

Dijets and Azimuthal Correlations

Magnus Hansson

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Outline

→ Motivation and Selection

→ Control Plots

→ Azimuthal jet correlations

→ $\frac{d\sigma}{dQ^2 dx}$, $\frac{d\sigma}{dQ^2 dx dE_{T,max}}$, $\frac{d\sigma}{dQ^2 dx d|\Delta\eta^*|}$ compared to published 96/97 data

→ Summary

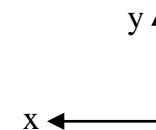
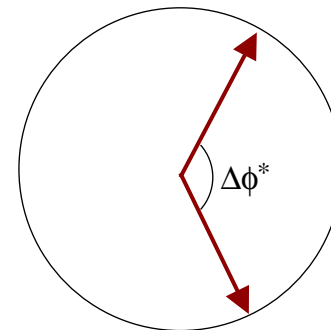
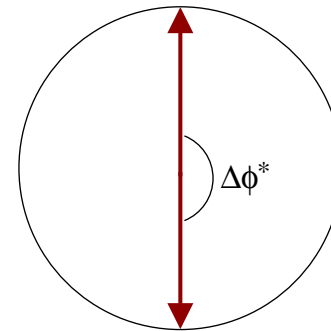
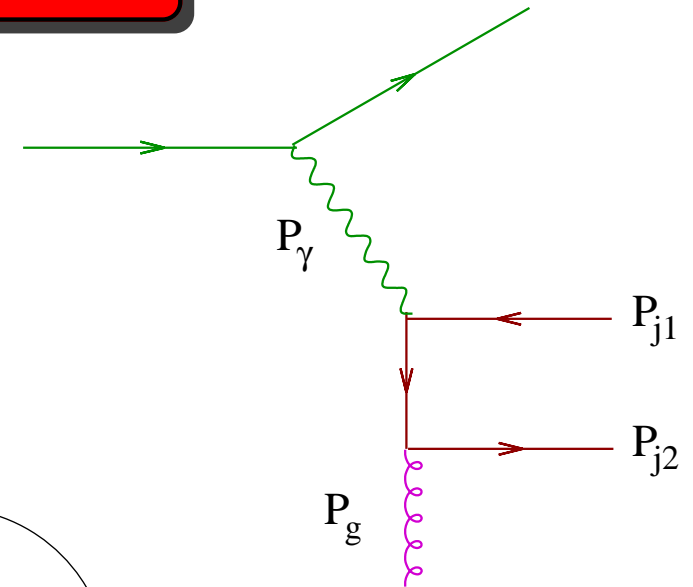
Motivation And Selection

$$P_g = P_{j1} + P_{j2} - P_\gamma$$

$$\begin{aligned} \Rightarrow k_t^{*2} &= (p_{t1}^* + p_{t2}^*)^2 \\ &= p_{t1}^{*2} + p_{t2}^{*2} + 2|p_{t1}^*||p_{t2}^*|\cos\Delta\phi^* \end{aligned}$$

$$k_t^* = 0 \Rightarrow \Delta\phi^* = 180^\circ$$

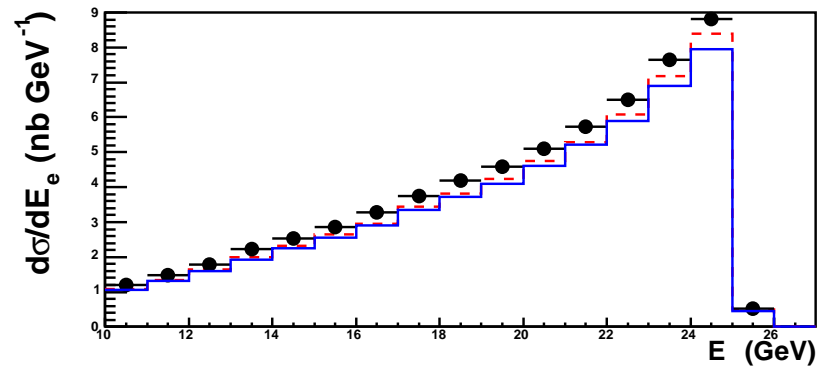
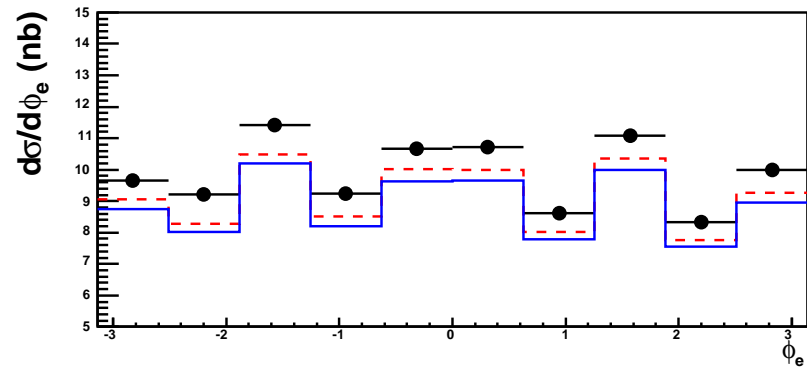
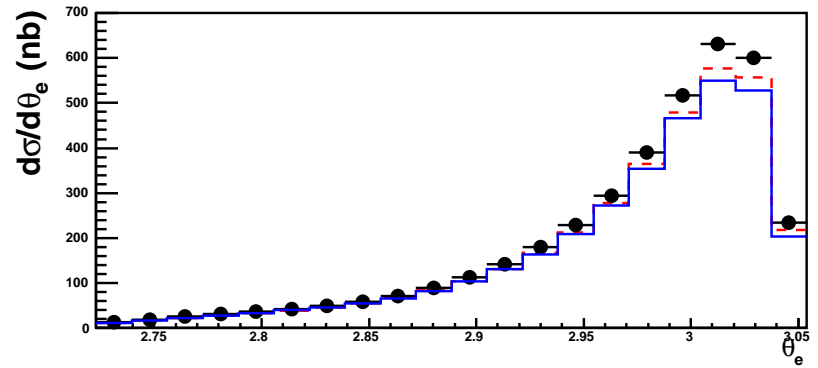
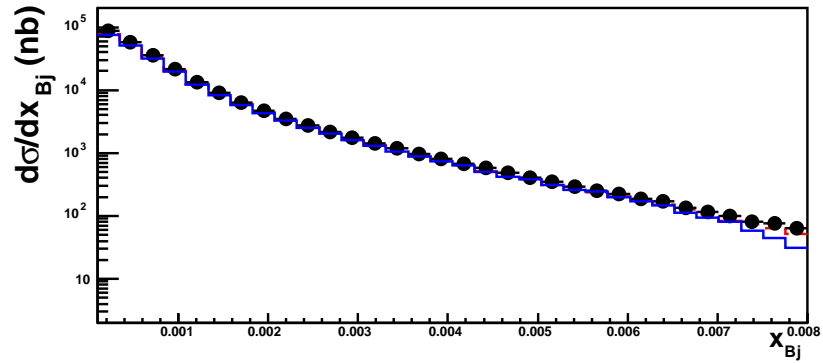
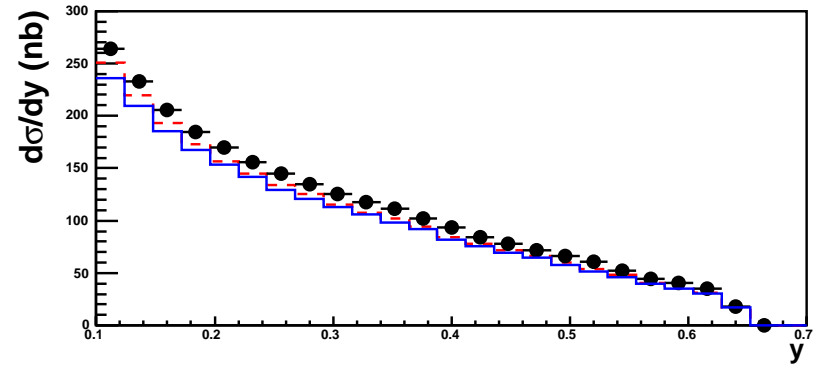
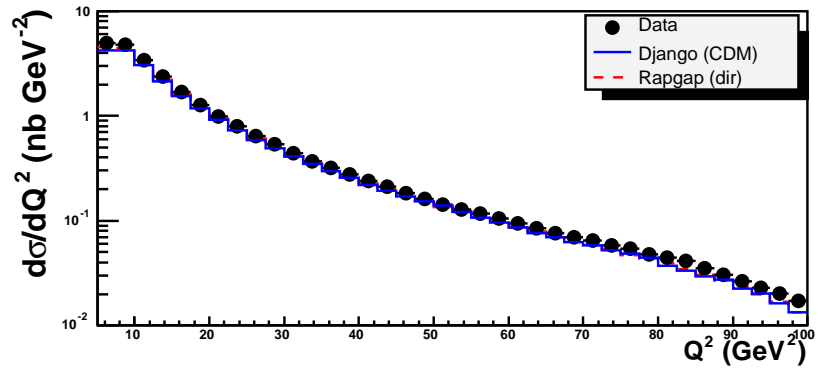
$$k_t^* \neq 0 \Rightarrow \Delta\phi^* < 180^\circ$$



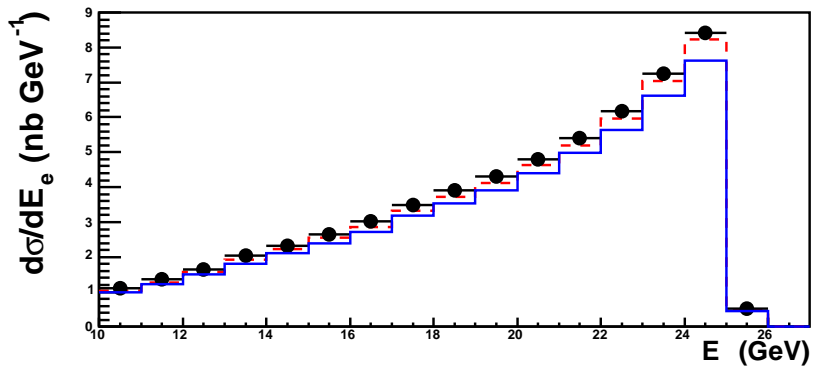
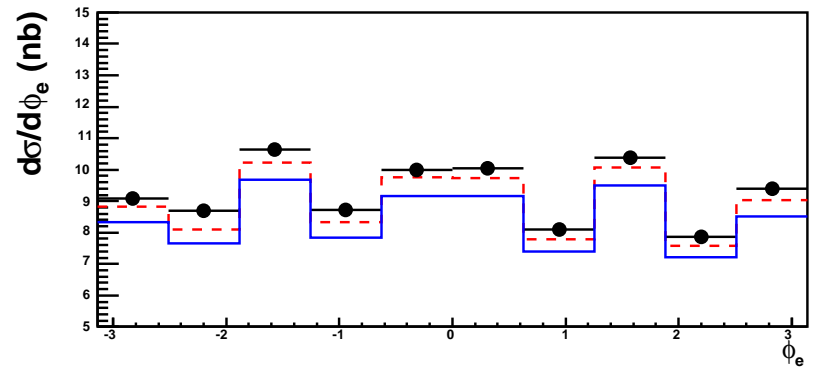
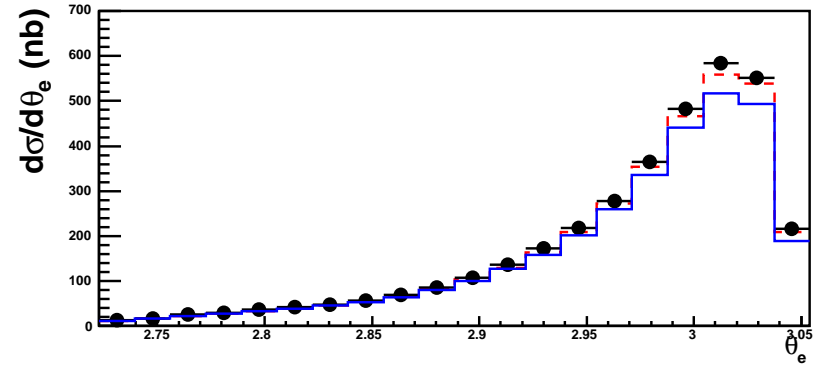
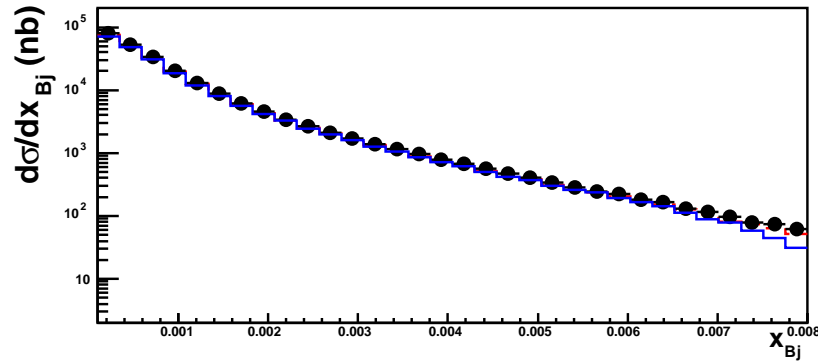
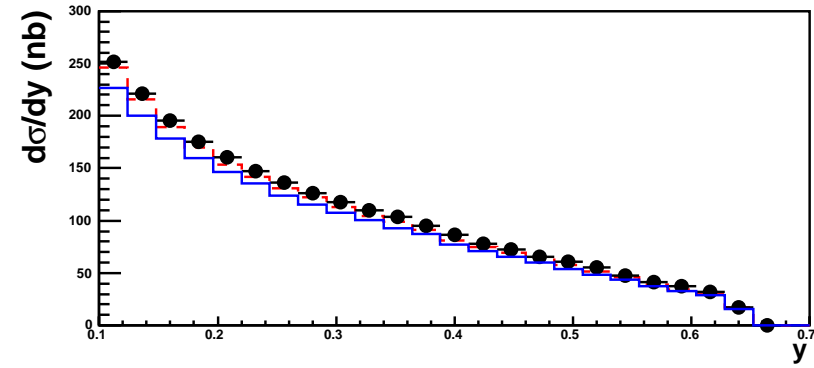
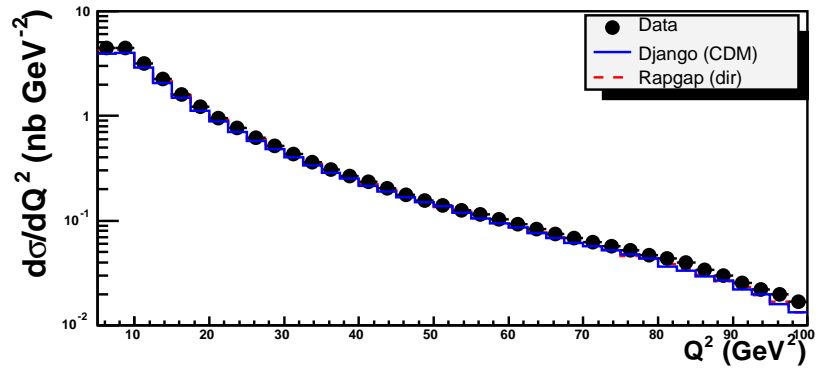
Motivation And Selection

