

More Binning

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University of Regina

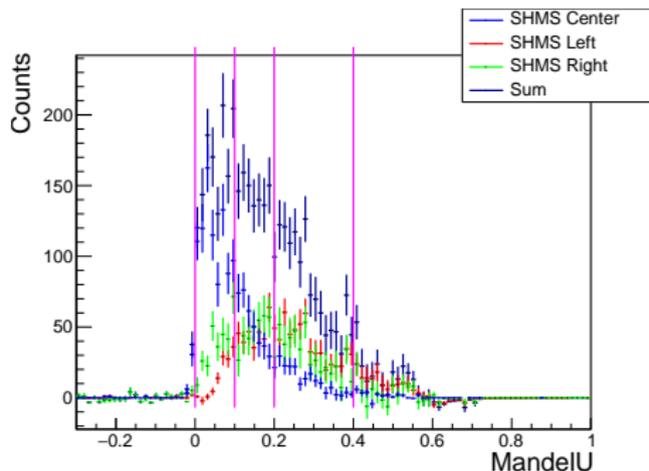
KaonLT Experiment, Jefferson Lab Hall C



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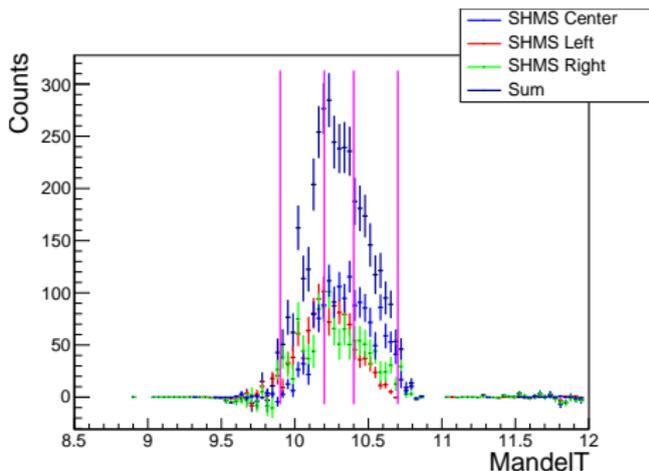
- Tighter cut $0.75 < \text{MMp} < 0.85$ in kinematic histograms
- Shift bin borders to smaller $-u$



$-u$ low	$-u$ high	Counts	L	C	R
0.0	0.1	1317.58	110.059	905.521	301.995
0.1	0.2	1321.13	403.697	484.686	432.747
0.2	0.4	1280.2	603.386	200.133	476.677

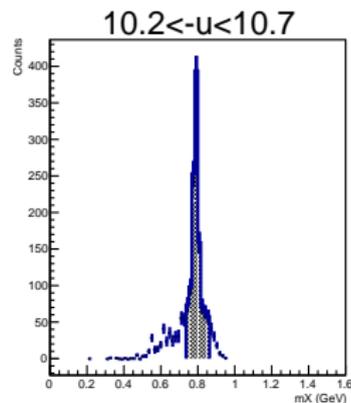
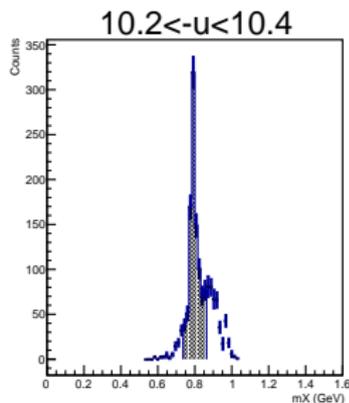
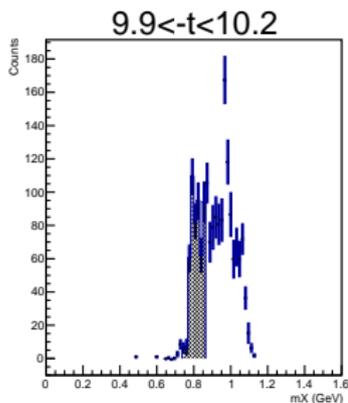
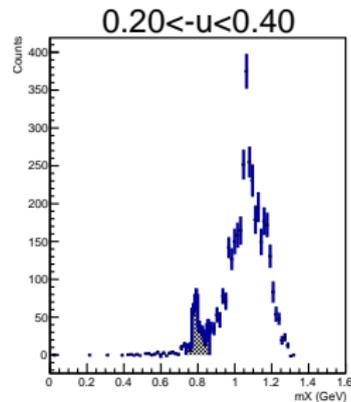
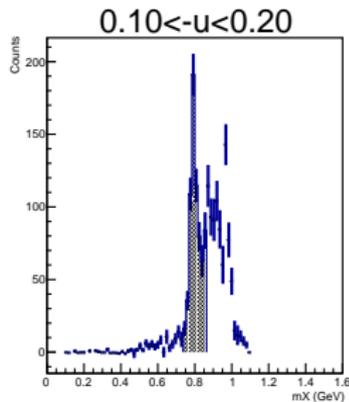
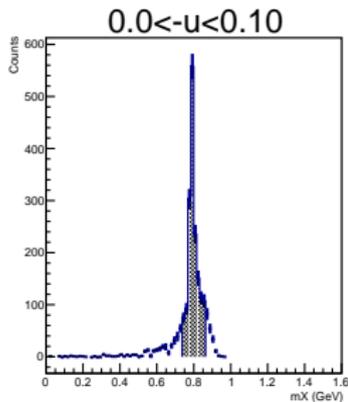


