

2D (P_T , Φ) Unfolding – Phi

Slide 1

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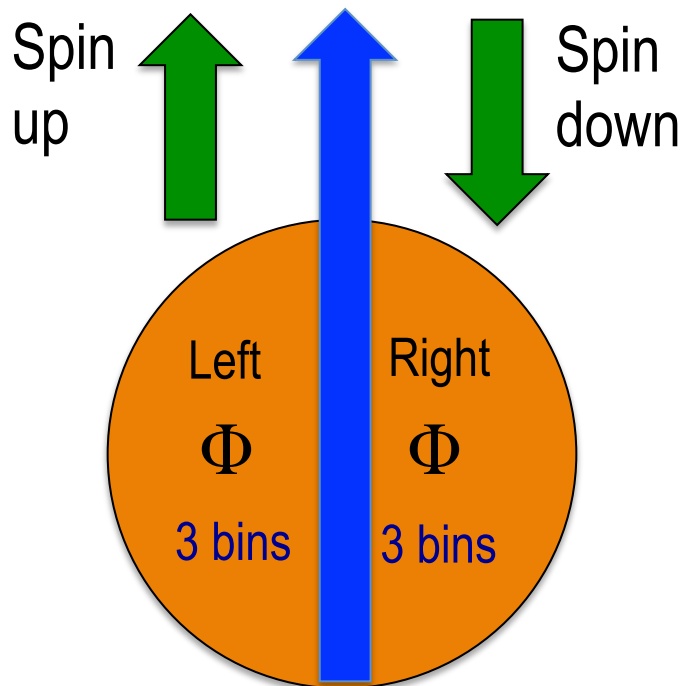
[2019/12/12 @ 15:00 KST]

Radiation Laboratory Meeting

2D (P_T , Φ) Unfolding – Phi

Slide 2

⌘ Calculate single spin asymmetry as a function of the P_T spectrum unfolded in N Φ bins. That is, left and right Φ bins as schematically depicted below.



$$A_N \cong \frac{1}{\langle \sin \rangle} * \left(\frac{N_{\Phi}^{left} - N_{\Phi}^{right}}{N_{\Phi}^{left} + N_{\Phi}^{right}} \right)$$

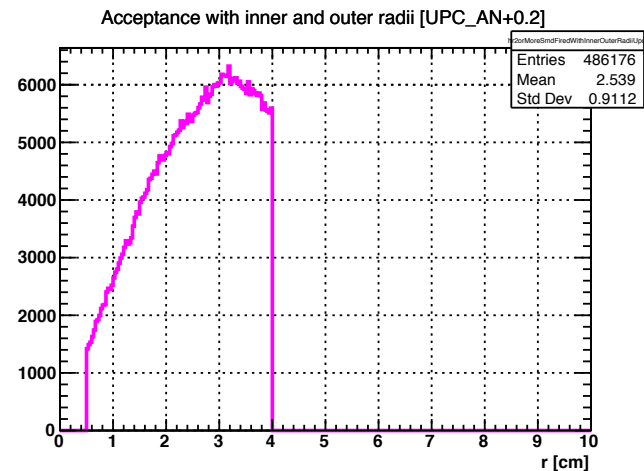
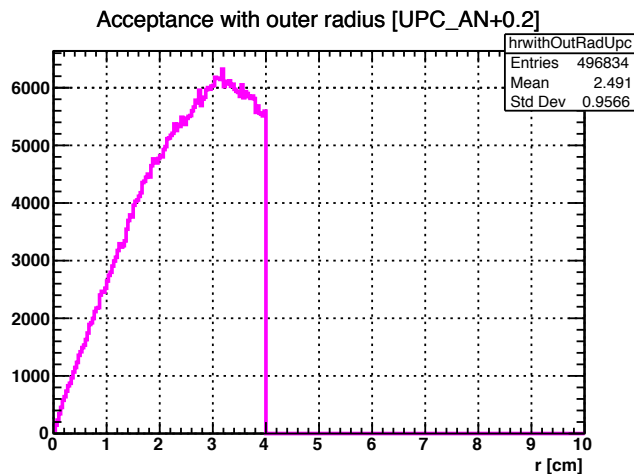
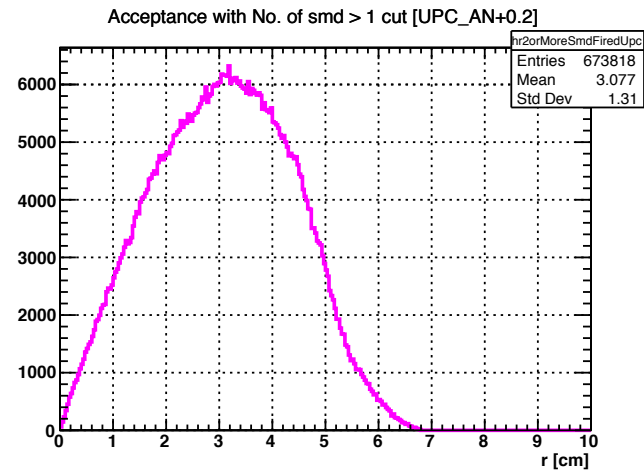
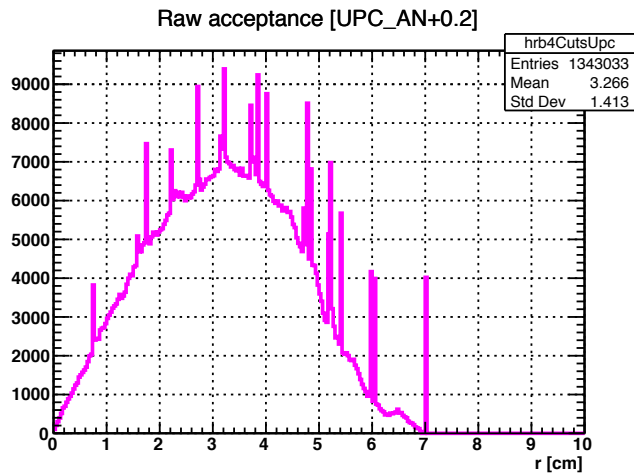
N_{Φ}^{left} : left yield