	DIS Cuts			Dijet Cuts	
$5 \text{ GeV}^2 <$	Q^2	$< 100 \text{ GeV}^2$	$-1 <$	η_j	< 2.5
$0.1 <$	y	< 0.7	$5 \text{ GeV} <$	$E_{\perp j1,2}^*$	
$10^{-4} <$	x_{Bj}	$< 10^{-2}$		Sort in η	
$9 \text{ GeV} <$	E_e				
$156^\circ <$	θ_e	$< 175^\circ$			
$35 \text{ GeV} <$	$E - p_z$	$< 70 \text{ GeV}$			
	$ z_{vtx} $	$< 35 \text{ cm}$			
	R_{clus}	$< 3.5 \text{ cm}$			
	E_{had}	$< 0.5 \text{ GeV}$			
	E_{veto}	$< 1.0 \text{ GeV}$			

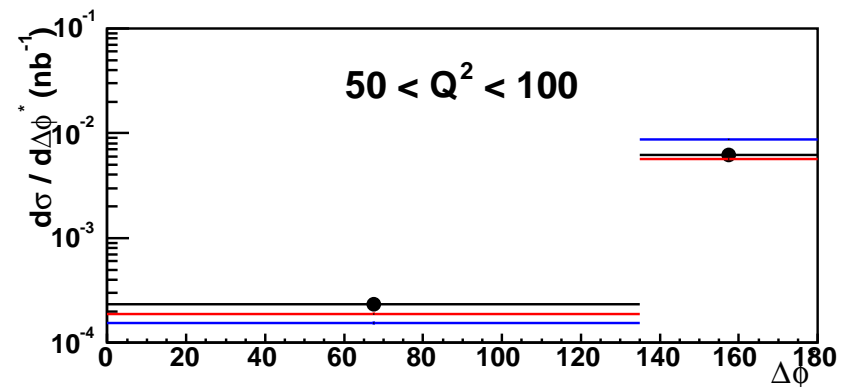
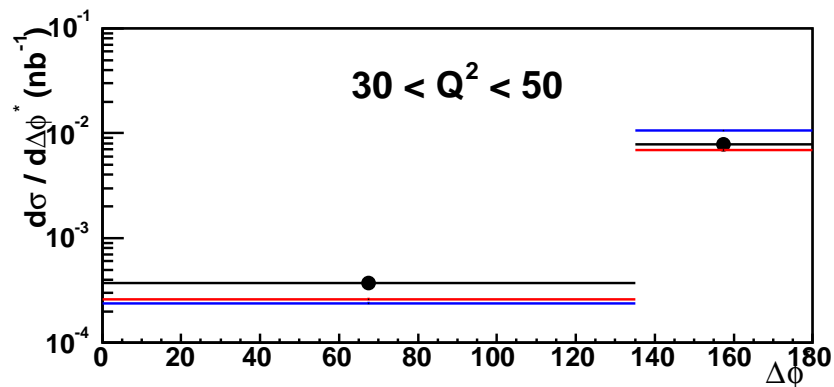
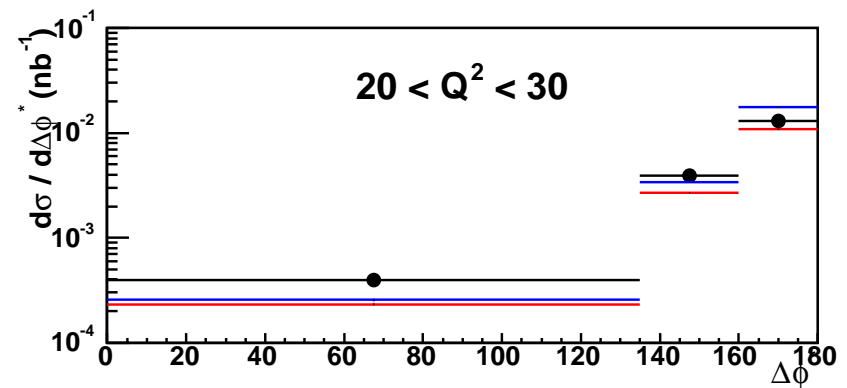
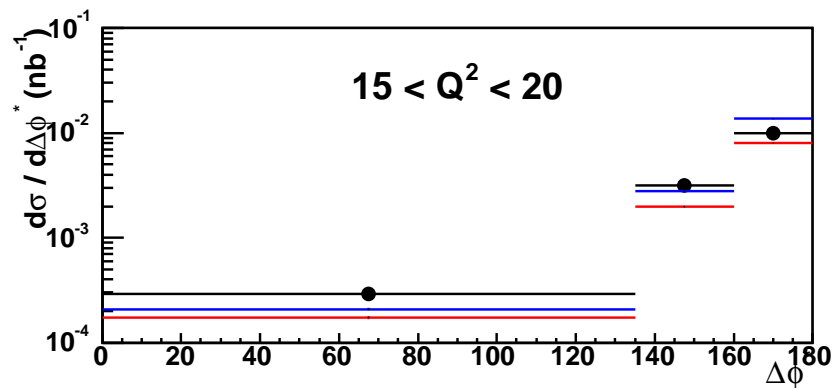
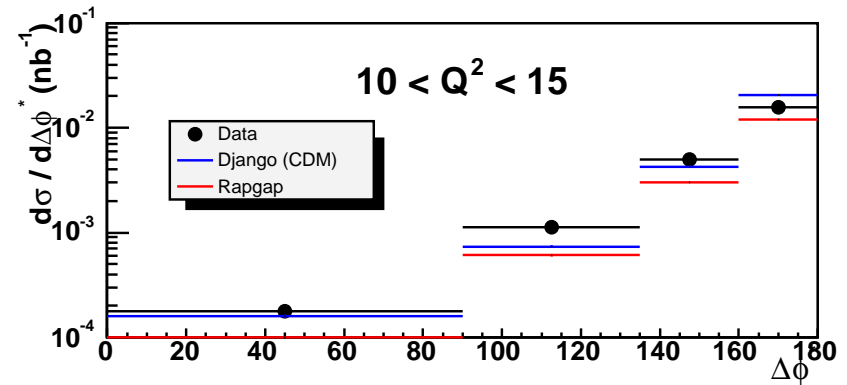
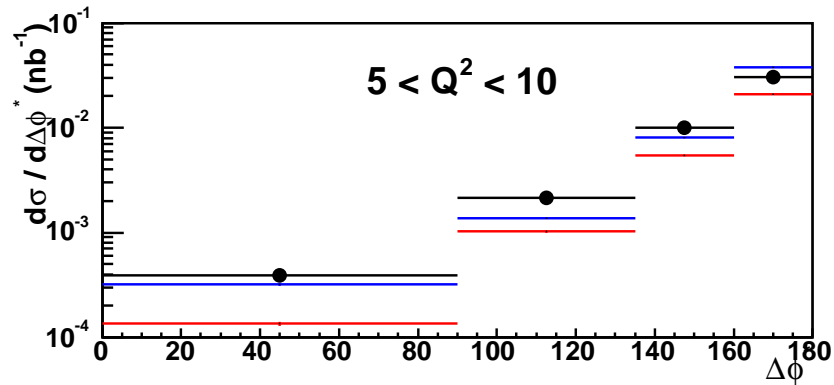
Control Plots, No Bg-finder



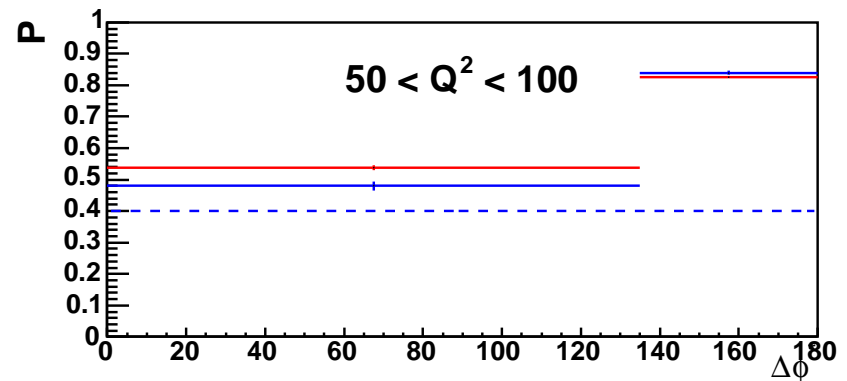
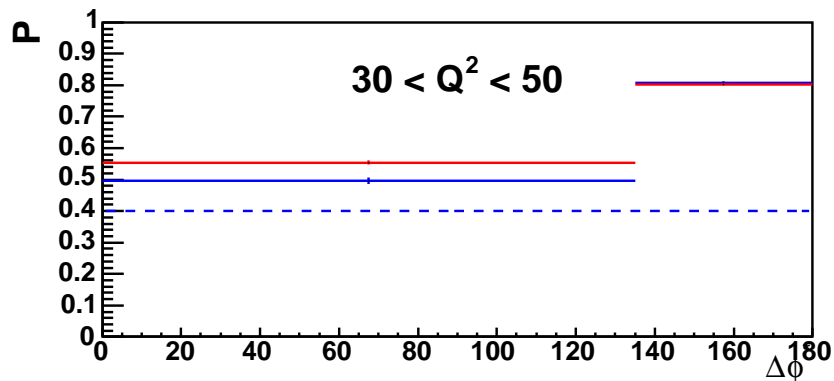
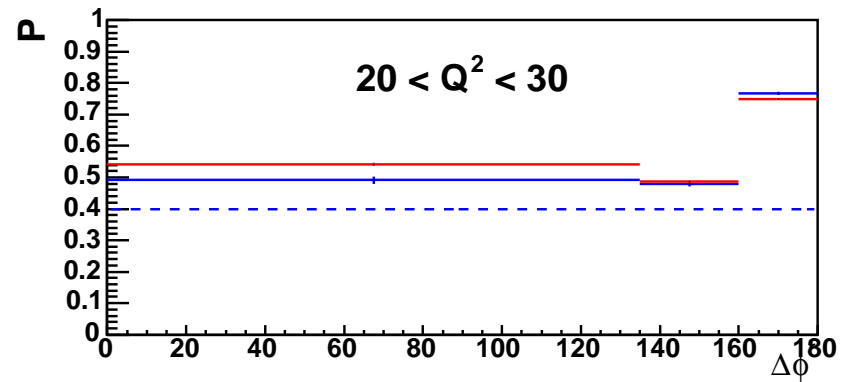
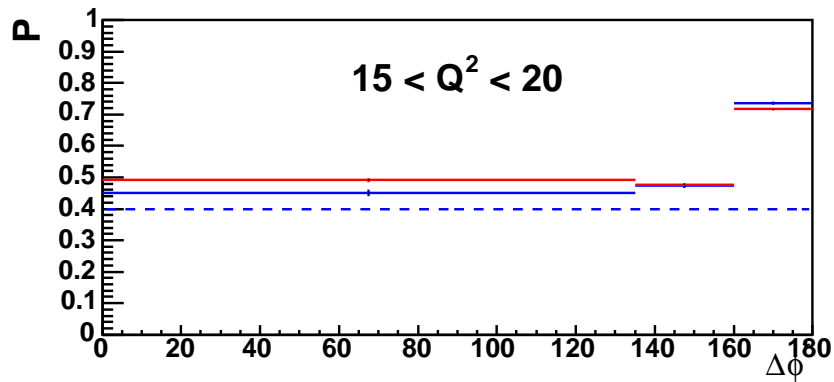
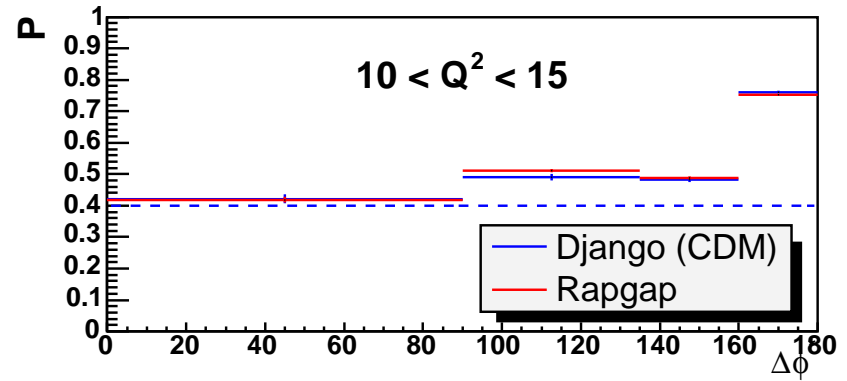
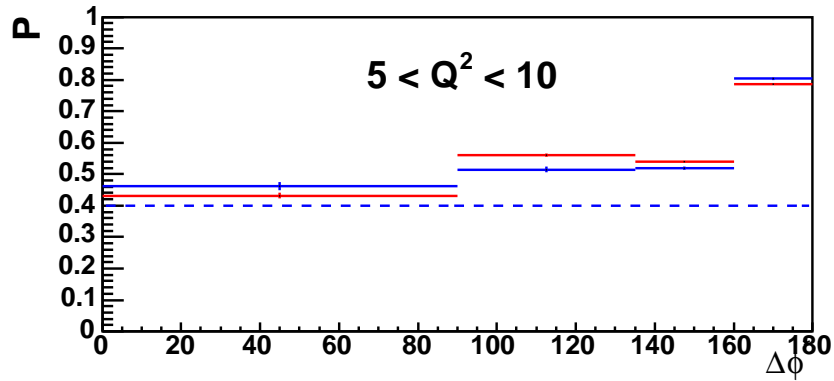
Control Plots, With Bg-finder