- Tighter cut $0.75 < \text{MMp} < 0.85$ in kinematic histograms
- Try binning in $-t$ instead of $-u$



$-t$ low	$-t$ high	Counts	L	C	R
9.9	10.2	1322.15	518.517	345.409	458.224
10.2	10.4	1706.31	536.707	695.244	474.354
10.4	10.7	1164.4	202.757	624.557	337.082

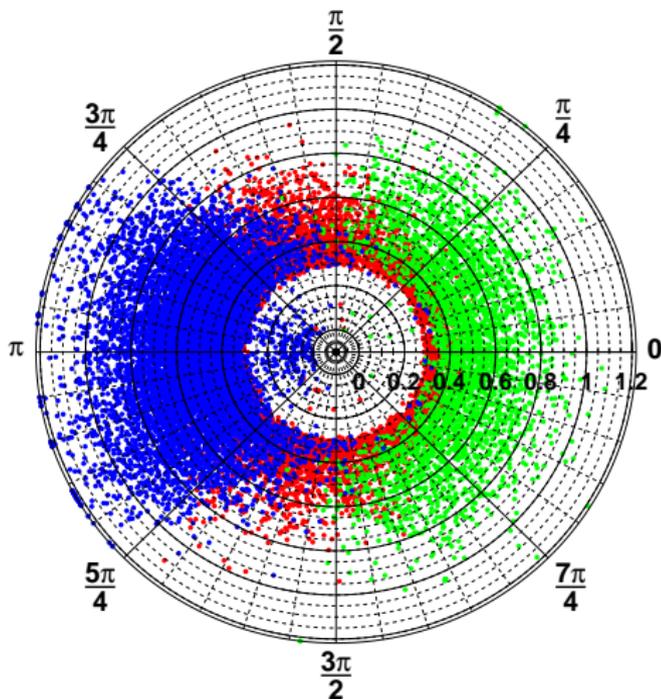
Pass 2&3: u - vs t -Binning (all ϕ , SHMS Center)



Check 1: $u - \phi$ Scatter Plot



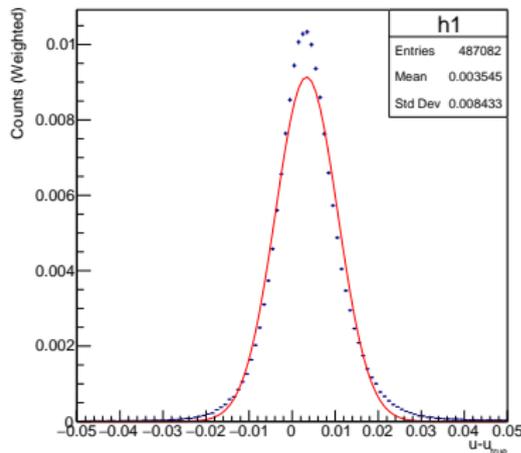
- Radial coordinate
 $-u + 0.3$
- Looking for u at which there is no longer full ϕ coverage
- Data shown here are: subject to strict AGC, HGC, and MMp cuts
- Data shown here are *not*: random, dummy target, or physics background-subtracted



Roughly: coverage seems patchy after $r=0.6 / -u=0.3$



- Plot (reconstructed - true) value of u
- $\sigma = 0.00843$ GeV (ROOT)
- $\sigma = 0.00722$ GeV (Gaussian fit)