N_{Φ}^{right} : right yield

Asymmetry to be computed by measuring the yields on the left and yields on the right after properly scaling with $1/\langle \sin \rangle$.

Phi Distribution – Acceptance Cut Check

Slide 3

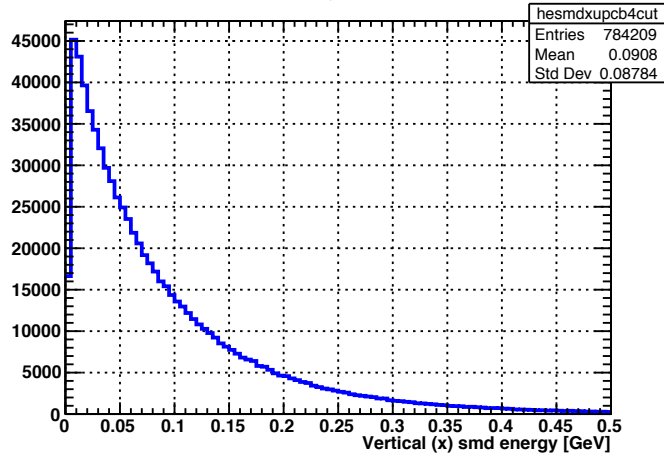


⌘ Inner and outer radii > 0.5 cm and < 4.0 cm cuts, respectively are applied as shown in the bottom right side panel.

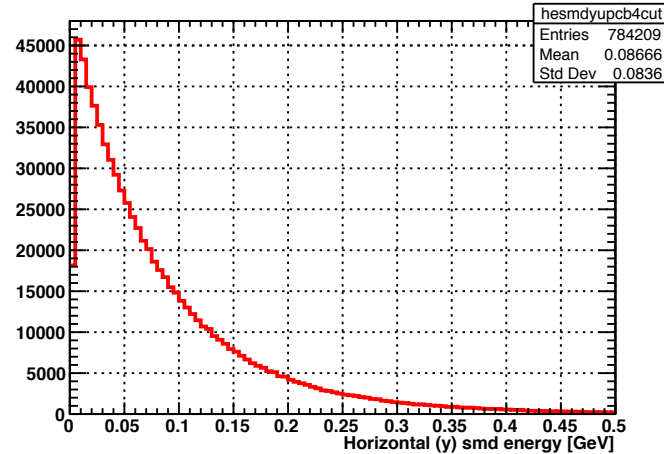
Phi Distribution - SMD Energy Check

Slide 4

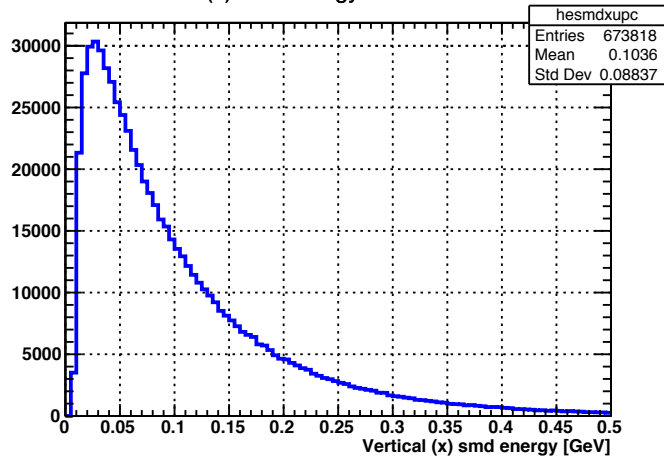
Vertical (x) smd energy before threshold cut



