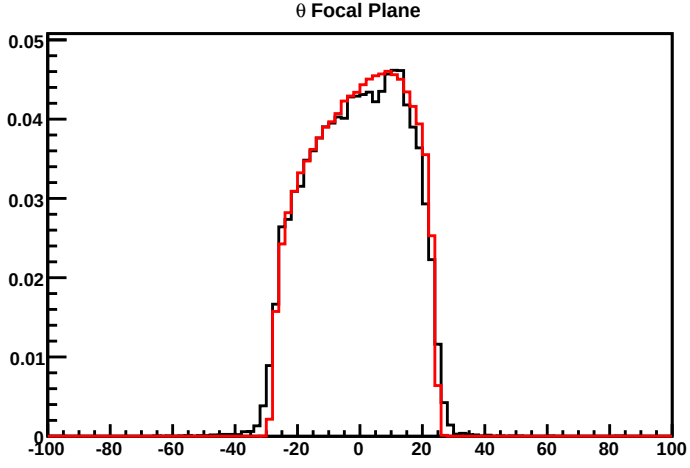


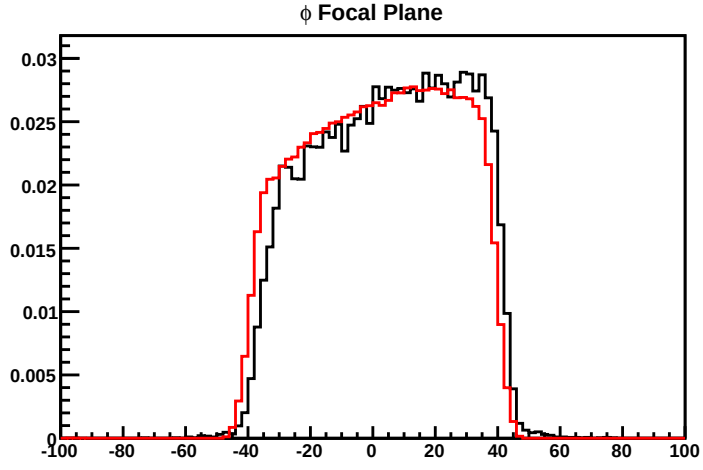
SAMC: Momentum Dependence (3)