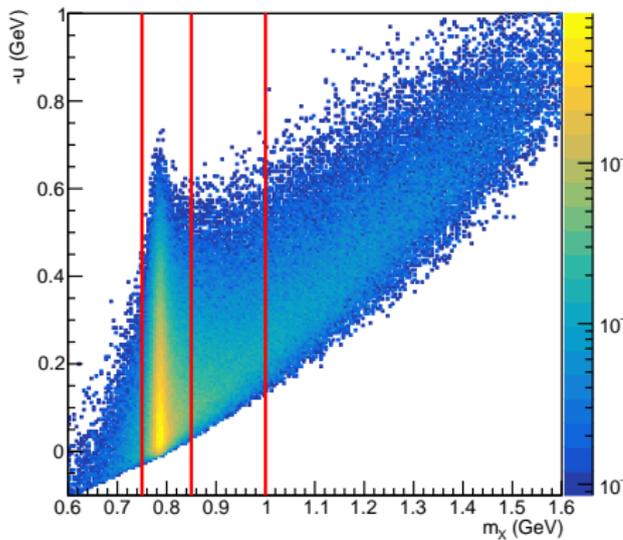


Not an issue, with my statistics bins will be least 10x this wide

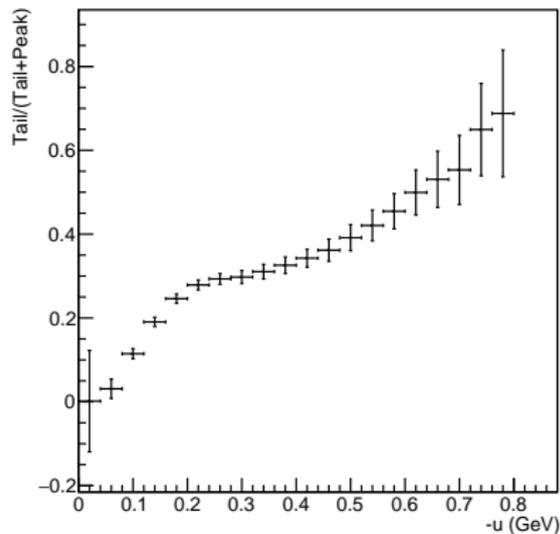
Check 3: Prominence of Radiative Tail



Omega SIMC

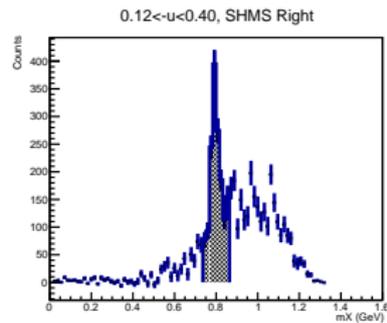
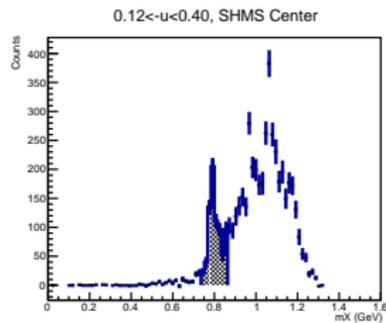
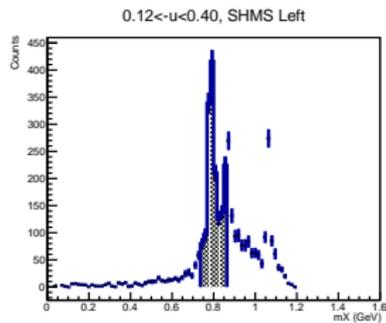
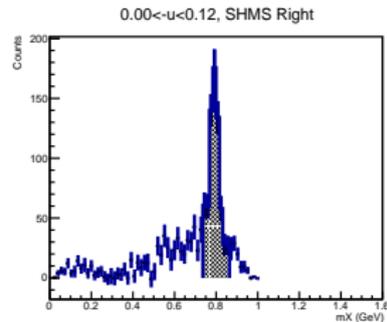
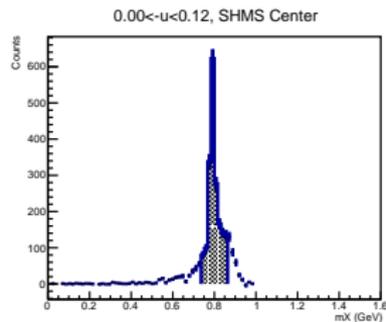
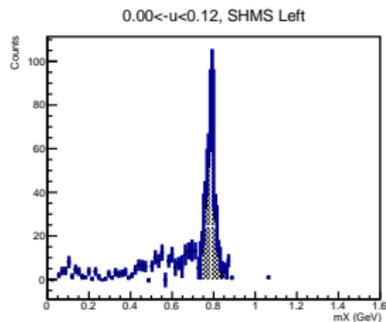