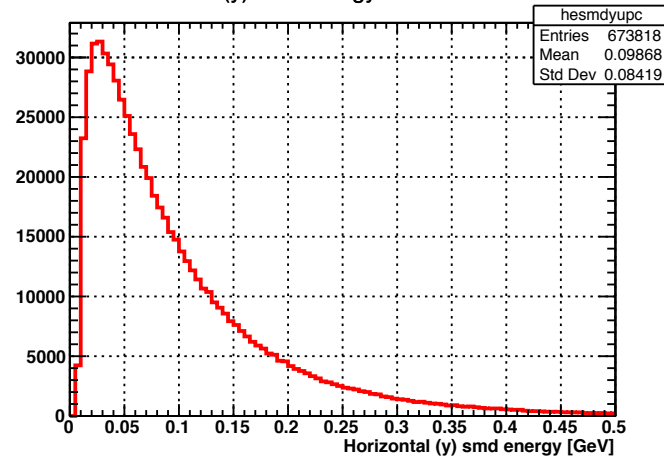
Horizontal (y) smd energy before threshold cut



Vertical (x) smd energy after threshold cut



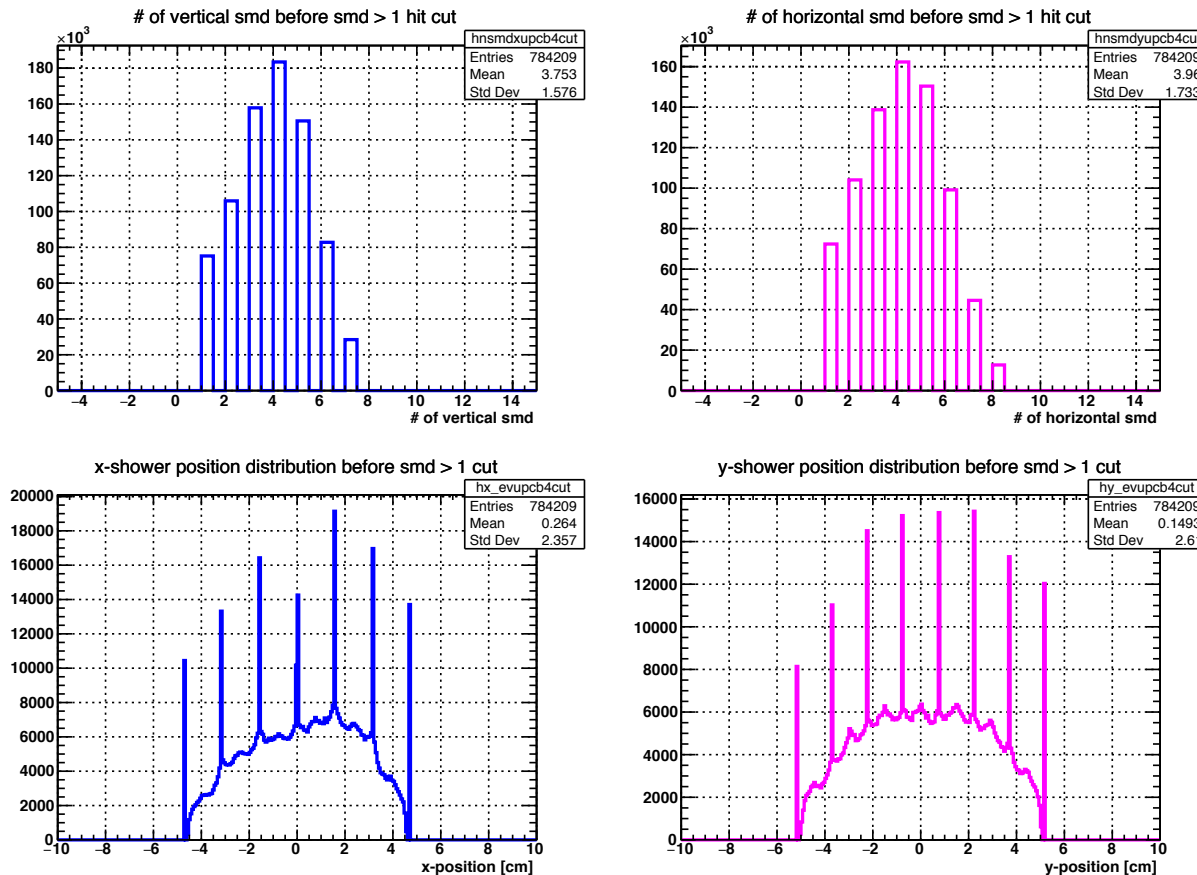
Horizontal (y) smd energy after threshold cut