Focal Plane Variables: E_s = 4730 MeV, E_p = 1190 MeV



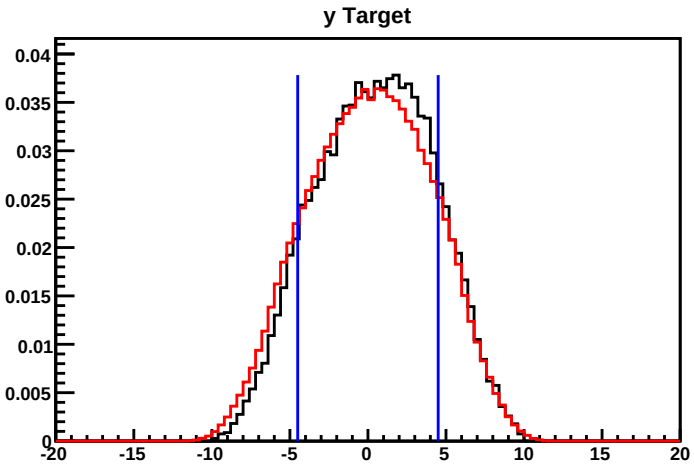


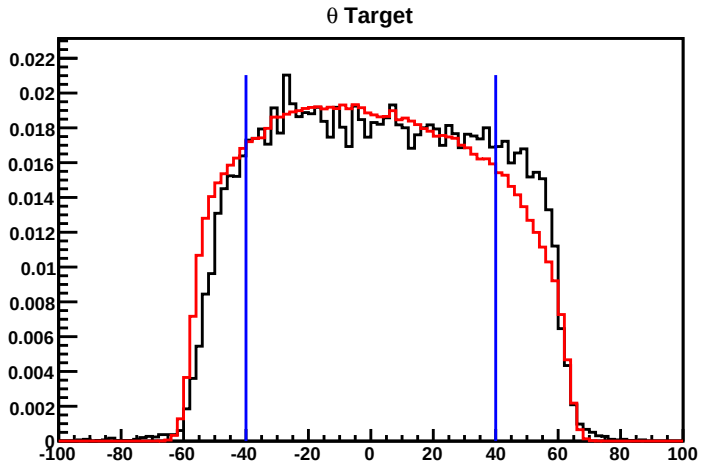


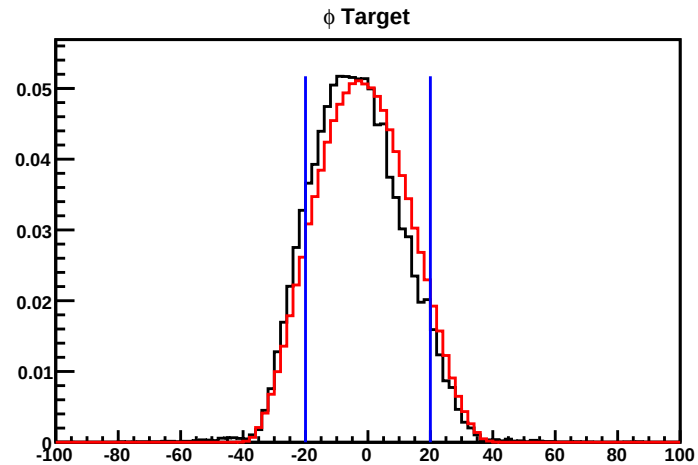


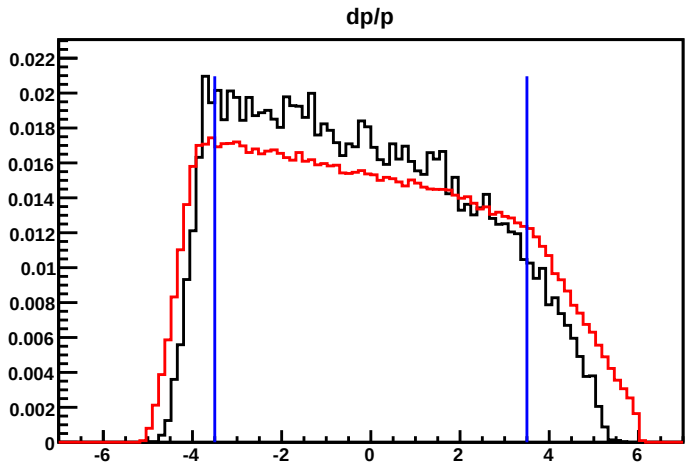
SAMC: Momentum Dependence (4)

Target Variables: E_s = 4730 MeV, E_p = 1190 MeV



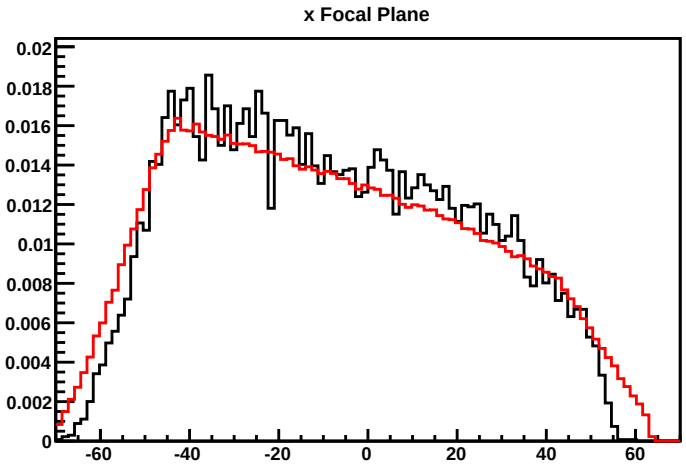


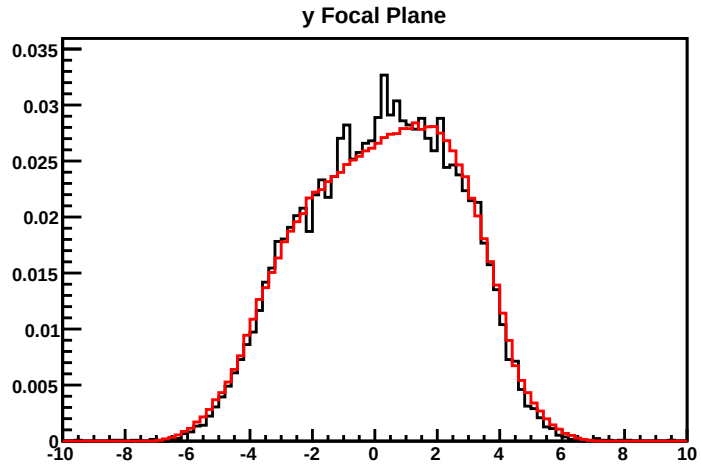


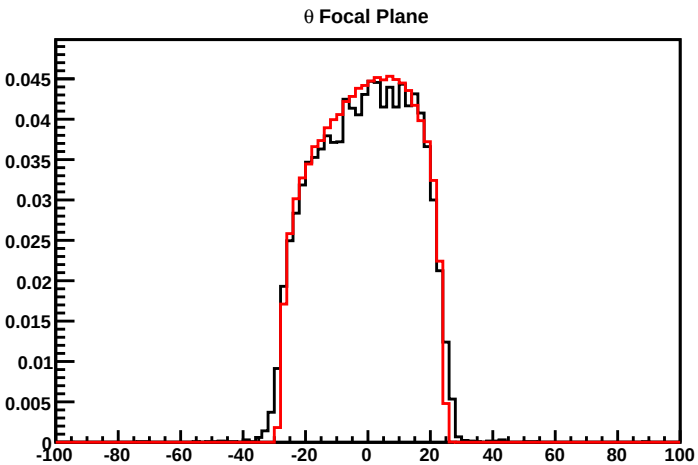


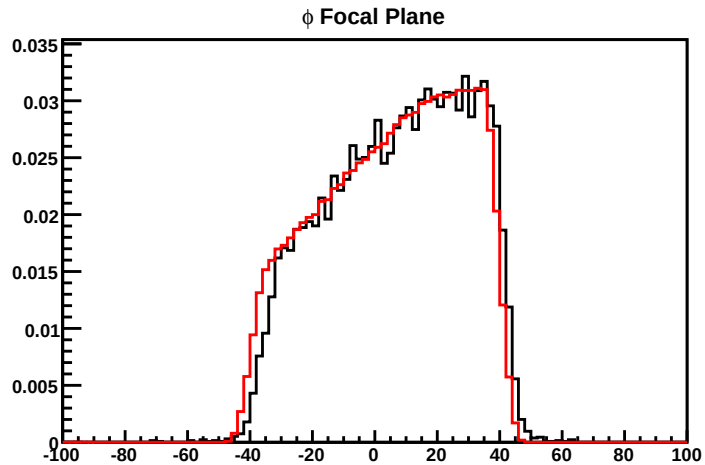
SAMC: Momentum Dependence (5)