Radiative Tail Fraction

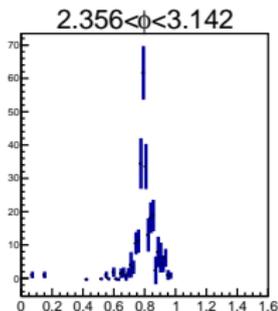
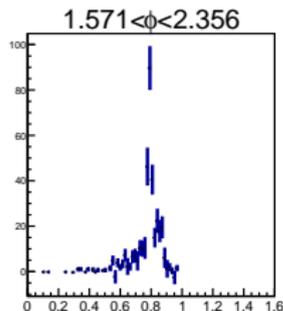
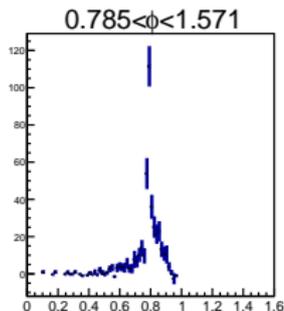
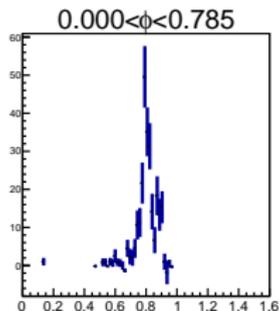
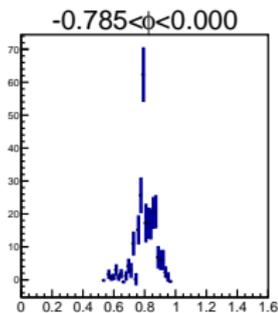
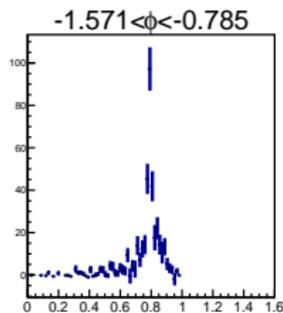
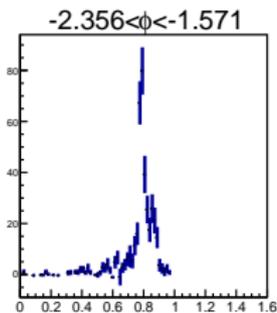
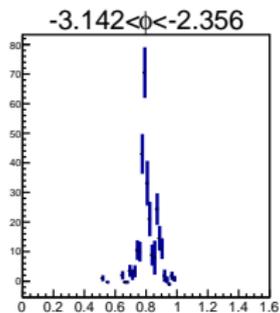


ϕ coverage fails sooner than the radiative tail takes over

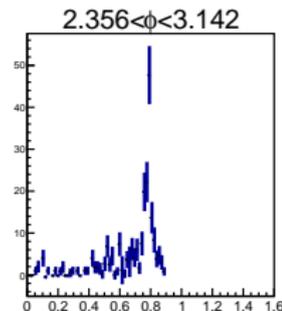
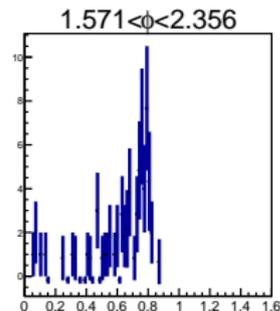
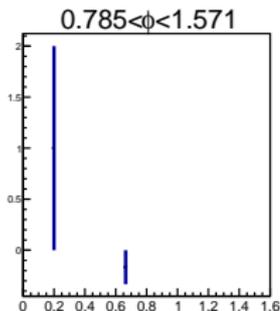
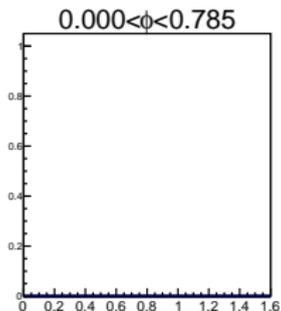
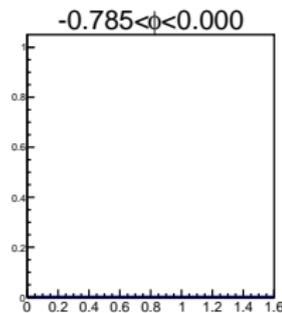
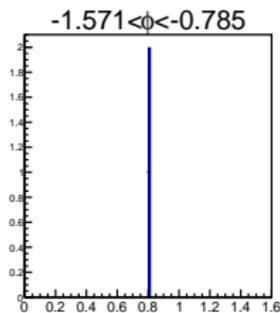
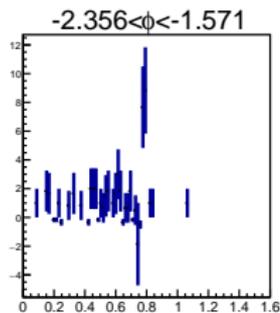
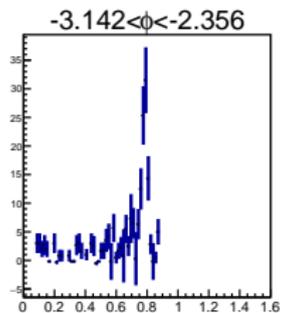
Pass 4: Try 2 u -Bins