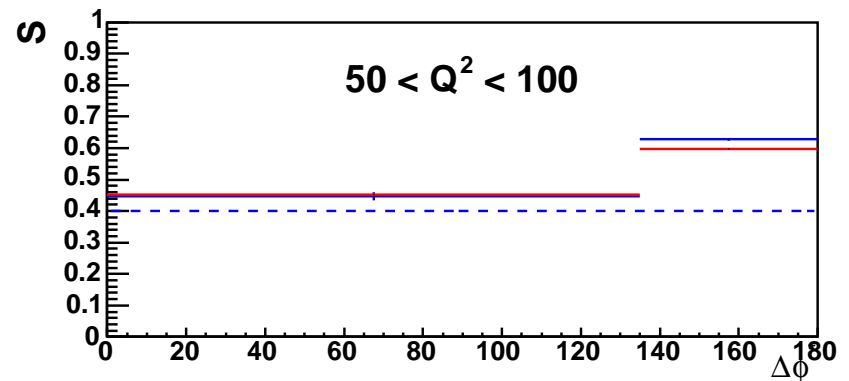
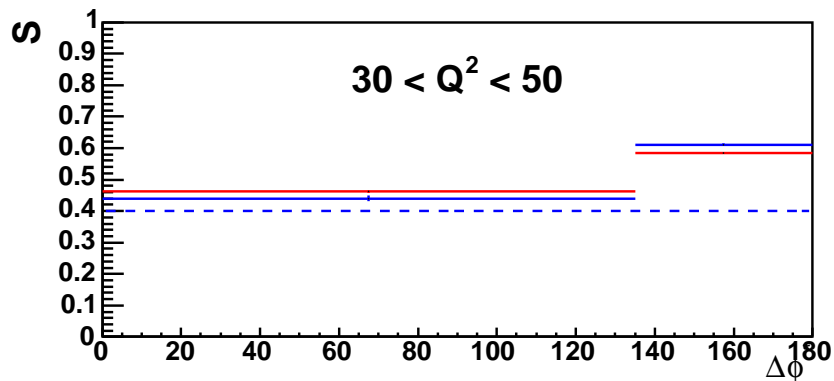
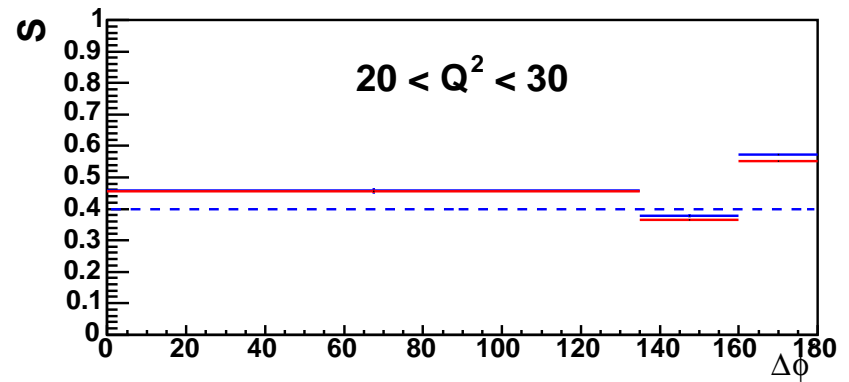
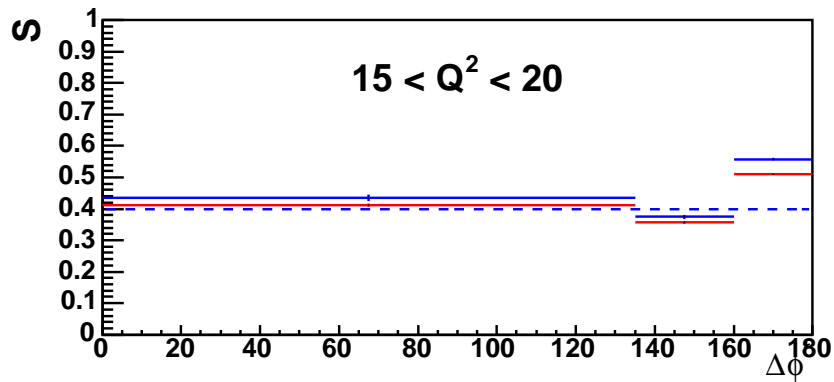
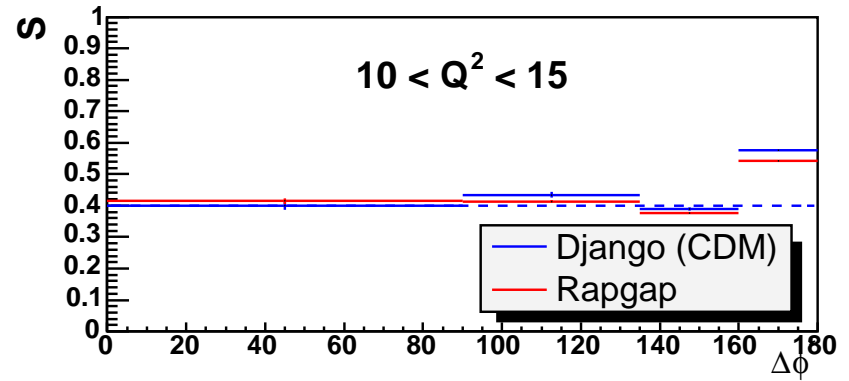
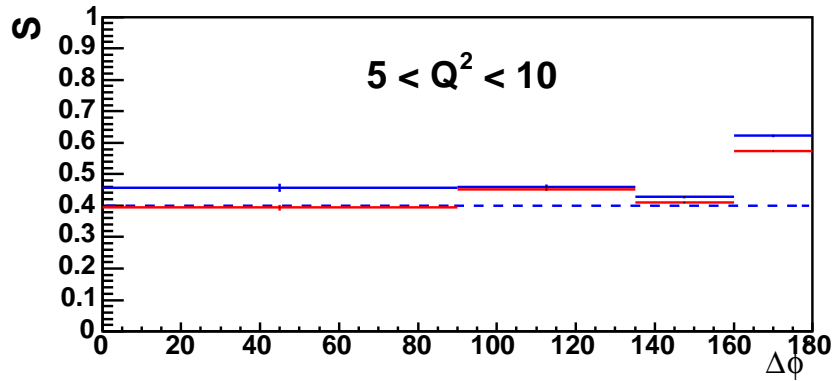
$$d\sigma / dQ^2 d\Delta\phi^*$$



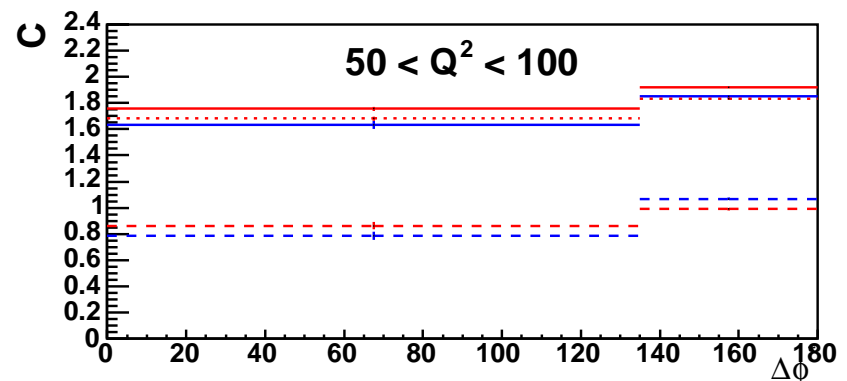
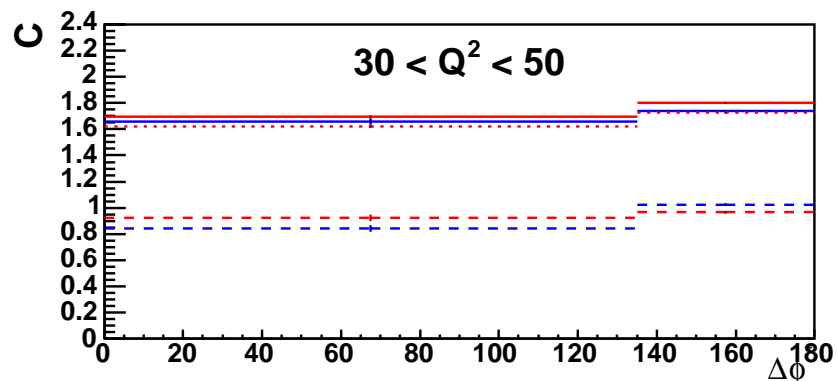
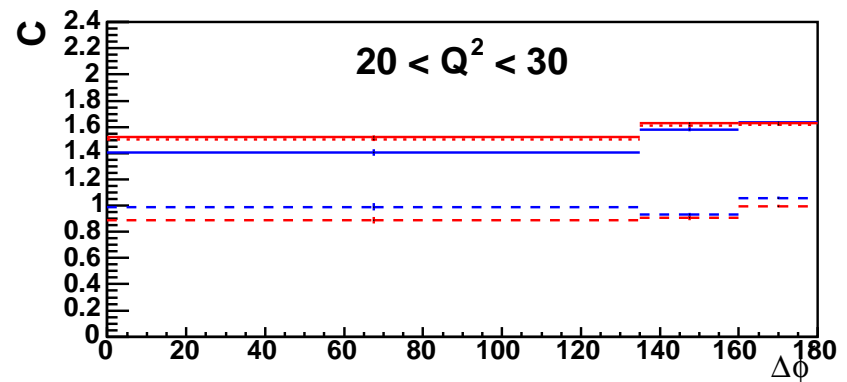
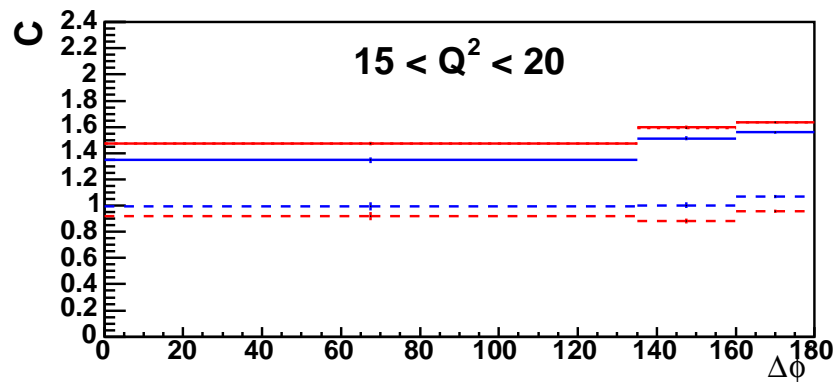
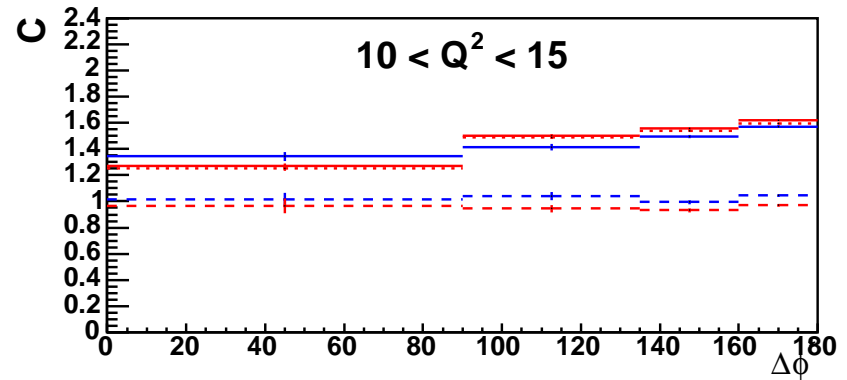
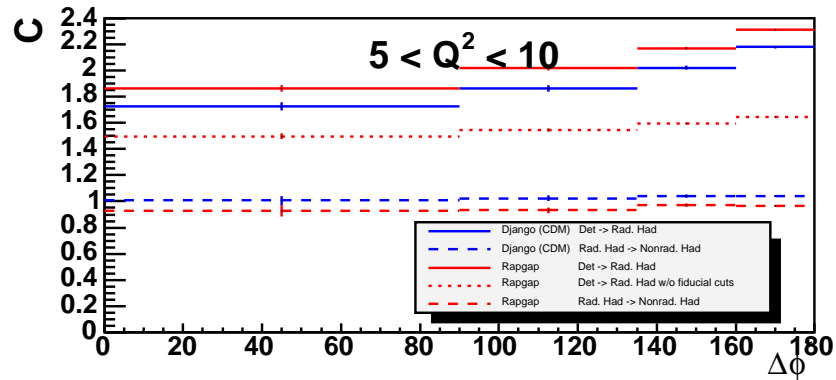
$d\sigma/dQ^2 d\Delta\phi^*$ Purity