Focal Plane Variables: E_s = 4730 MeV, E_p = 1600 MeV



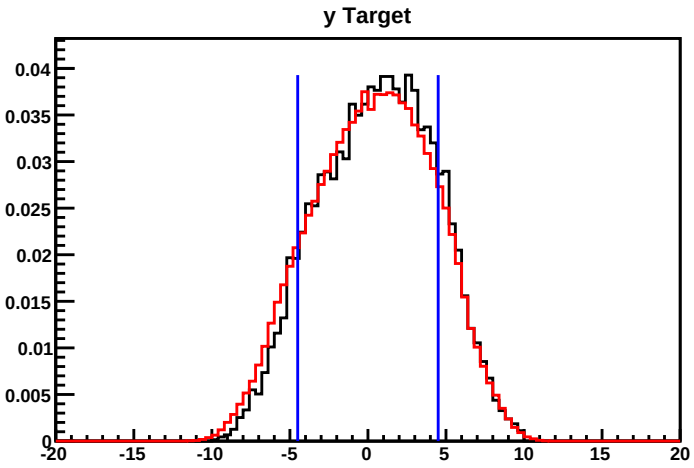


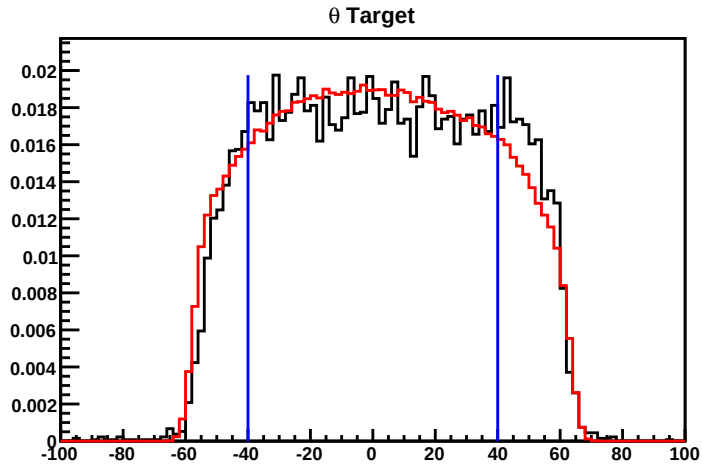


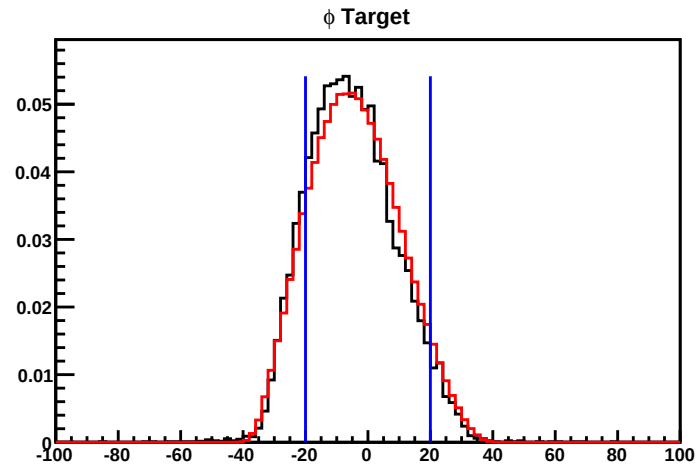


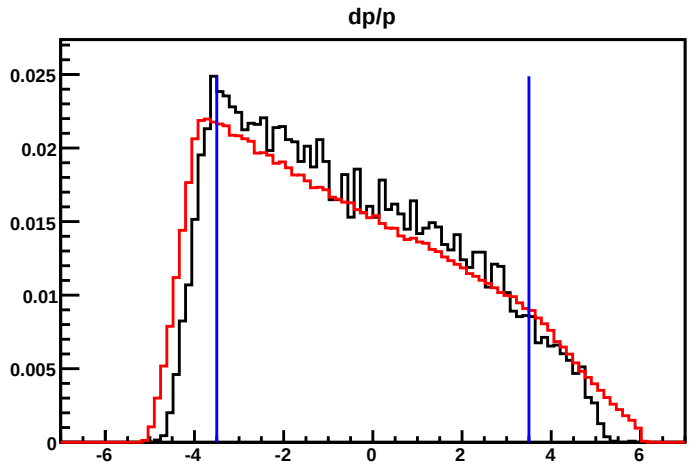
SAMC: Momentum Dependence (6)