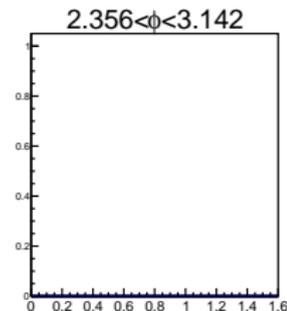
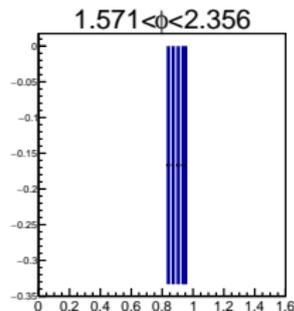
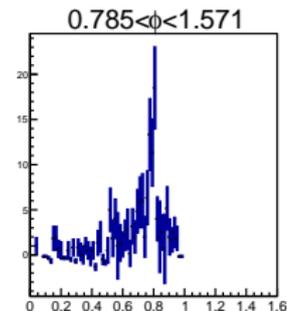
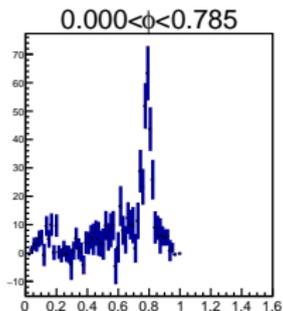
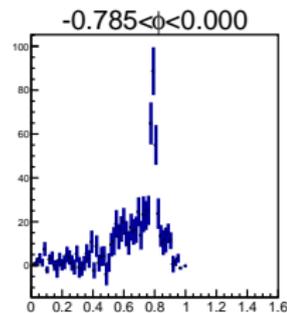
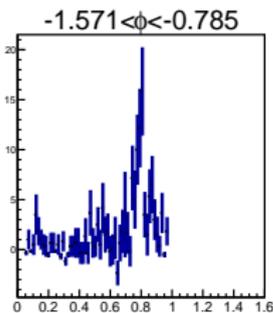
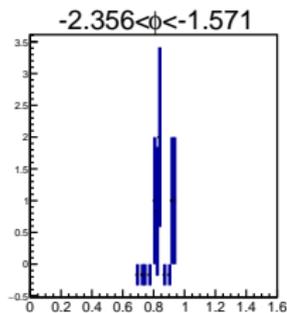
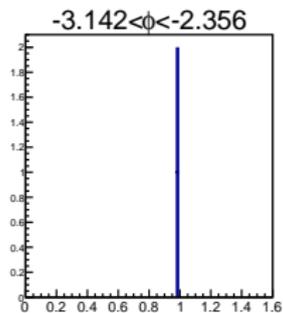
Pass 4: SHMS Center, $0.0 < u < 0.12$