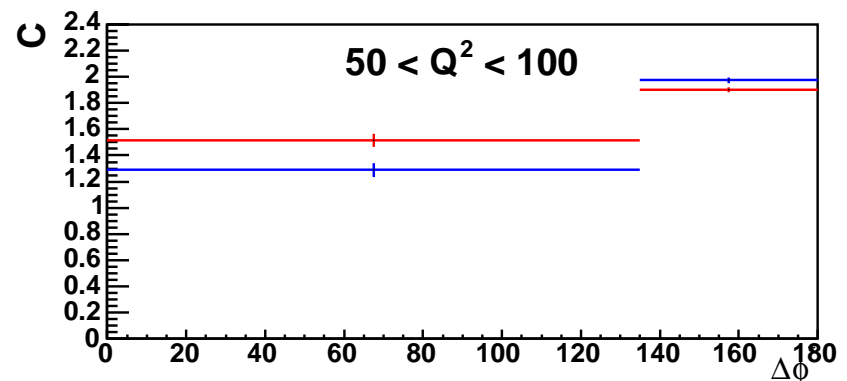
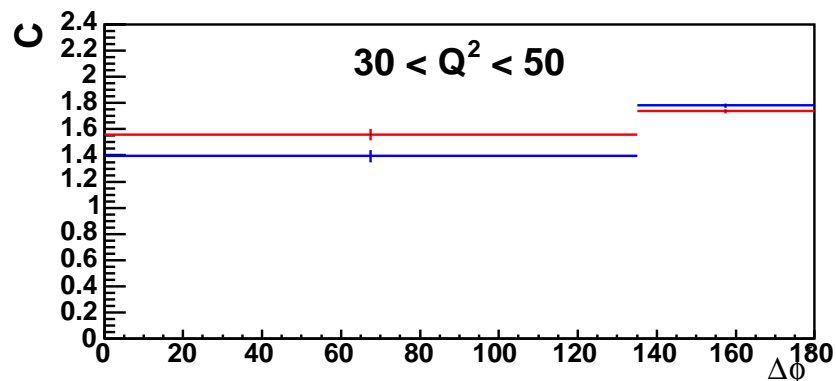
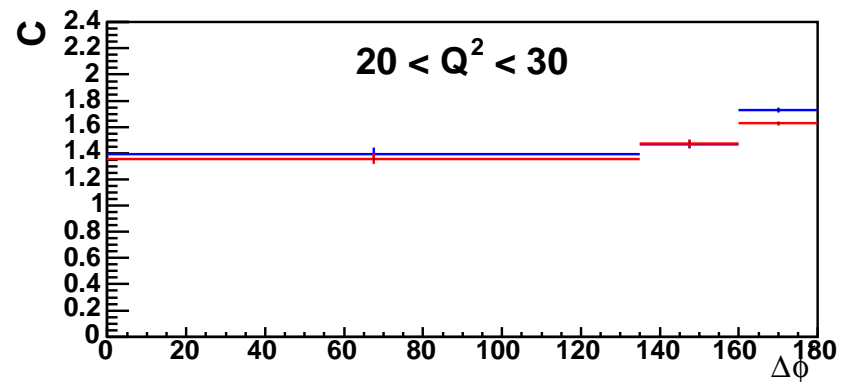
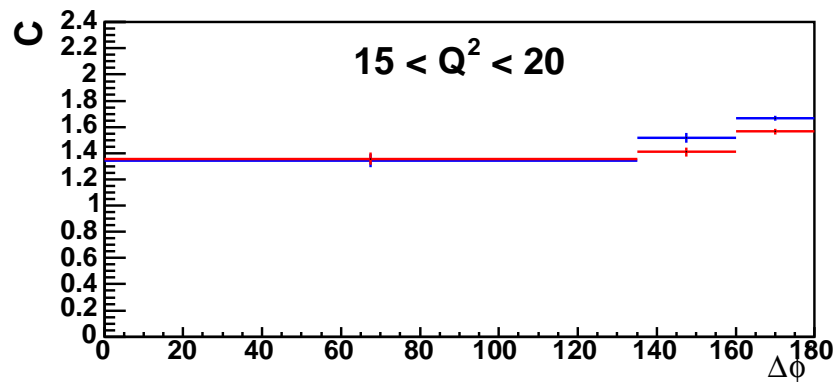
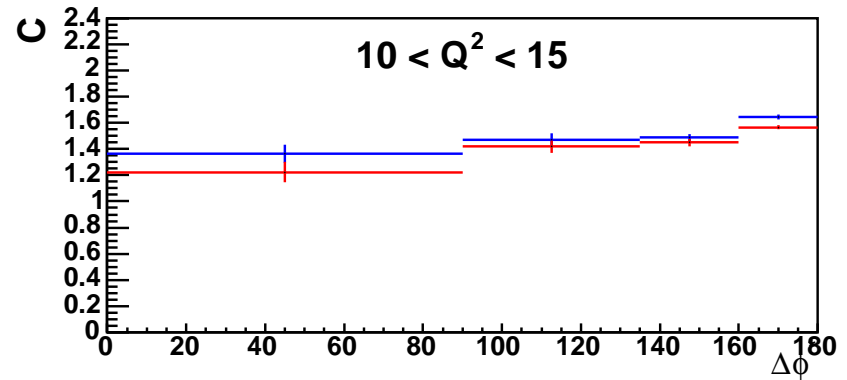
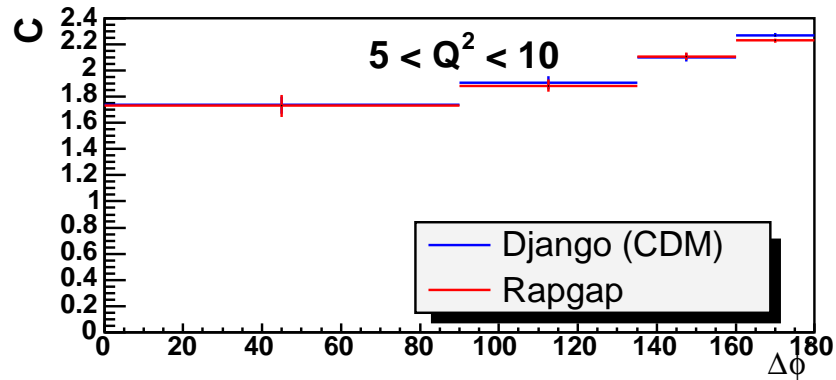
$d\sigma/dQ^2 d\Delta\phi^*$ Stability



$d\sigma/dQ^2 d\Delta\phi^*$ Correction factors



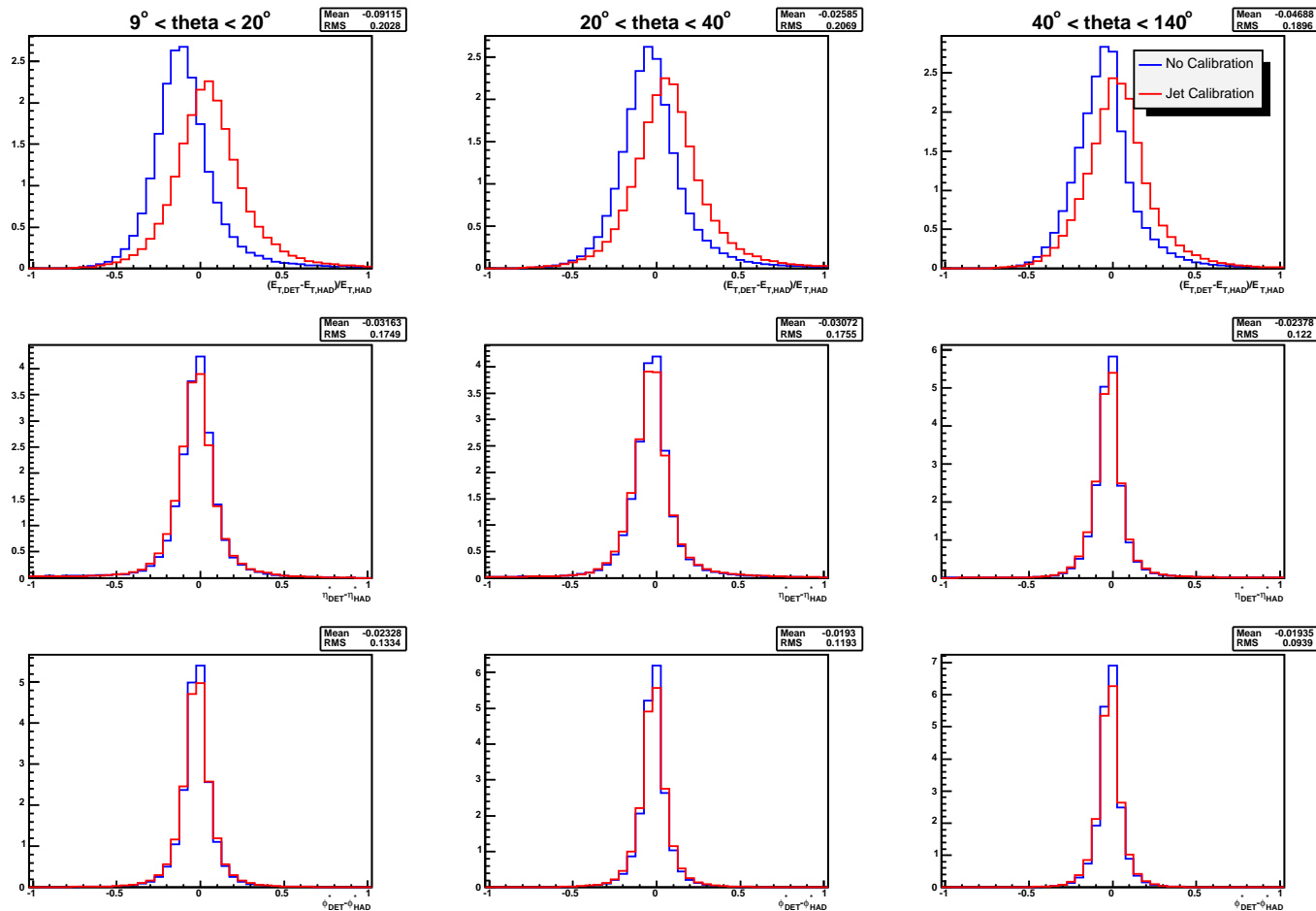
$d\sigma/dQ^2 d\Delta\phi^*$ Correction factors



Jet Calibration

Apply Jet Calibration \Rightarrow Lower correction factors?

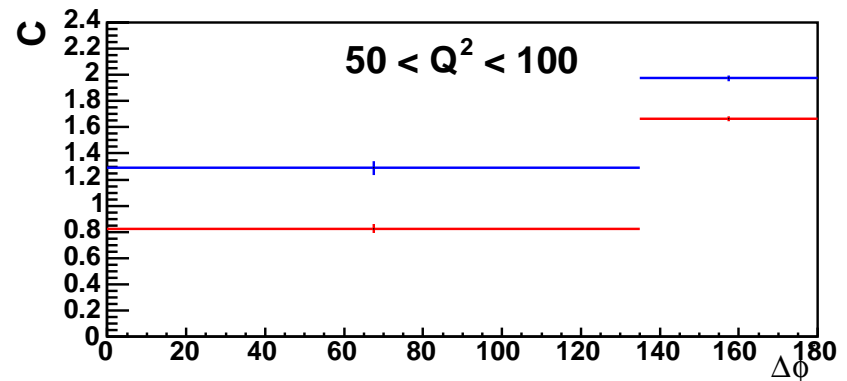
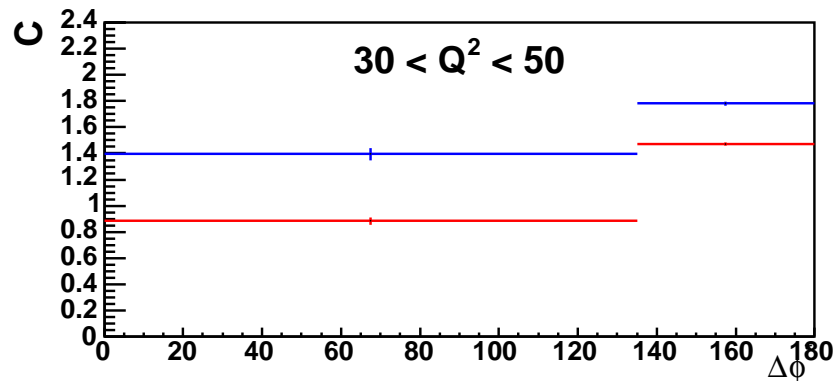
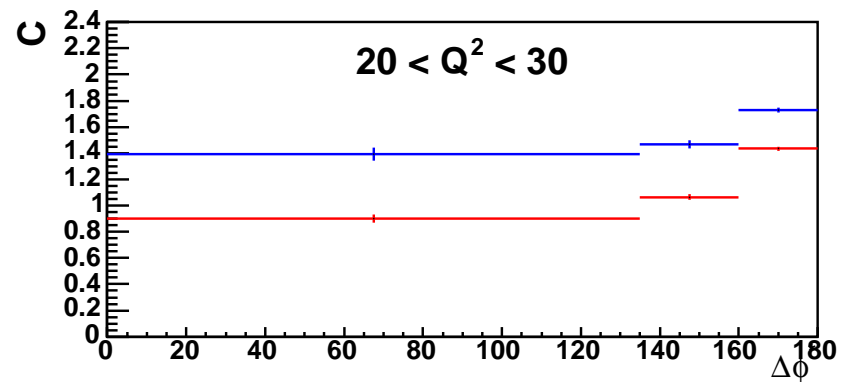
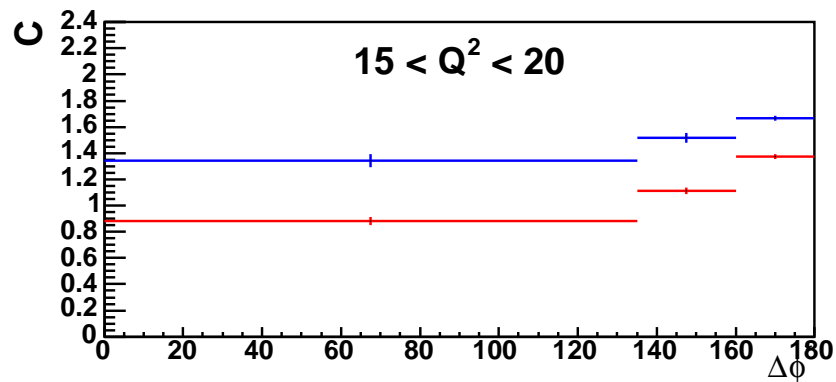
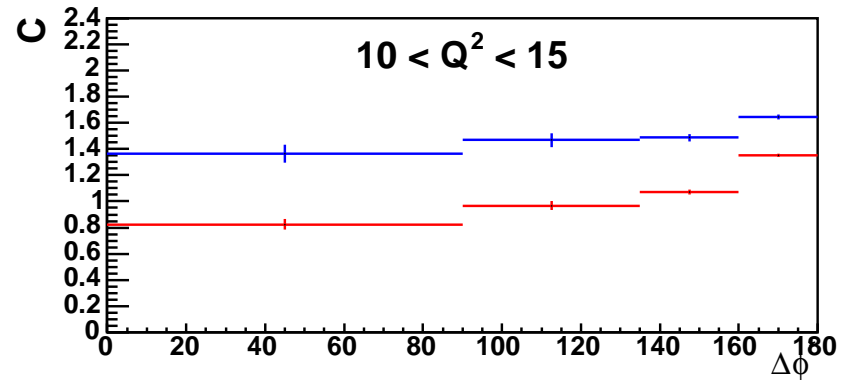
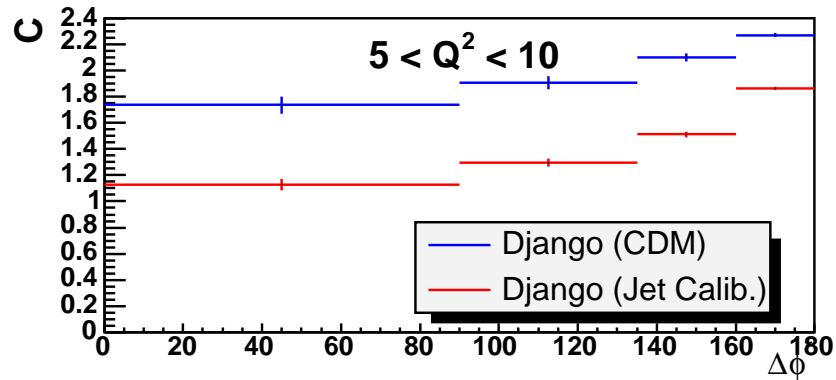
Note: Calibration made for $Q^2 > 100 \text{ GeV}^2$ and $P_{T,JET} > 10 \text{ GeV}$.