Target Variables: E_s = 4730 MeV, E_p = 1600 MeV



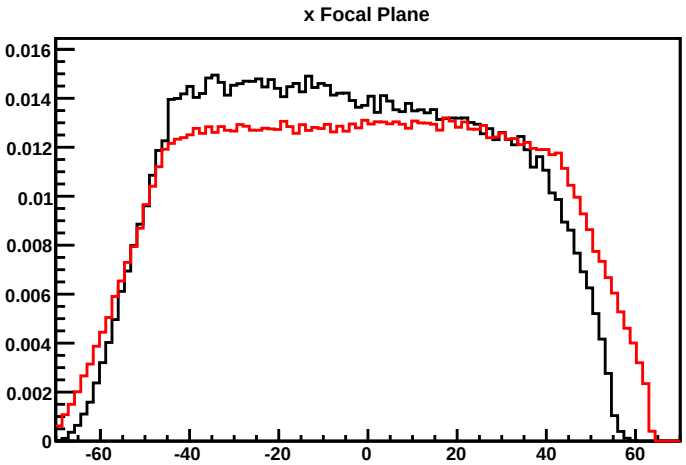


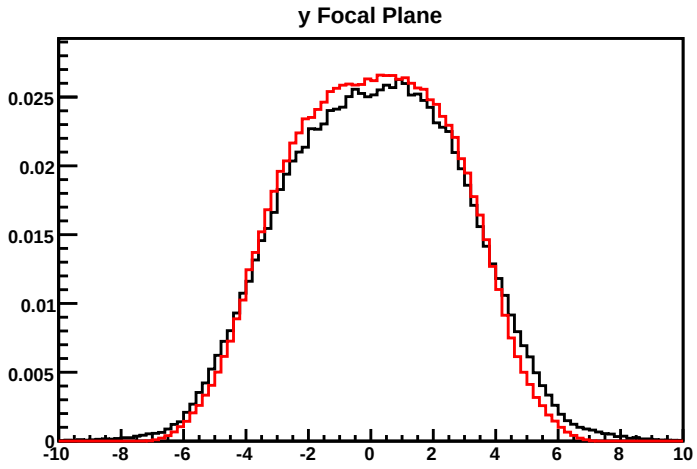


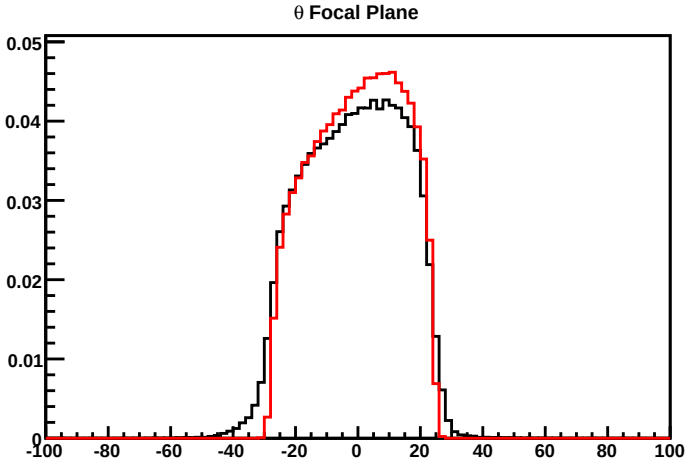


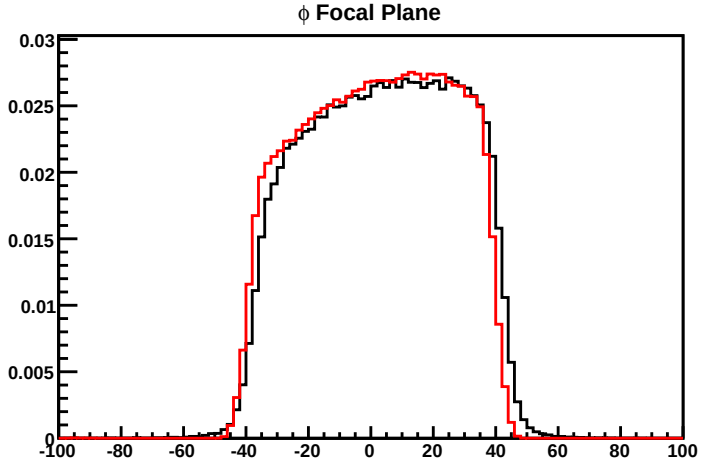
SAMC: Momentum Dependence (7)