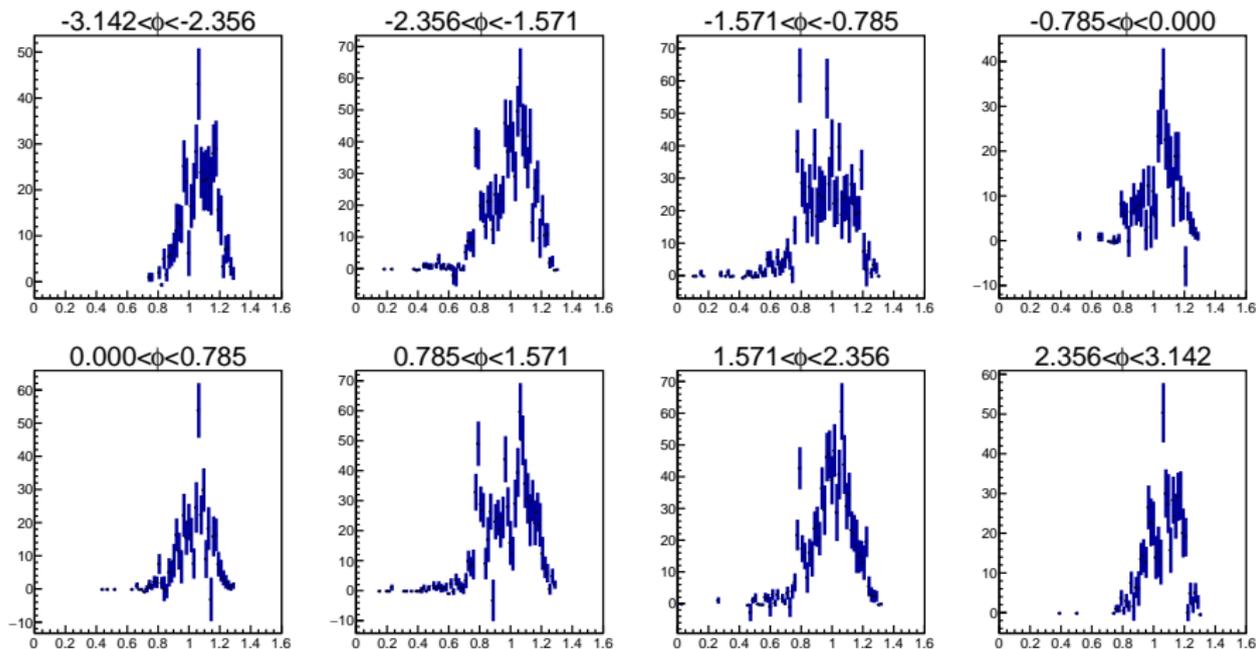
Pass 4: SHMS Left, $0.0 < u < 0.12$



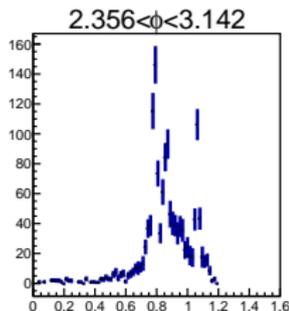
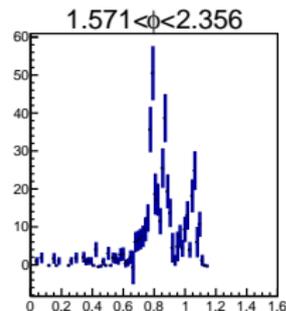
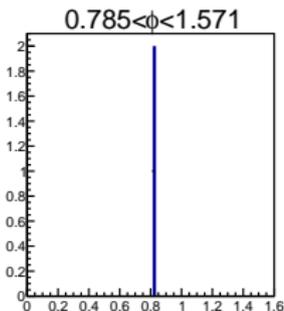
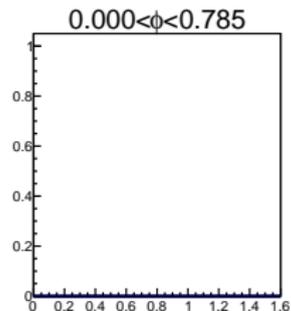
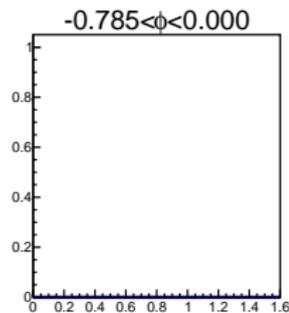
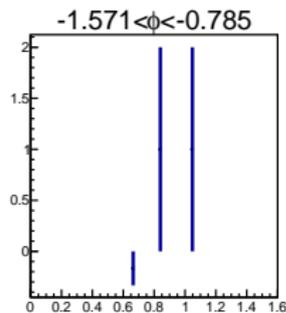
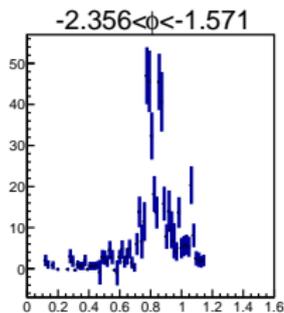
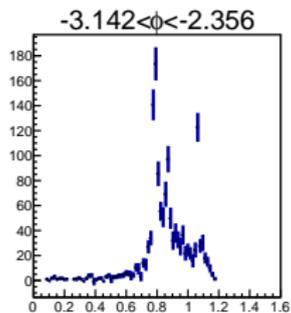
Pass 4: SHMS Right, $0.0 < u < 0.12$