Phi Distribution - SMD XY Position Check

Slide 5

© Top panels depict # of fired vertical, N_x , (left) and horizontal, N_y , (right) smd **before** applying $N_x(N_y) > 1$ hit cut.

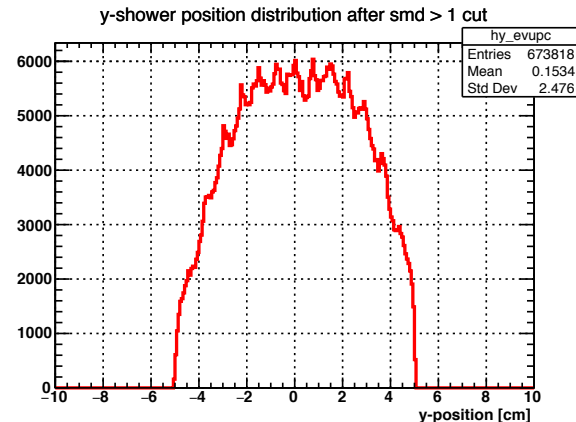
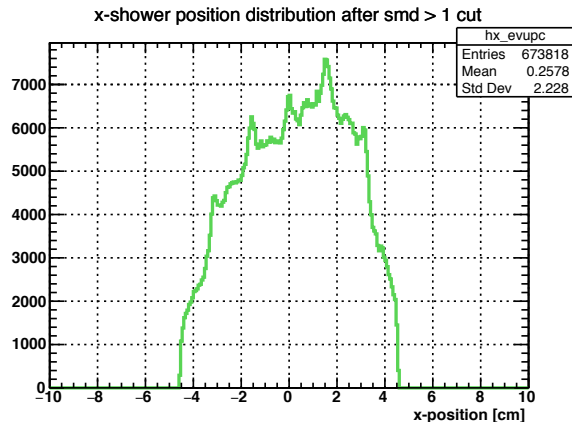
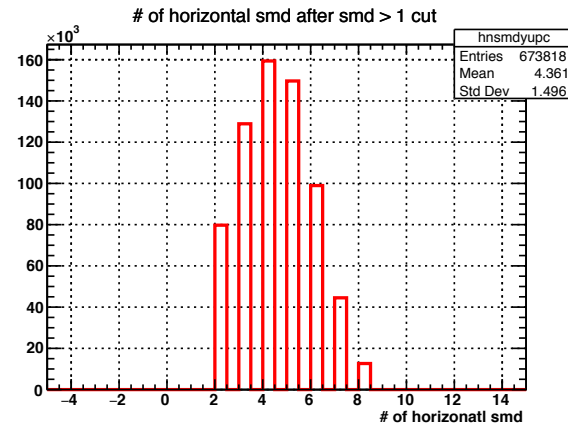
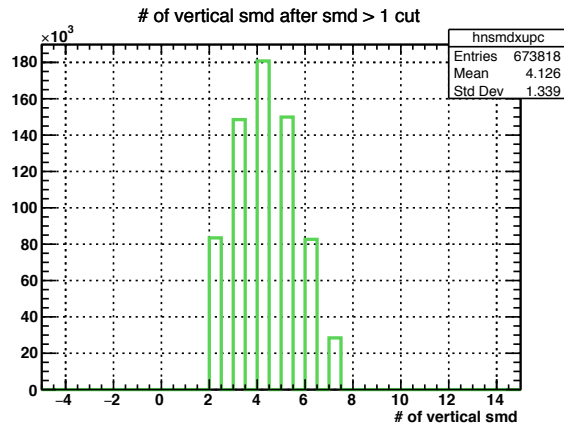


© Bottom panels are x (left) and y (right) particle position distributions before smd cut, N_x & $N_y > 1$ fired strips above the SMD threshold, $E = 0.003$ GeV is applied. The spikes $x = 7$ and $y = 8$ are smd strips.