Focal Plane Variables: E_s = 5890 MeV, E_p = 600 MeV



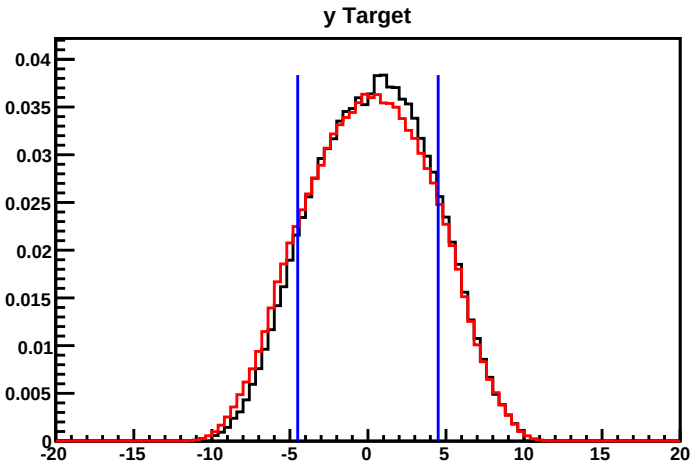


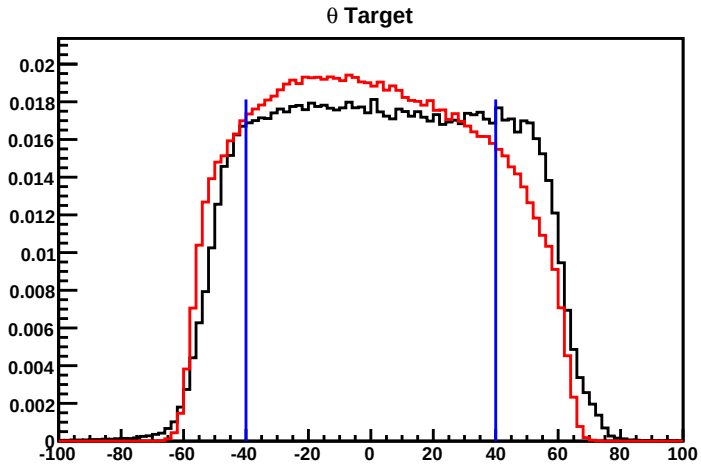


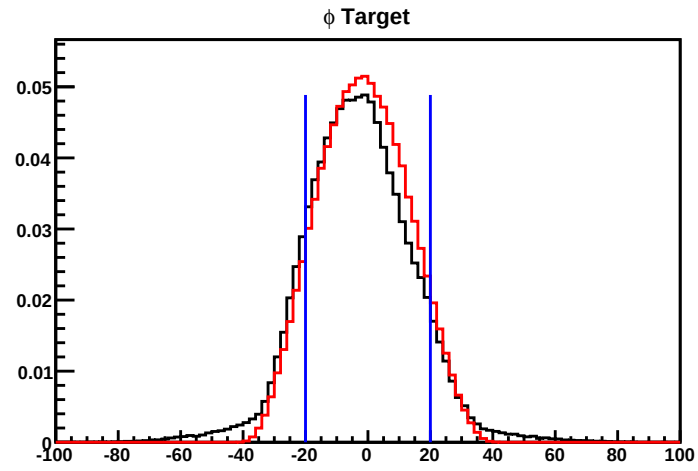


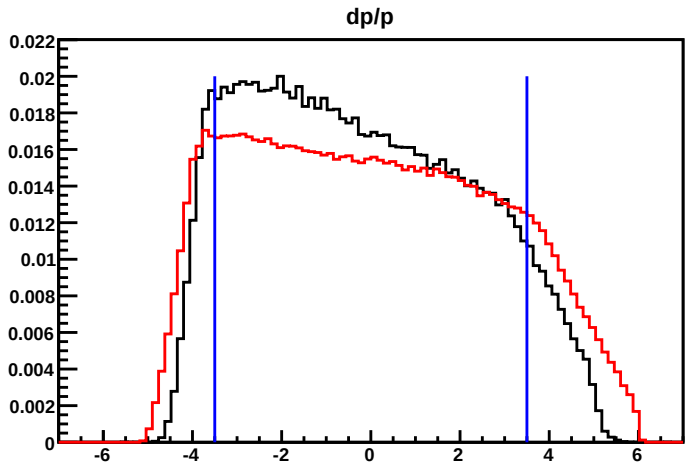
SAMC: Momentum Dependence (8)