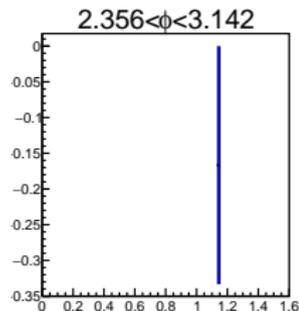
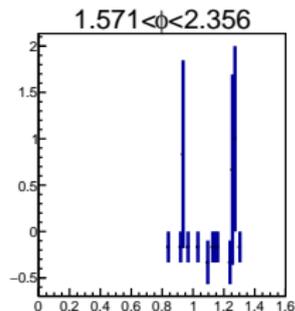
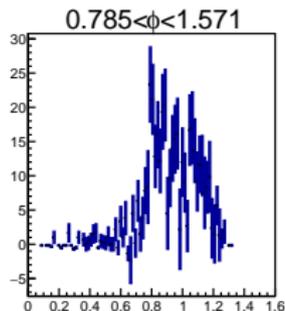
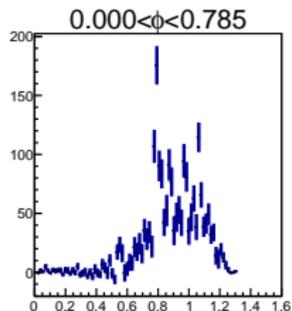
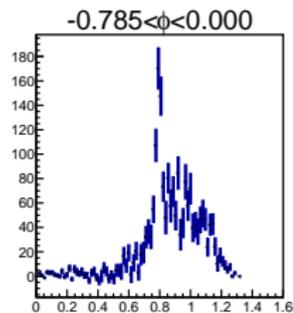
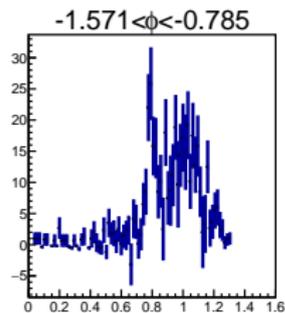
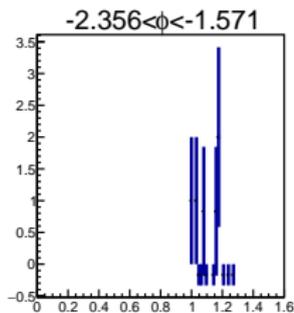
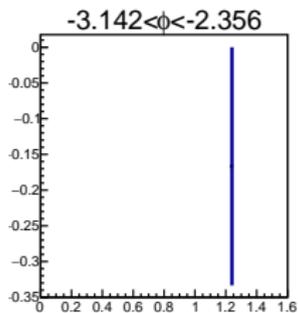
Pass 4: SHMS Center, $0.12 < u < 0.40$