Phi Distribution - SMD XY Position Check

Slide 6

© Top panels display the number of vertical, N_x , (left) and horizontal, N_y , (right) smd after applying $N_x(N_y) > 1$ hit cut.

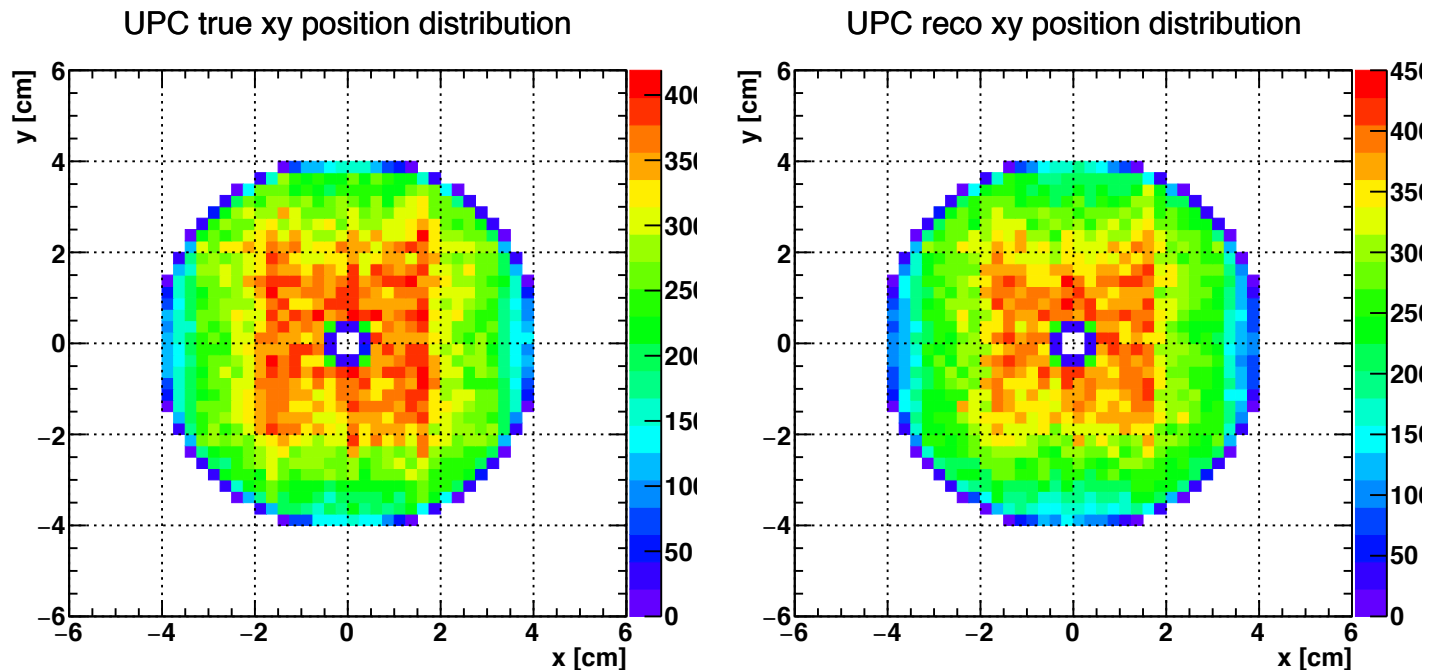


© Bottom panels are x (left) and y (right) particle position distributions after smd cut $N_x/N_y > 1$ fired strips above the SMD threshold, $E = 0.003$ GeV is applied. The SMD spikes in the x and y distributions have now been eliminated.