Target Variables: E_s = 5890 MeV, E_p = 600 MeV



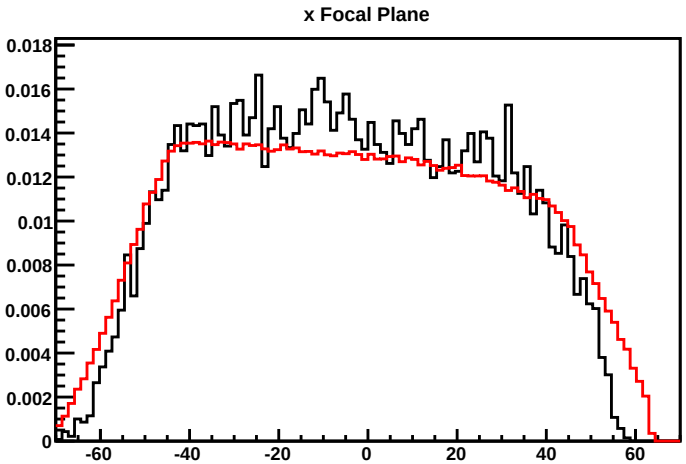


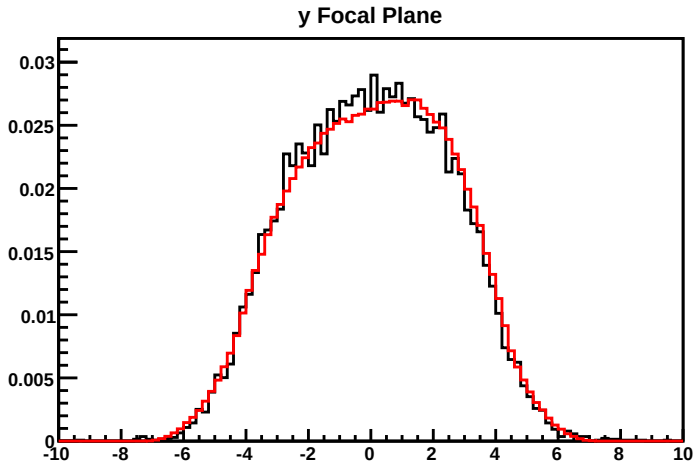


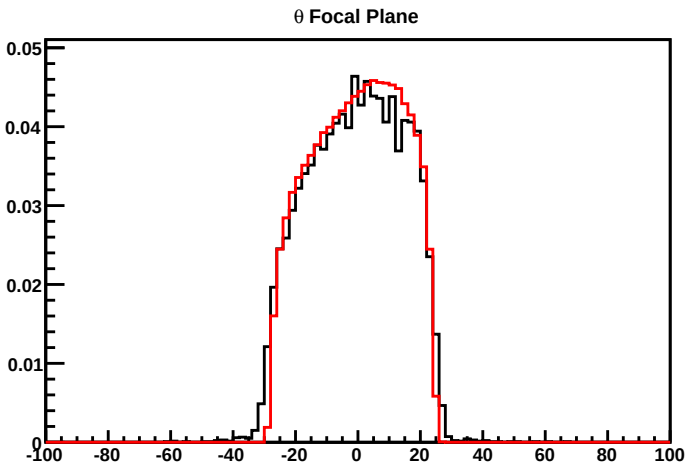


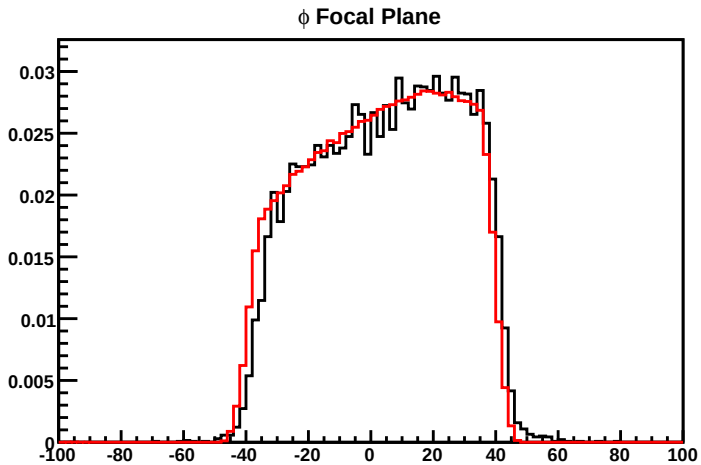
SAMC: Momentum Dependence (9)

Focal Plane Variables: E_s = 5890 MeV, E_p = 1200 MeV



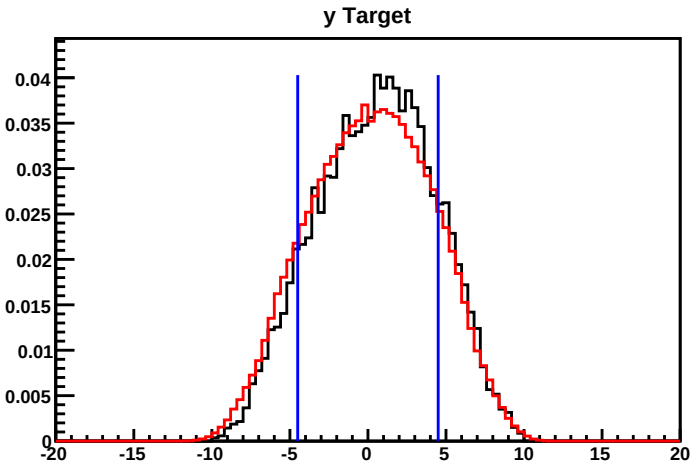


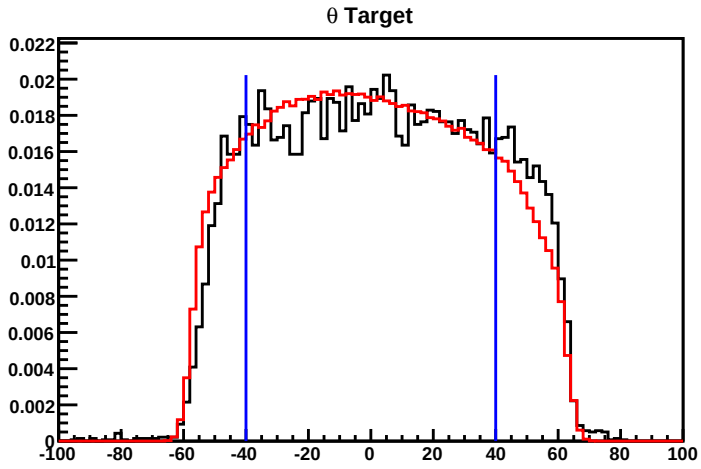


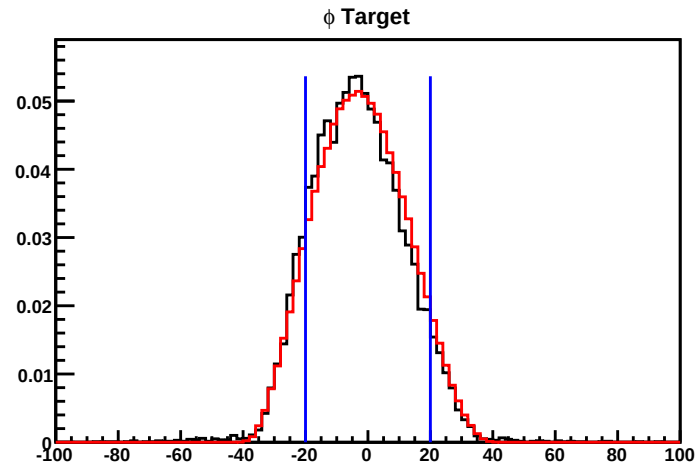


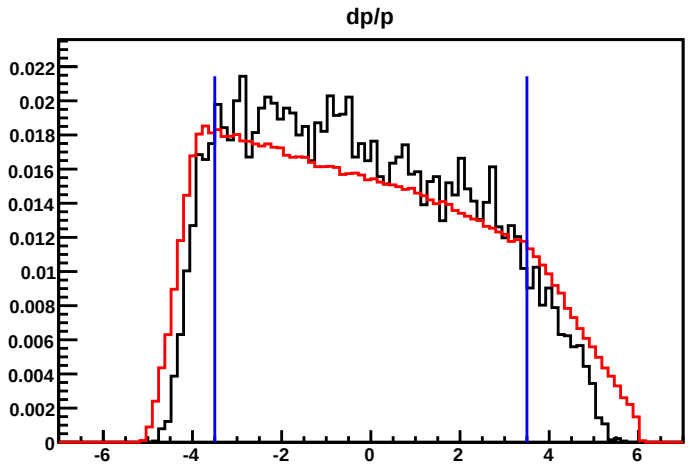
SAMC: Momentum Dependence (10)