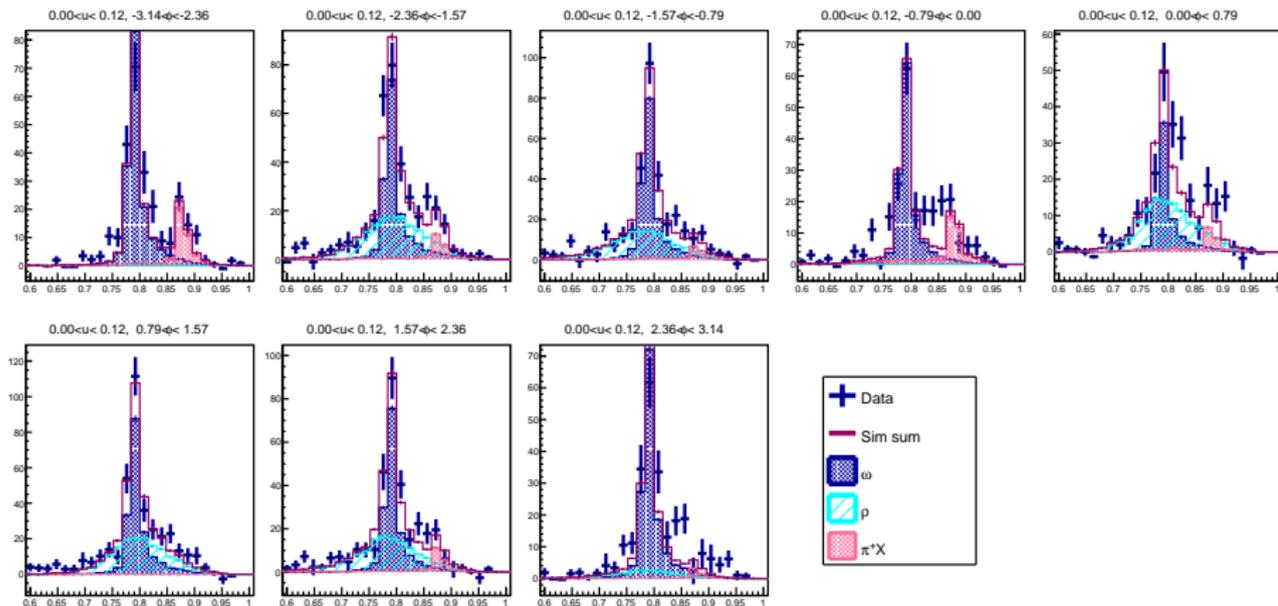
Pass 4: SHMS Left, $0.12 < u < 0.40$



Pass 4: SHMS Right, $0.12 < u < 0.40$

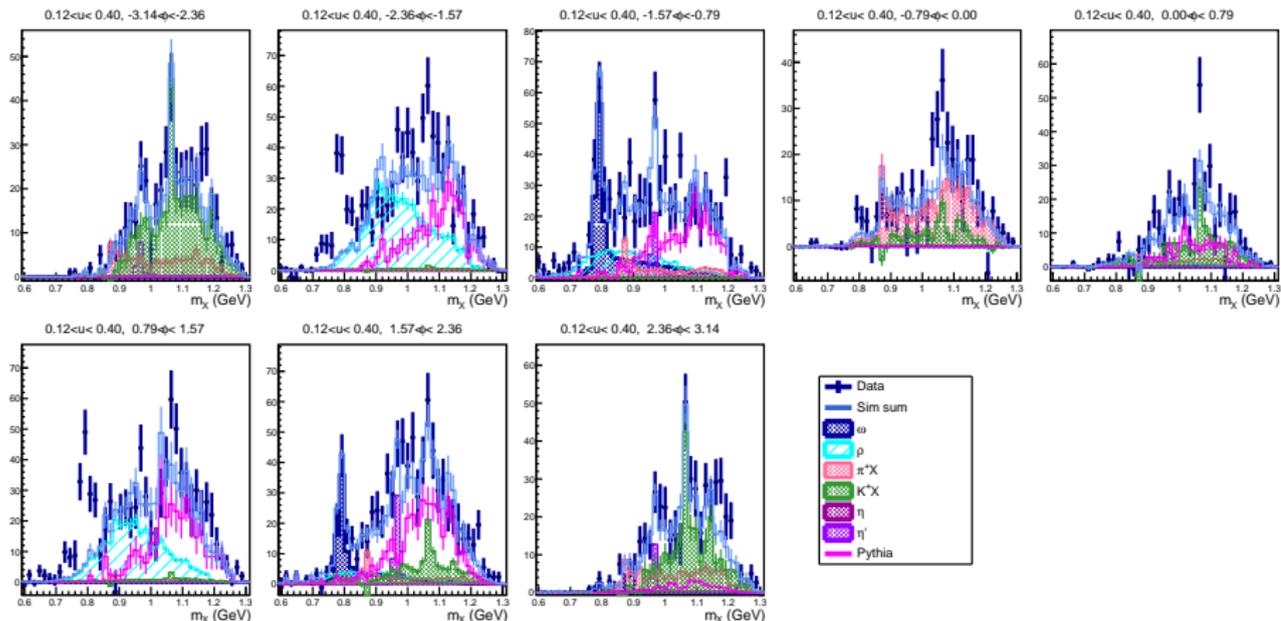


Binned Shape Study: SHMS Center, $0.00 < u < 0.12$



- Because of different u -dependence of various physics channels, not all processes contribute
- Need to consider ω , ρ , and π^+ leaktthrough

Binned Shape Study: SHMS Center, $0.12 < u < 0.40$



- All background processes included
- Odd shape of K^+ leakthrough $\rightarrow K^+$ also has π^+ contamination
- Statistical errors on Pythia and data K^+ sample make ROOT fitting less reliable



- Low statistics, many sources of systematic uncertainty
- Will try $K^+ \Lambda$ MC instead of data sample
- Now looking at low ϵ for same Q^2 , W
- Running more Pythia - u -binning makes it even less efficient, but the u -dependence appears accurate
- Meeting with Bill next Tuesday morning
- Will eventually want to try Gabriel's background subtraction framework for the u -channel