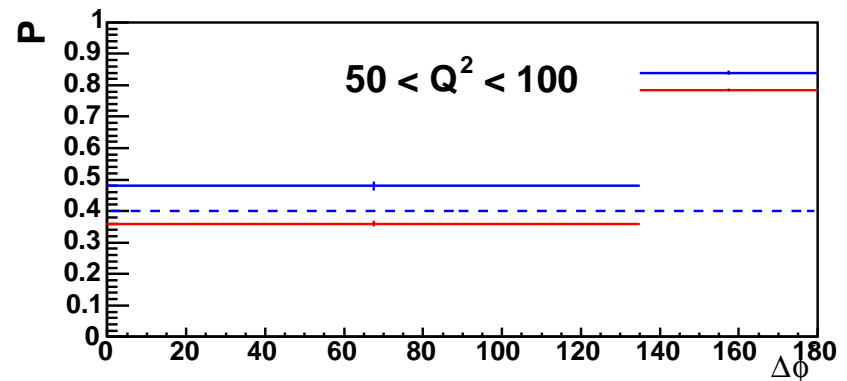
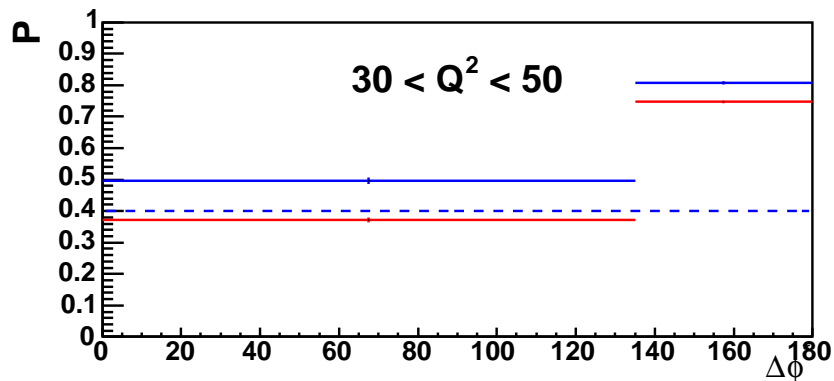
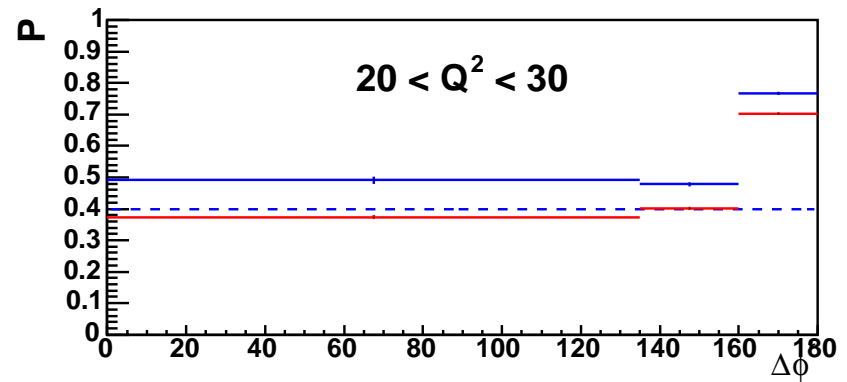
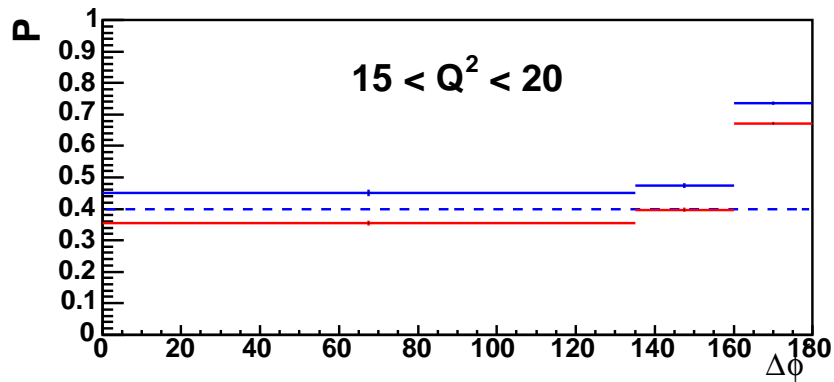
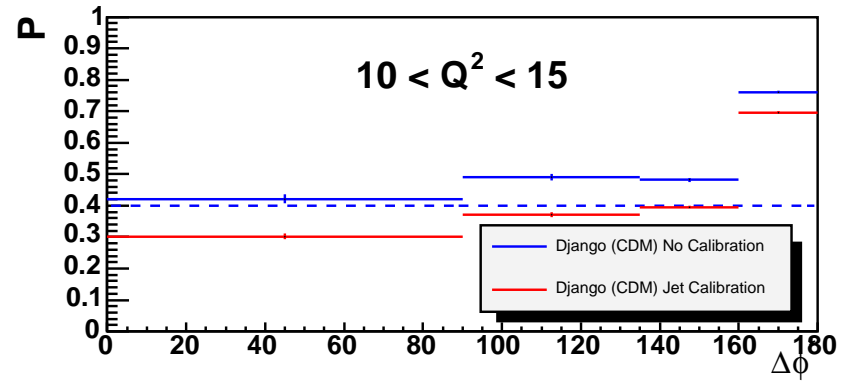
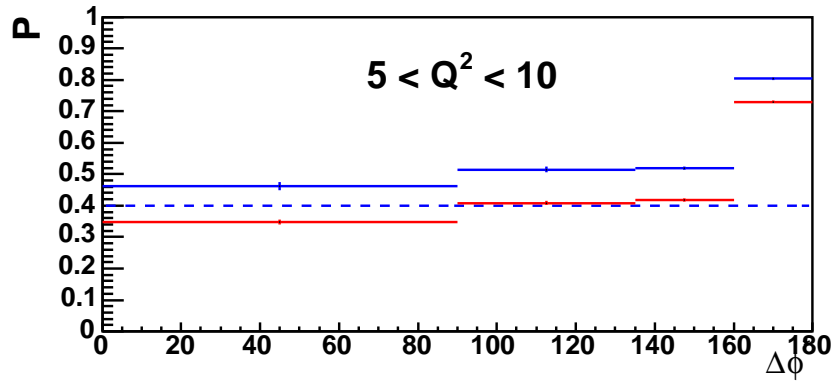
Less E_T shift, but overcompensating a bit. Broader distributions.

1.5 % more DIS events and 30% more dijet events (!)

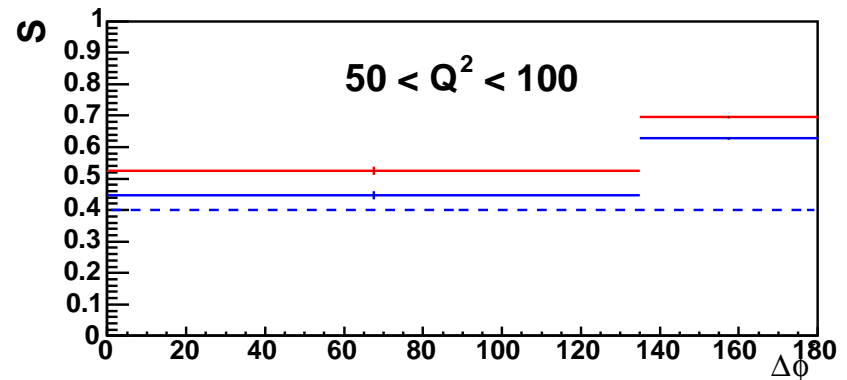
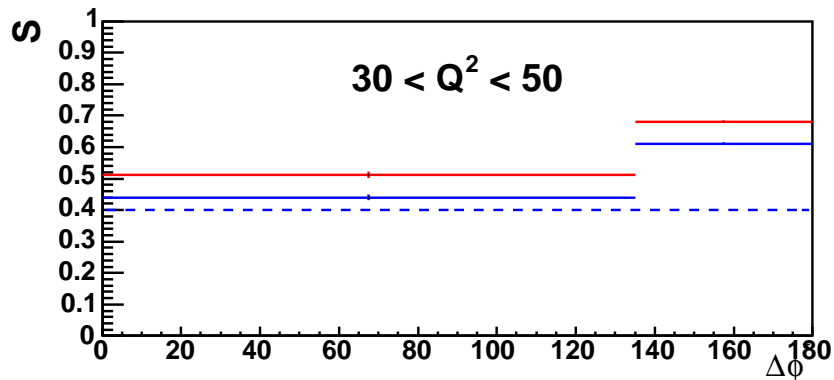
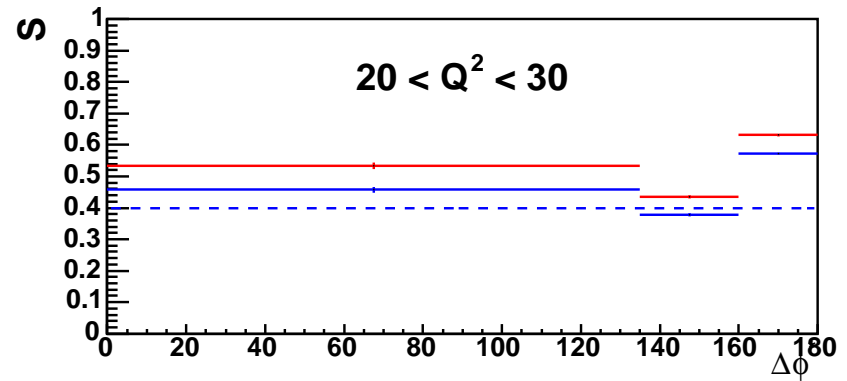
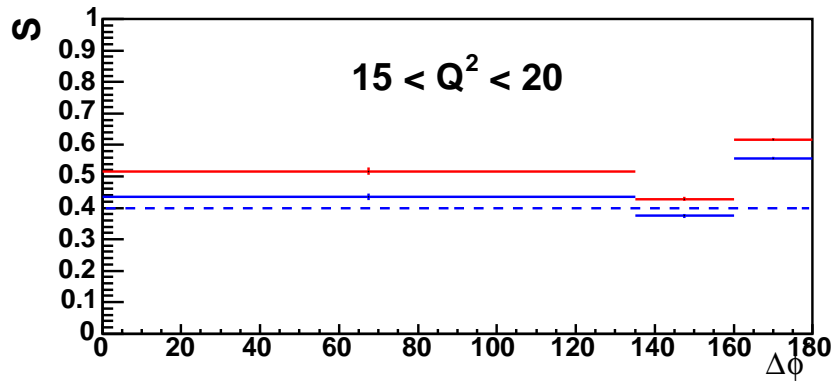
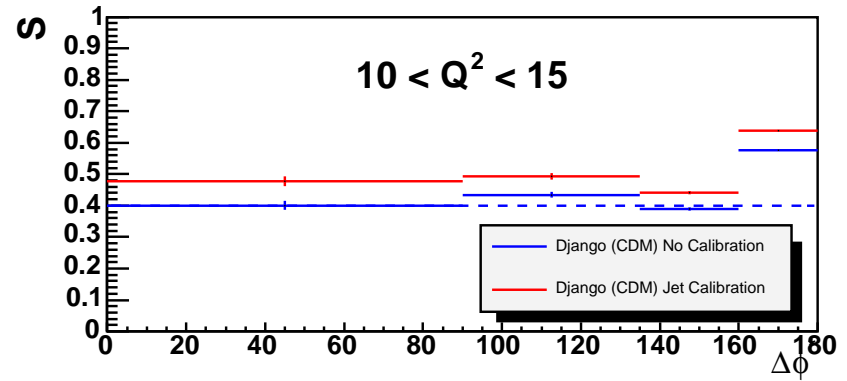
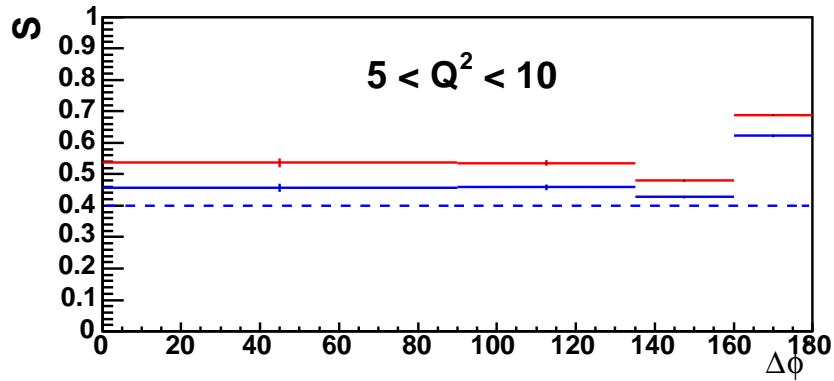
$d\sigma/dQ^2 d\Delta\phi^*$ Correction factors