Phi Distribution - 2D XY Position Check

Slide 7

2D true (left) and reco (right) xy distributions for un-polarized UPC

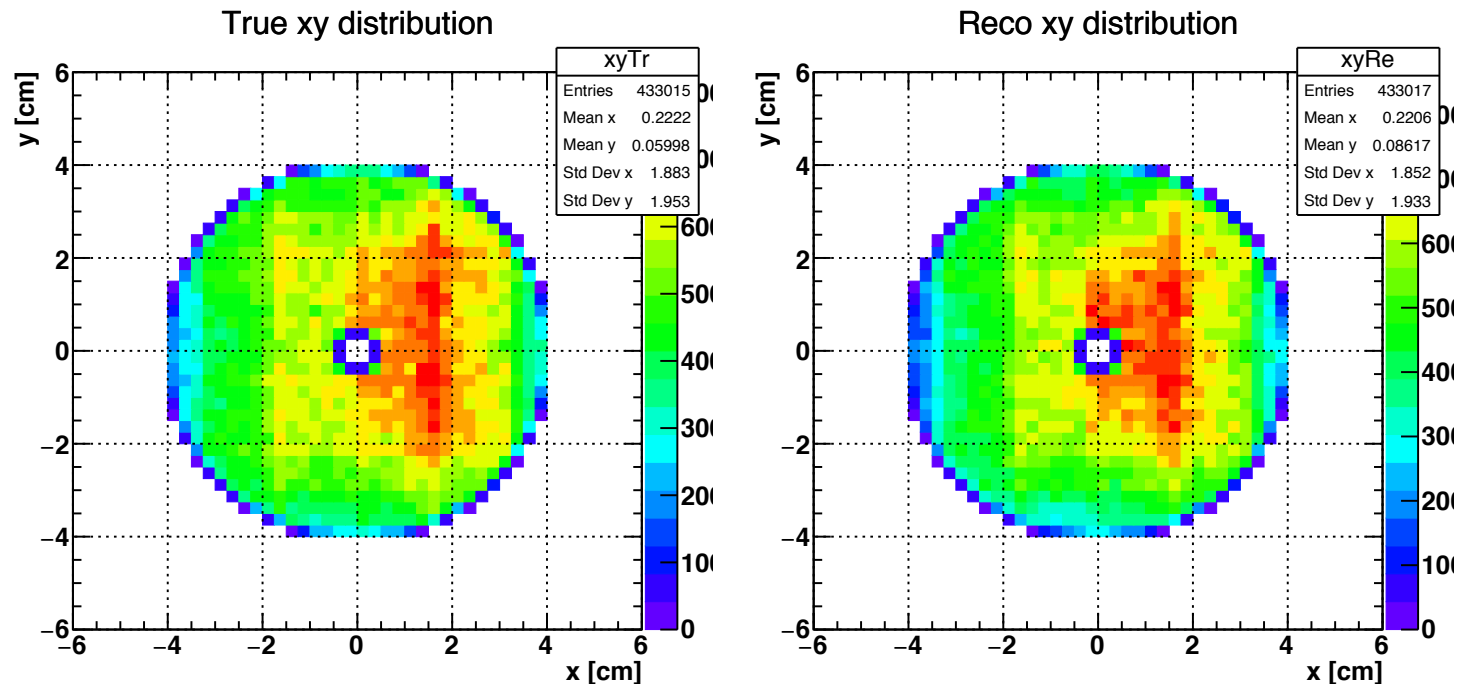


Net asymmetry is zero as the yield in the left and right Φ bins cancel out.

Phi Distribution - 2D XY Position Check

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True (left) and reco (right) 2D xy distributions for polarized UPC



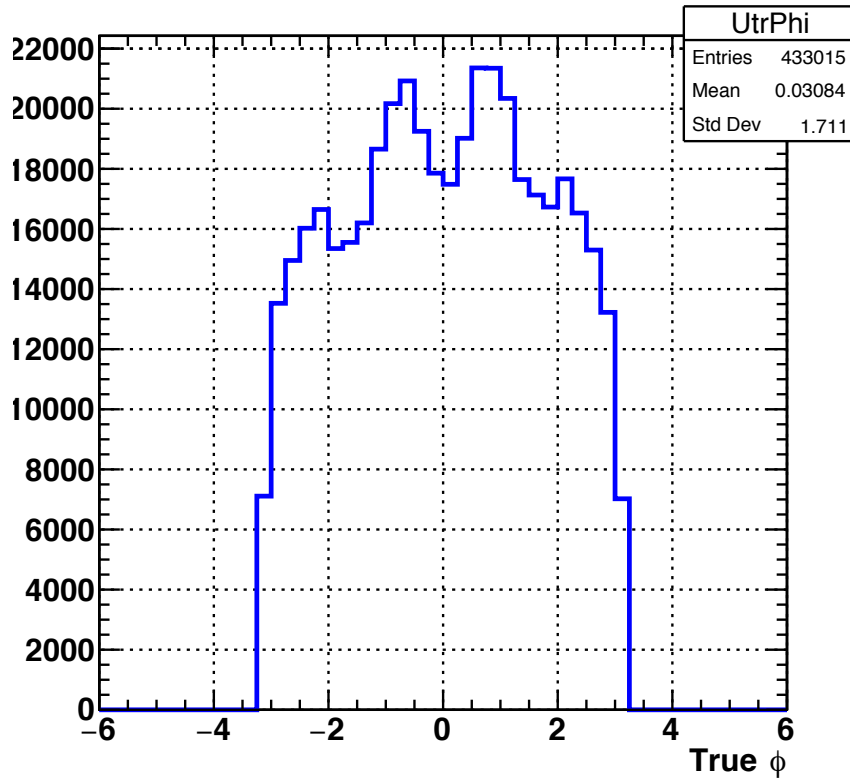
Overall net asymmetry exists and we aim to calculate this A_N in later analysis