Target Variables: E_s = 5890 MeV, E_p = 1200 MeV



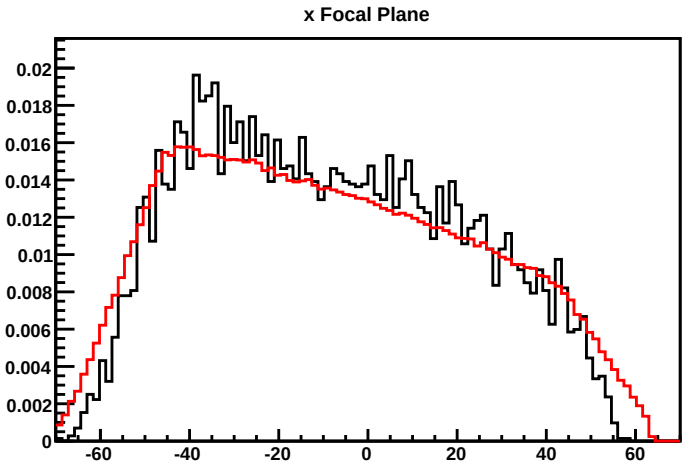


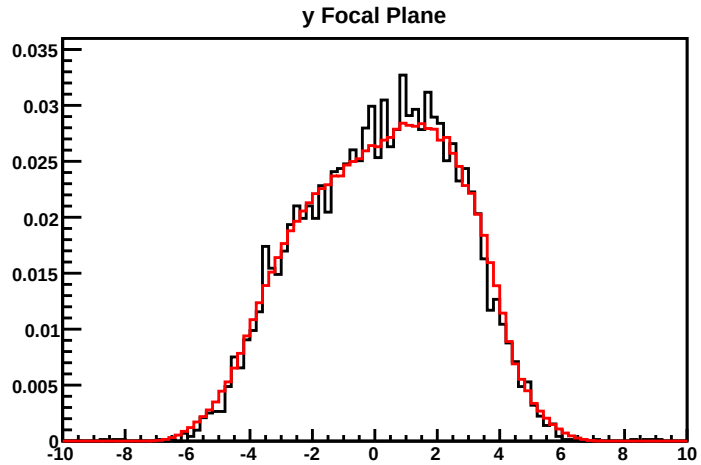


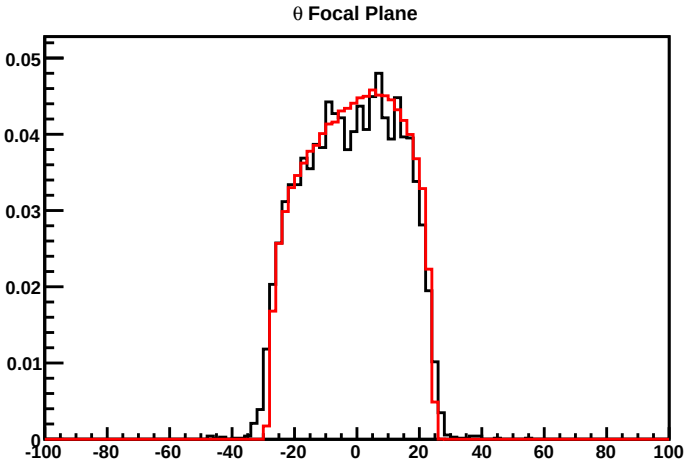


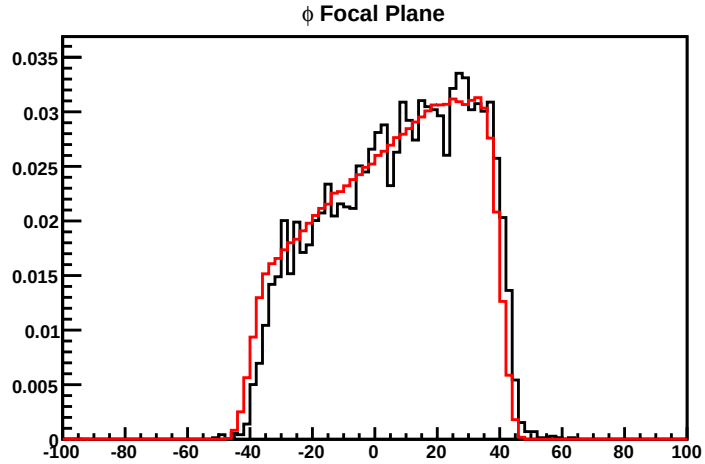
SAMC: Momentum Dependence (11)