$d\sigma/dQ^2 d\Delta\phi^*$ Purity



$d\sigma/dQ^2 d\Delta\phi^*$ Stability



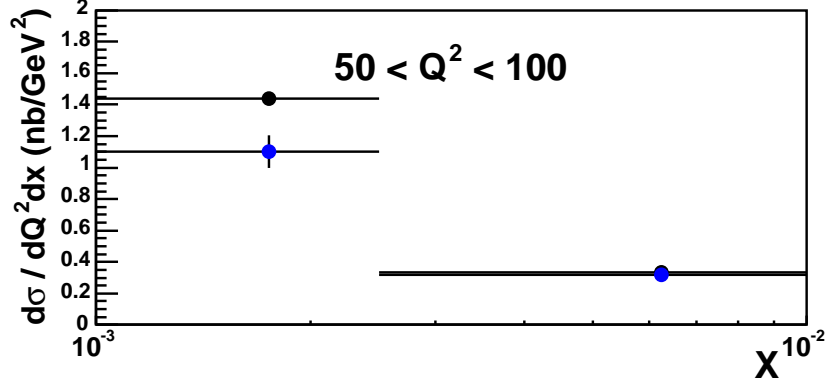
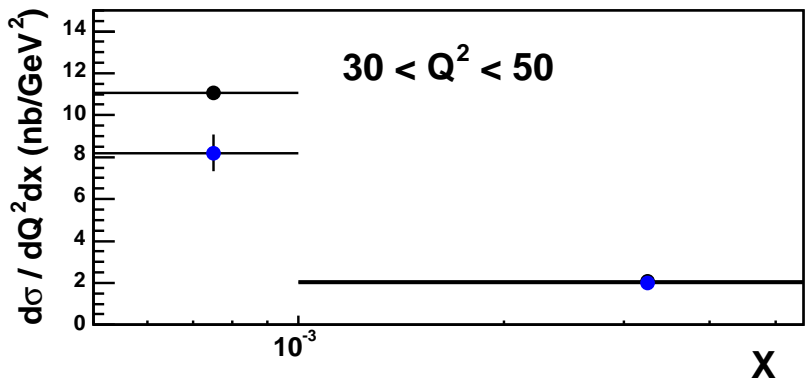
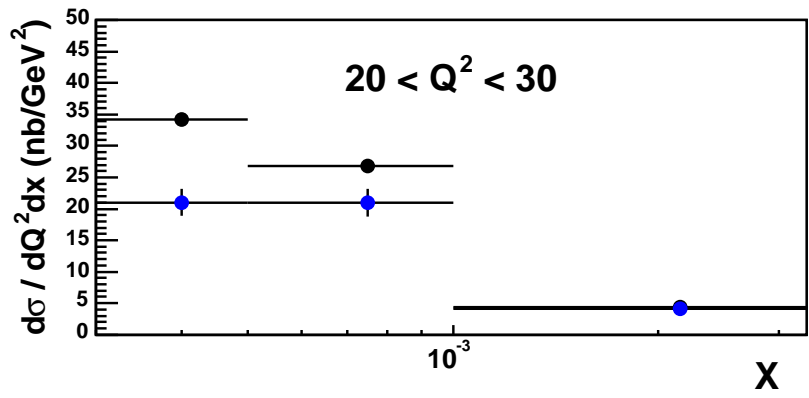
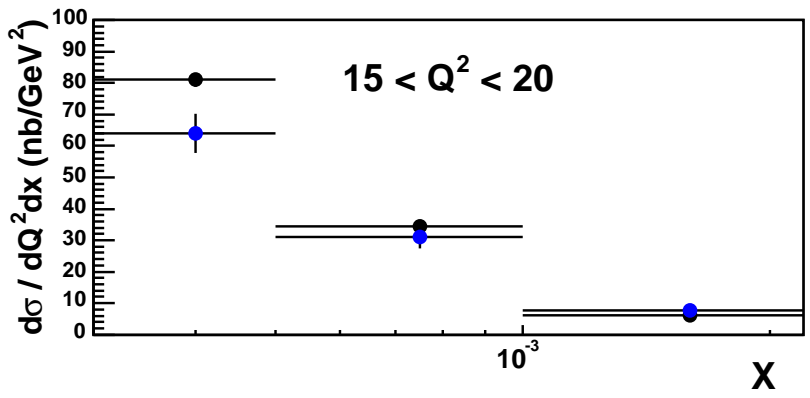
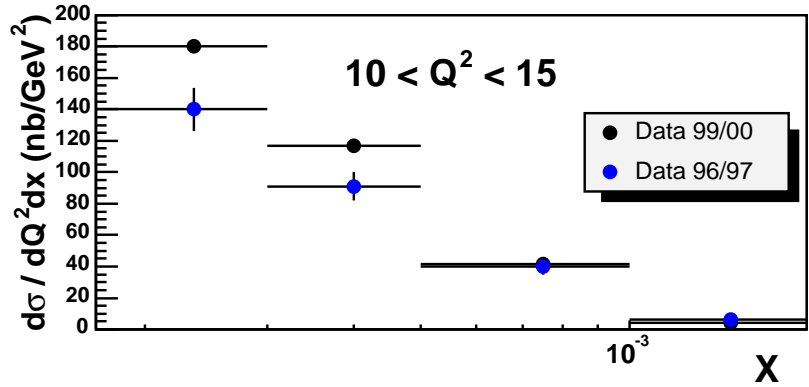
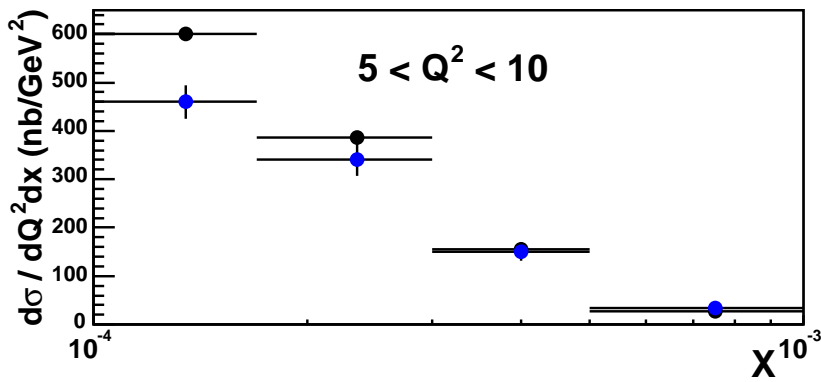
9900 Vs. 9697

Selection

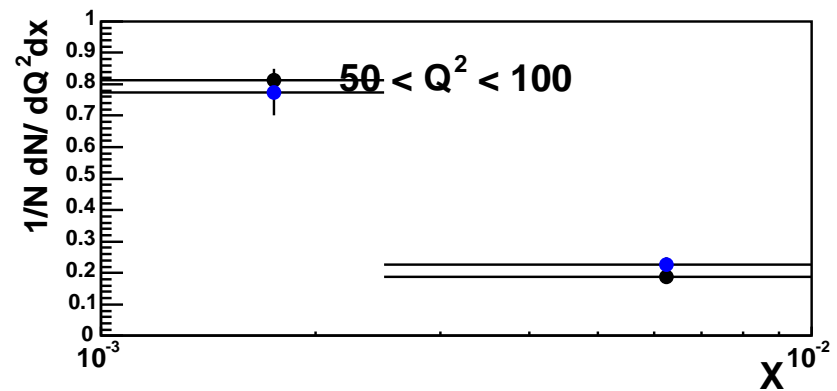
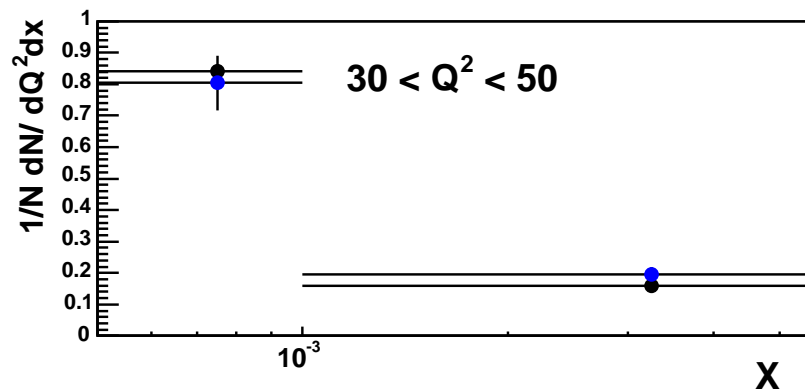
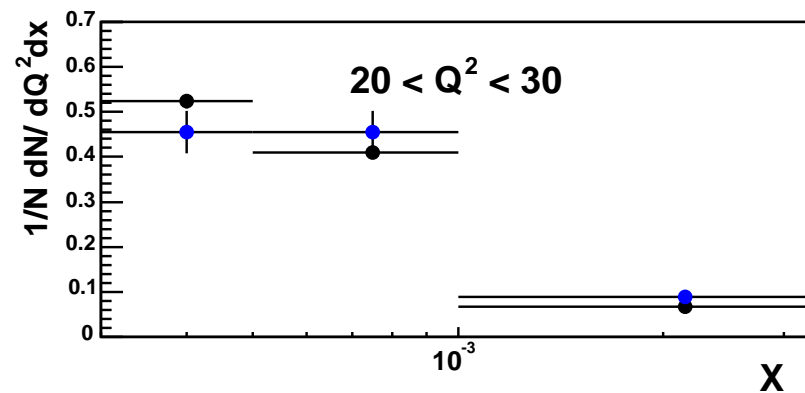
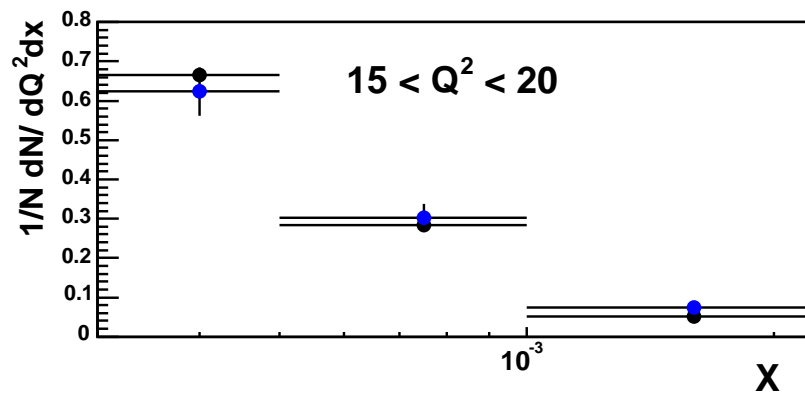
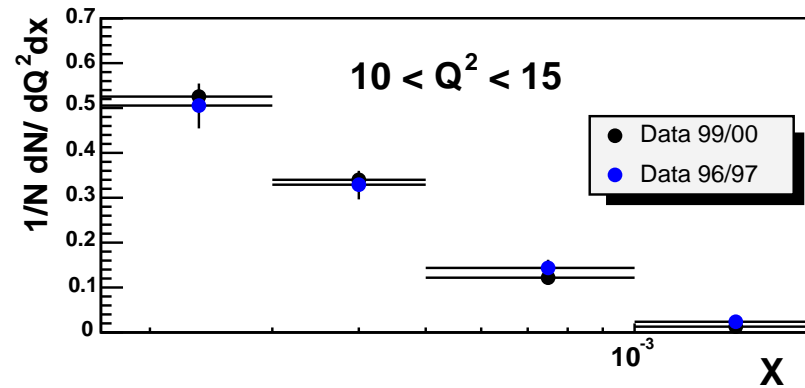
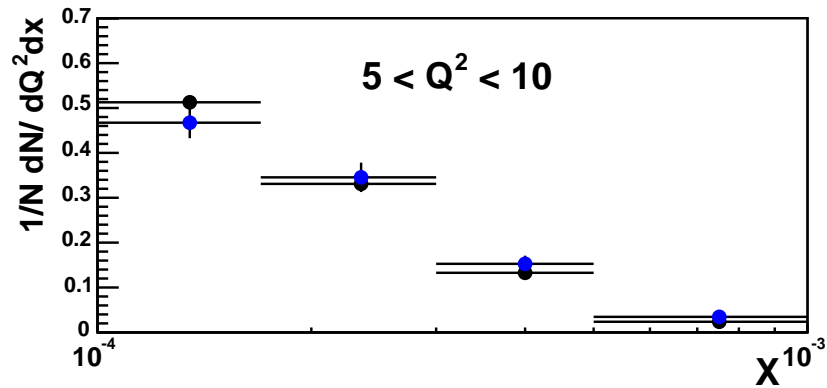
DIS Cuts			Dijet Cuts		
$5 \text{ GeV}^2 <$	Q^2	$< 100 \text{ GeV}^2$	$-1 <$	η_j	< 2.5
$0.1 <$	y	< 0.7	$7 \text{ GeV} <$	$E_{\perp j1}^*$	
$10^{-4} <$	x_{Bj}	$< 10^{-2}$	$5 \text{ GeV} <$	$E_{\perp j2}^*$	
$9 \text{ GeV} <$	E_e			Sort in E_{\perp}^*	
$156^\circ <$	θ_e	$< 175^\circ$			
$35 \text{ GeV} <$	$E - p_z$	$< 70 \text{ GeV}$			
	$ z_{vtx} $	$< 35 \text{ cm}$			
	R_{clus}	$< 3.5 \text{ cm}$			
	E_{had}	$< 0.5 \text{ GeV}$			
	E_{veto}	$< 1.0 \text{ GeV}$			

Differences: $E_p = 820 \leftrightarrow 920 \text{ GeV}$, Trigger S0||S1 (?) \leftrightarrow S0||S61