Phi Distributions

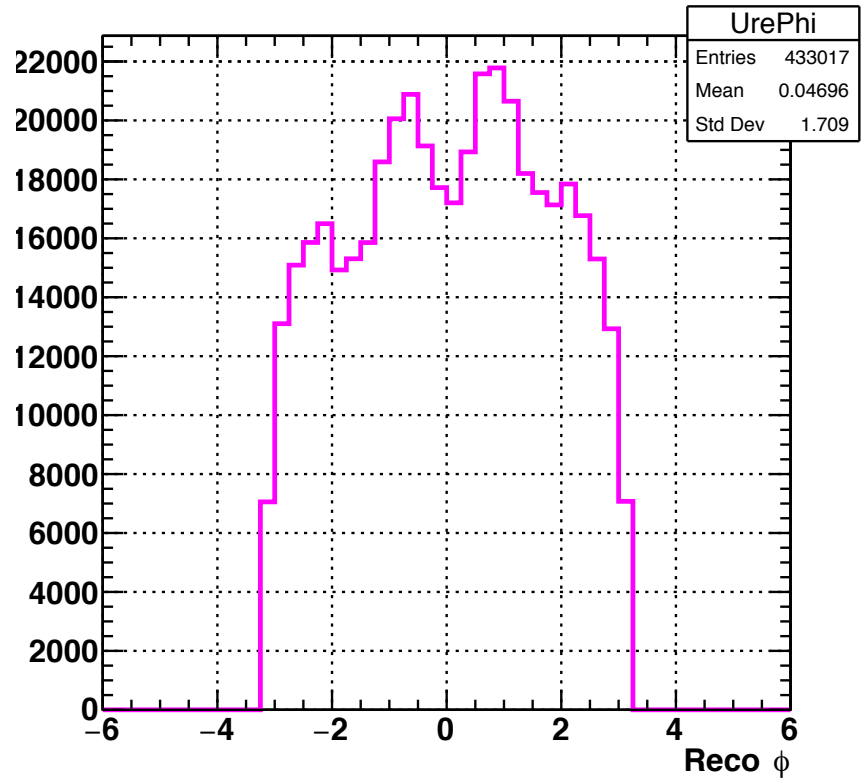
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True and reco phi distributions

True ϕ distribution



Reco ϕ distribution

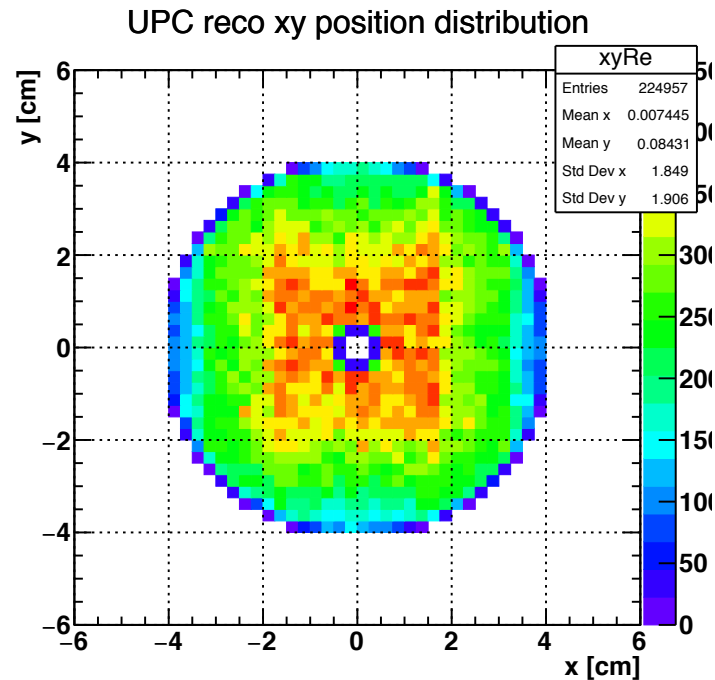
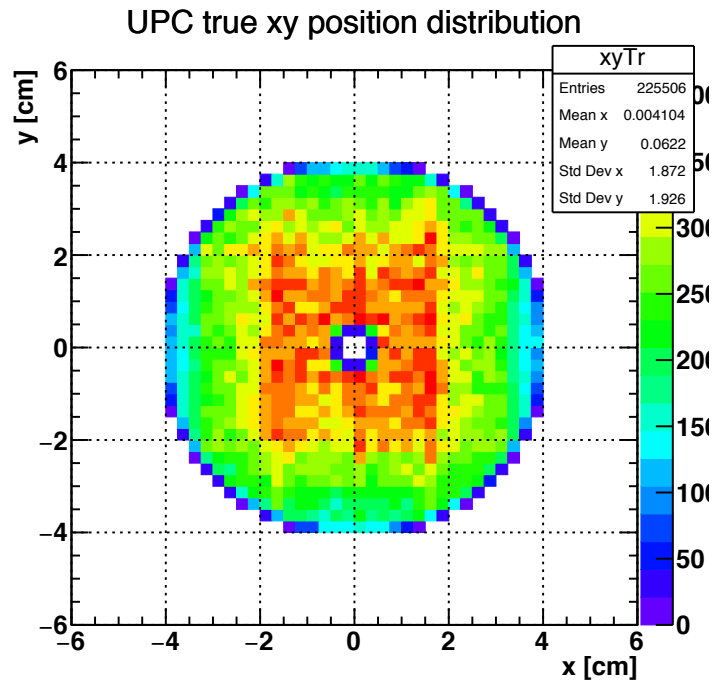