Focal Plane Variables: E_s = 5890 MeV, E_p = 1700 MeV



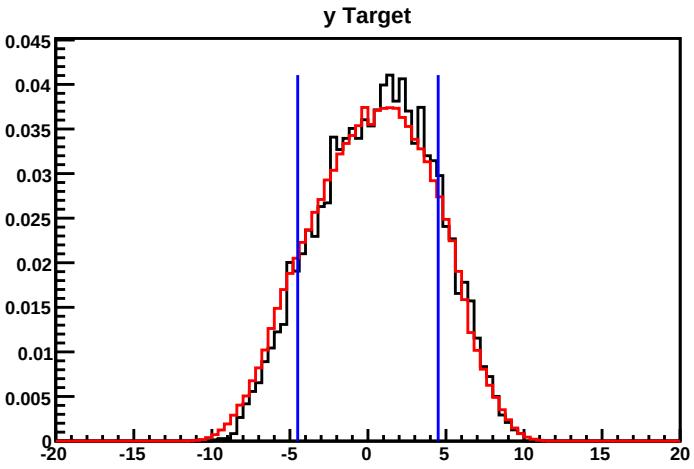


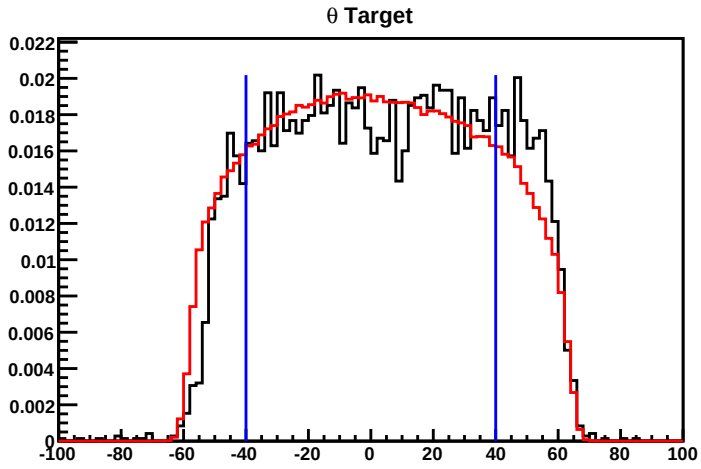


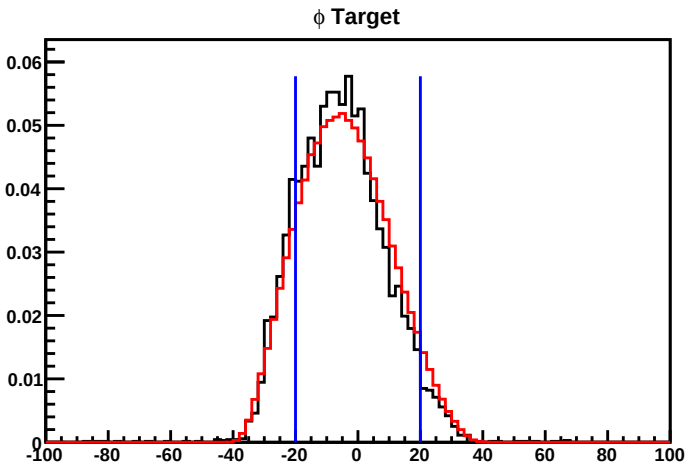


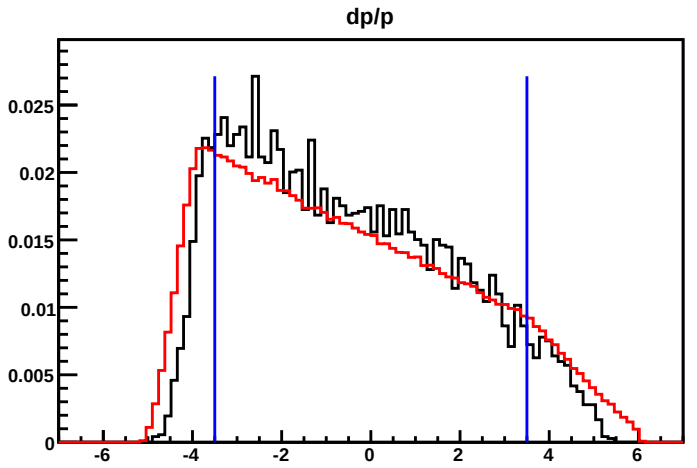
SAMC: Momentum Dependence (12)

Target Variables: E_s = 5890 MeV, E_p = 1700 MeV









Testing the 'New' Method (1)

Procedure

1. Throw a flat distribution in θ_{tg} and ϕ_{tg} larger than the LHRS acceptance. y_{tg} and $\delta p/p$ are thrown within analysis cuts (N_{trial})
2. Determine how many of those events pass to the focal plane and pass analysis cuts (N_{pass})
3. $w = \frac{N_{\text{pass}}}{N_{\text{trial}}}$
4. $d\Omega_{\text{eff}} = w\Delta\theta\Delta\phi$, where $\Delta\theta\Delta\phi$ is determined from the illuminated widths in θ_{tg} and ϕ_{tg}

- Test: Vary the illuminated width to values much larger than the nominal width and see if the resulting $d\Omega_{\text{eff}}$ changes

Testing the 'New' Method (2)

Results at E_s = 4730 MeV, E_p = 600 MeV

- Run for 15M good events (that pass to the focal plane)

Effective Solid Angle Study	
$d\Omega_{\text{illum}}$ (msr)	$d\Omega_{\text{eff}}$ (msr)
24	3.03 $\pm$ 1.46E-4
38	3.03 $\pm$ 8.90E-5

Summary

- Mismatch in x_{fp}, θ_{tg} and $\delta p/p$ seems to depend on E_p?
- The procedure to obtain the effective solid angle doesn't depend upon the size of the illuminated widths in θ_{tg} and ϕ_{tg}

What's Next?

- Acceptance
  - Mismatch in x_{fp}, θ_{tg} and $\delta p/p$
    - In SAMC: run the focal plane variables through the analyzer optics matrix and see how the target variables compare to data (code is just about done, almost ready to go)
- $\pi^{+,-}$ cross sections compared to Wiser code
  - Are there protons or other garbage contaminating the π^+ data?
  - Using our cross sections may be better for the Geant4 simulation of BigBite (?)