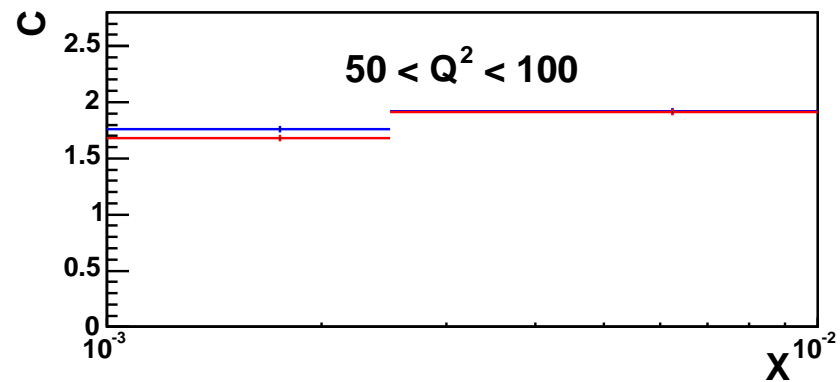
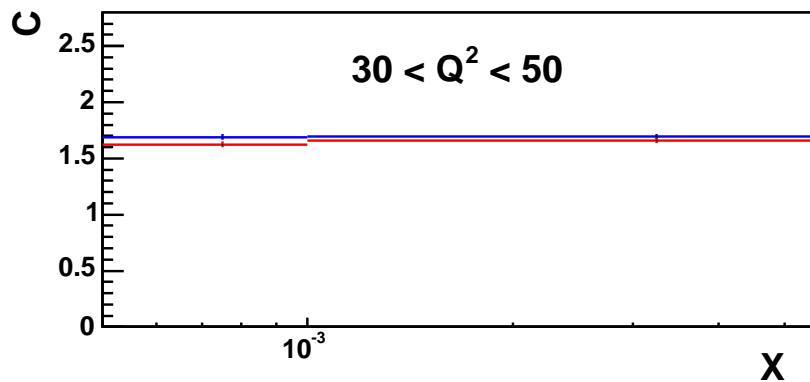
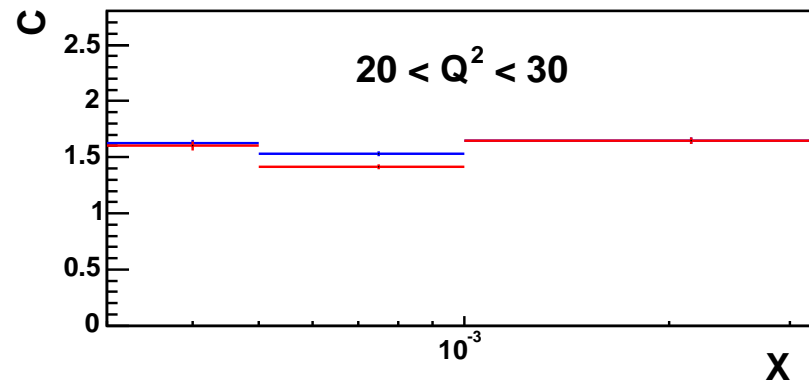
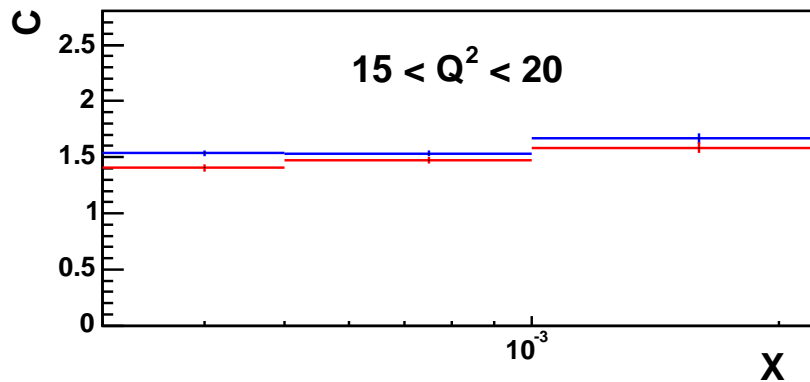
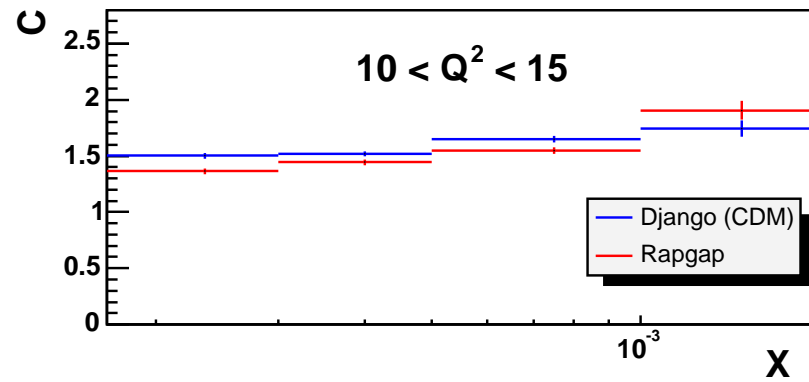
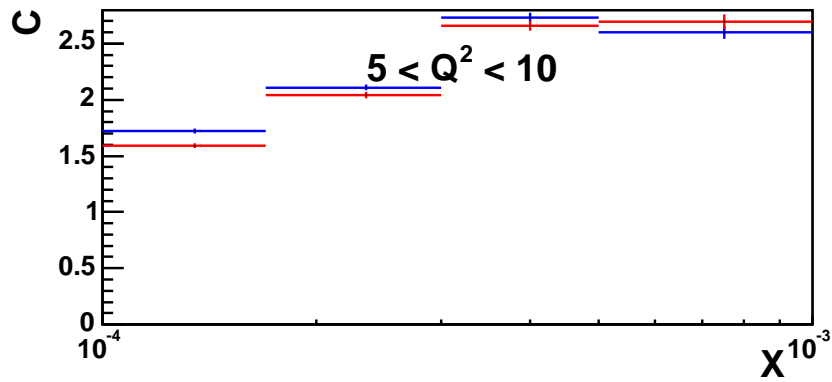
$d\sigma/dQ^2 dx$ (No Calibration)



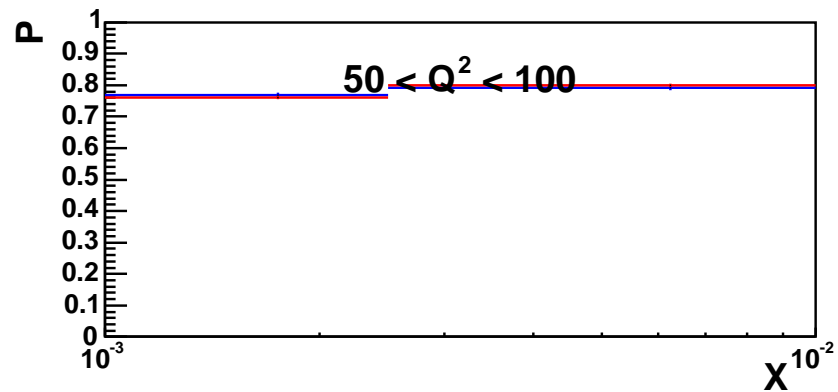
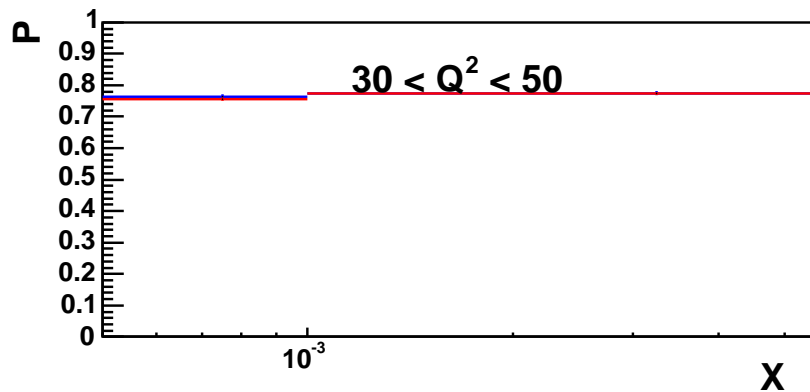
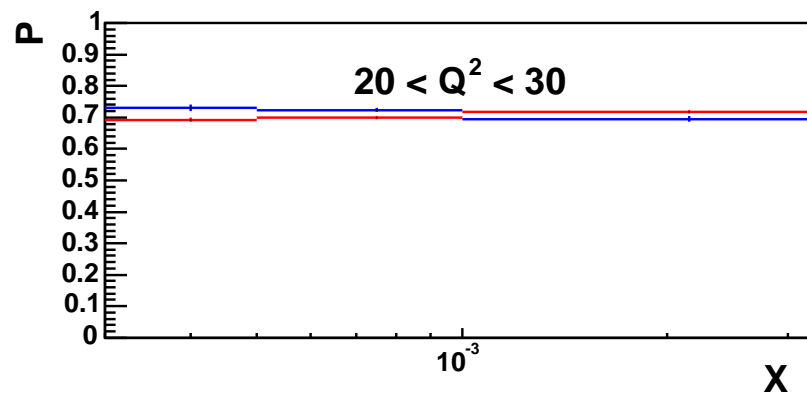
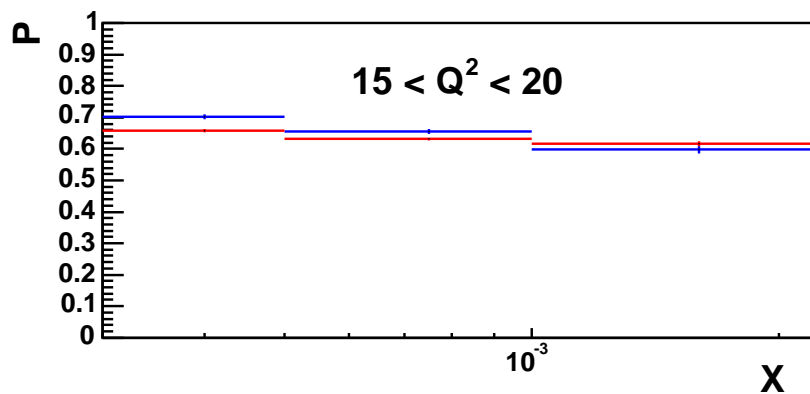
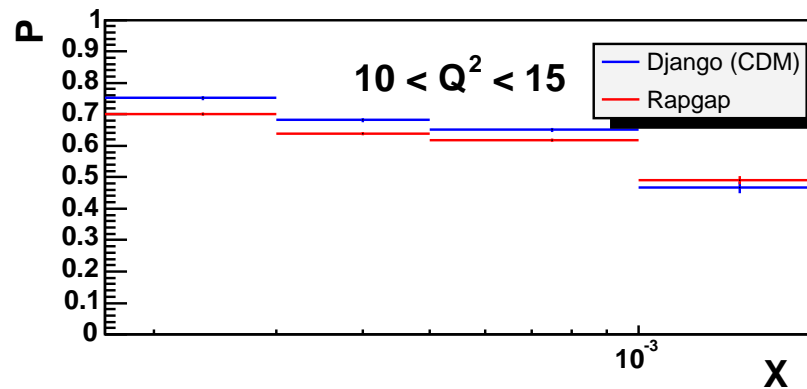
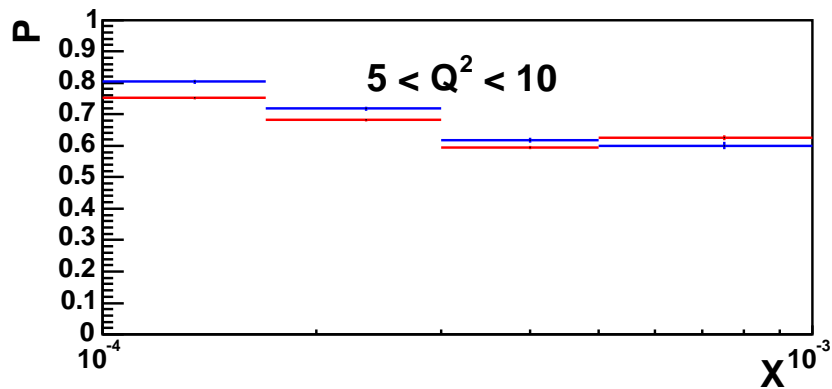
$d\sigma/dQ^2 dx$ (No Calibration)



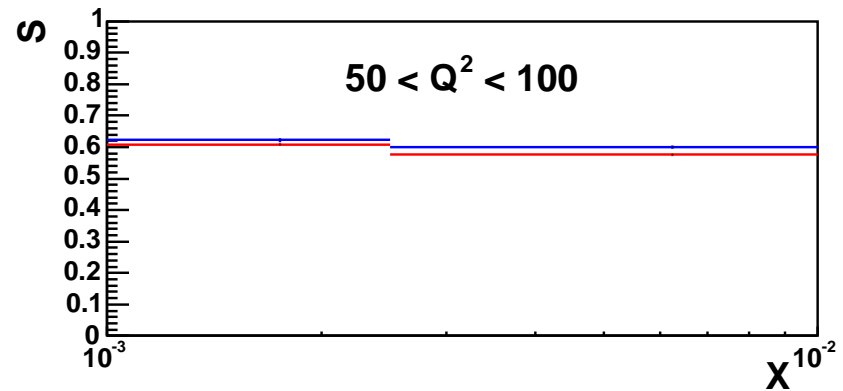
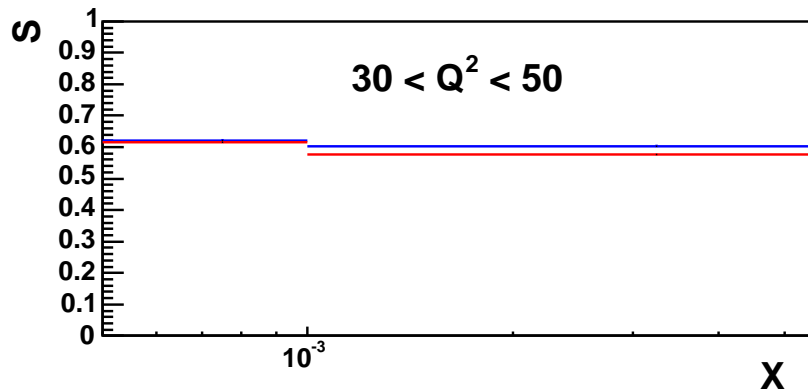
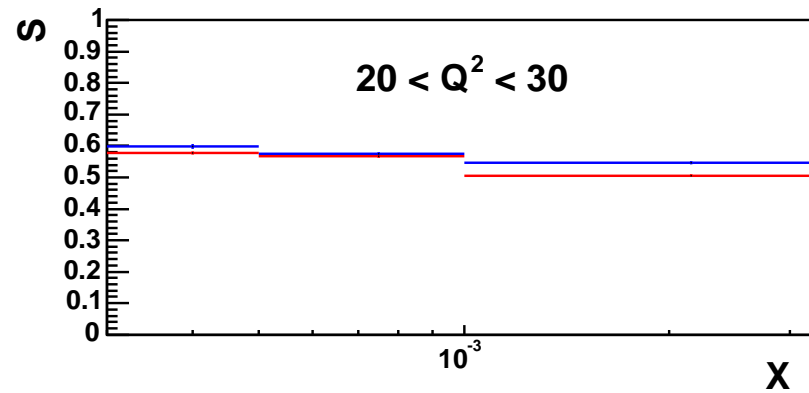
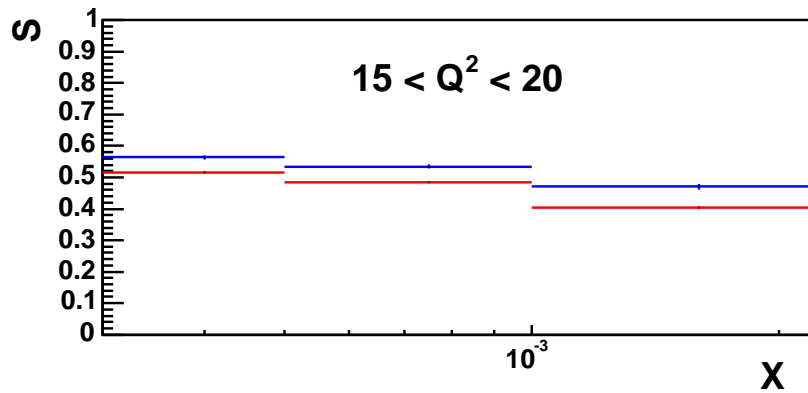
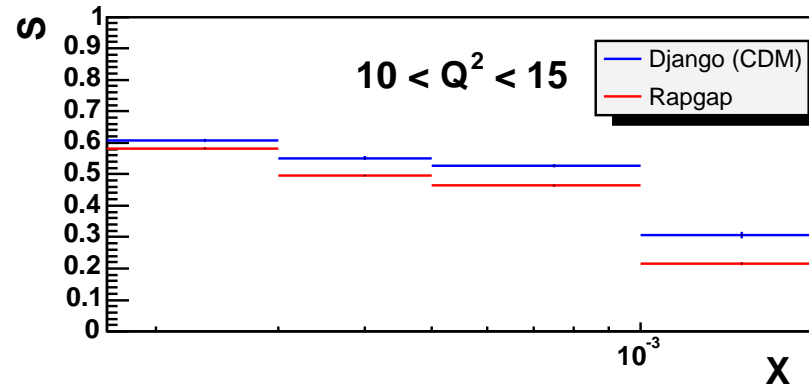
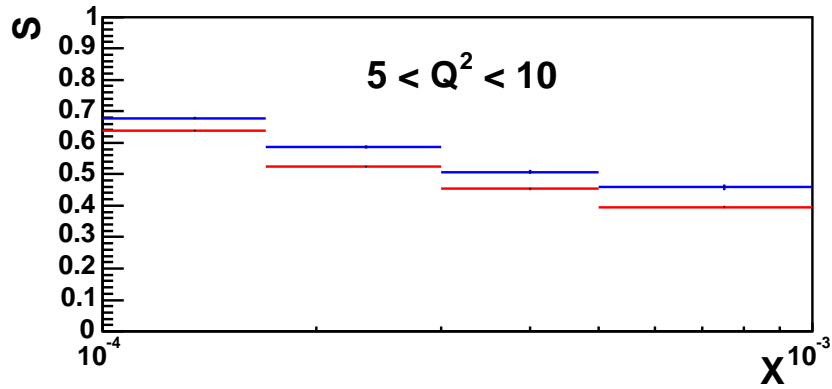
$d\sigma/dQ^2 dx$ Correction factors