BACKUP

2D XY Position Distributions – Un polarized UPC

Slide 1

With statistics box

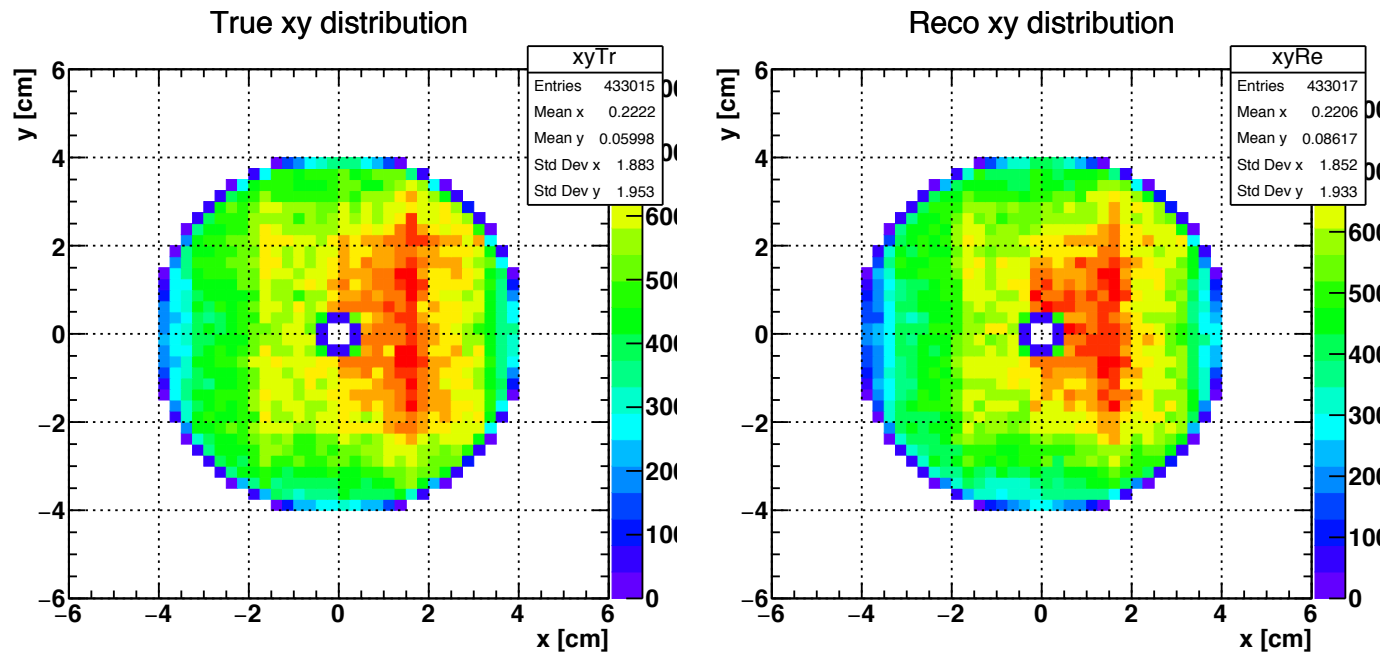


Net asymmetry is zero as the yield in the left and right Φ bins cancel out.

2D XY Position Distributions – Polarized UPC_AN

Slide 2

With statistics box



⌘ Overall net asymmetry exists and we aim to calculate this A_N in later analysis.