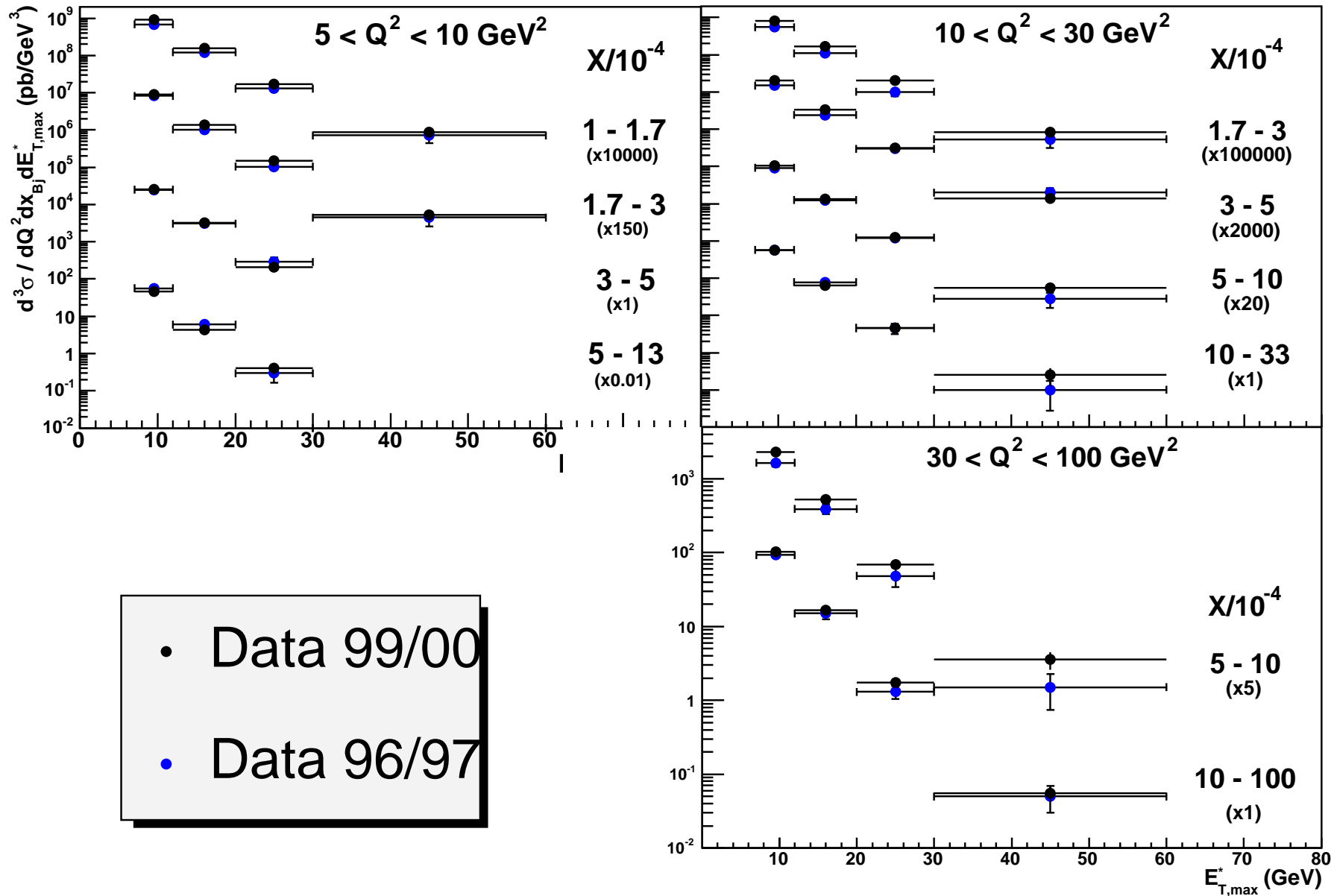
$d\sigma/dQ^2 dx$ Purity



$d\sigma/dQ^2 dx$ Stability

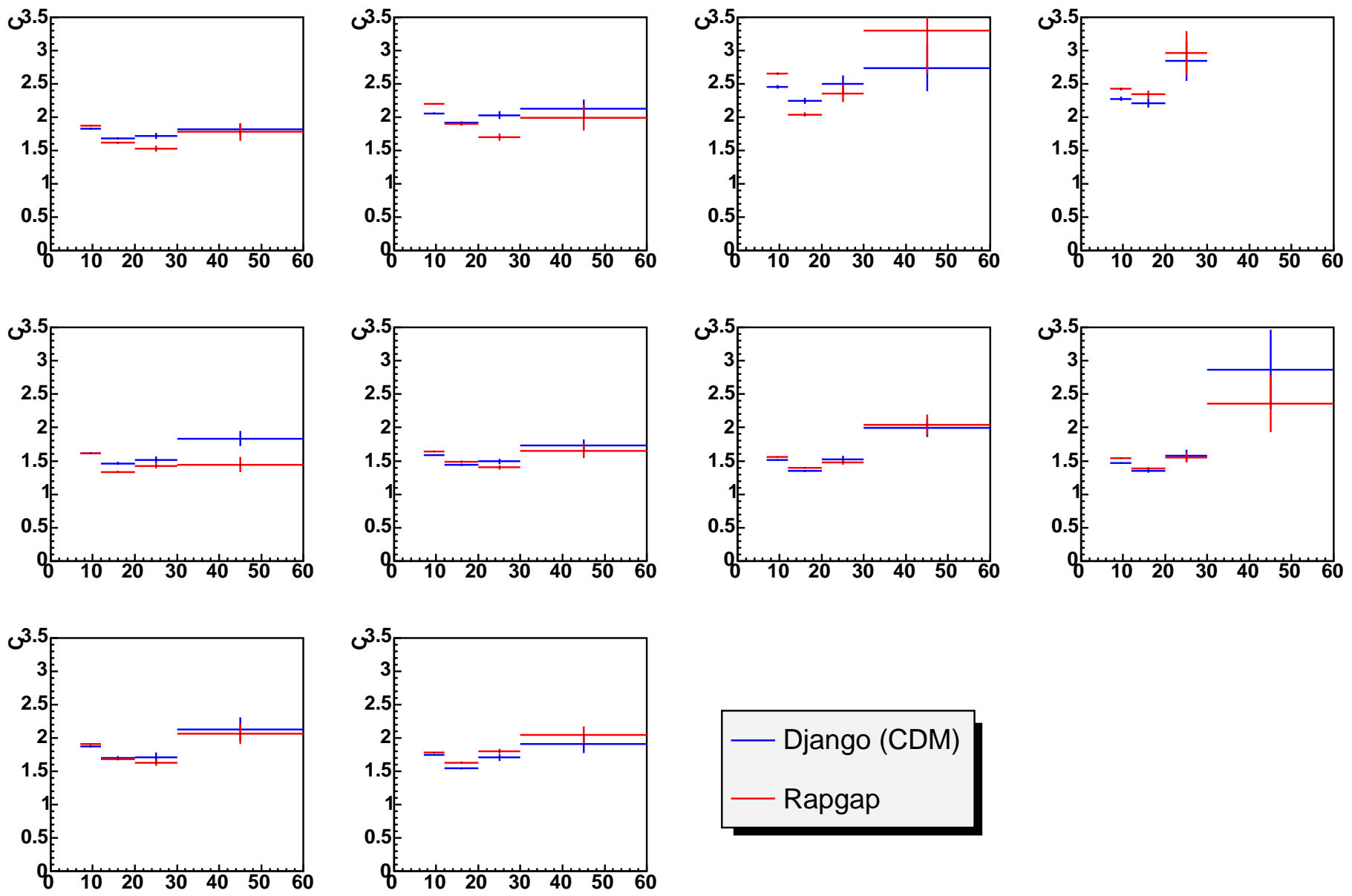


$d\sigma/dQ^2 dx dE_{T,max}$ (No Calibration)

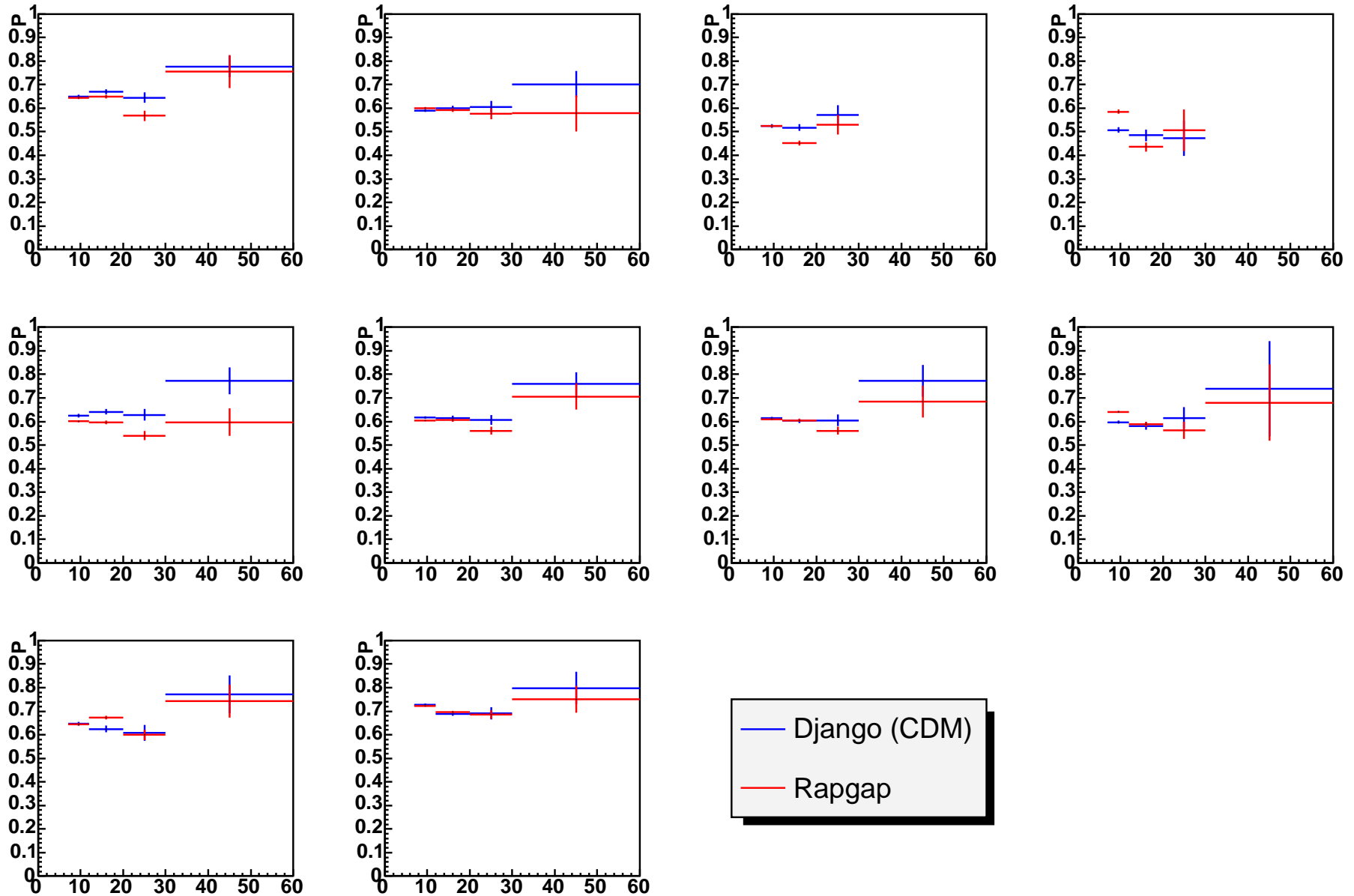


- Data 99/00
- Data 96/97

$d\sigma/dQ^2 dx dE_{T,max}$ Correction factors

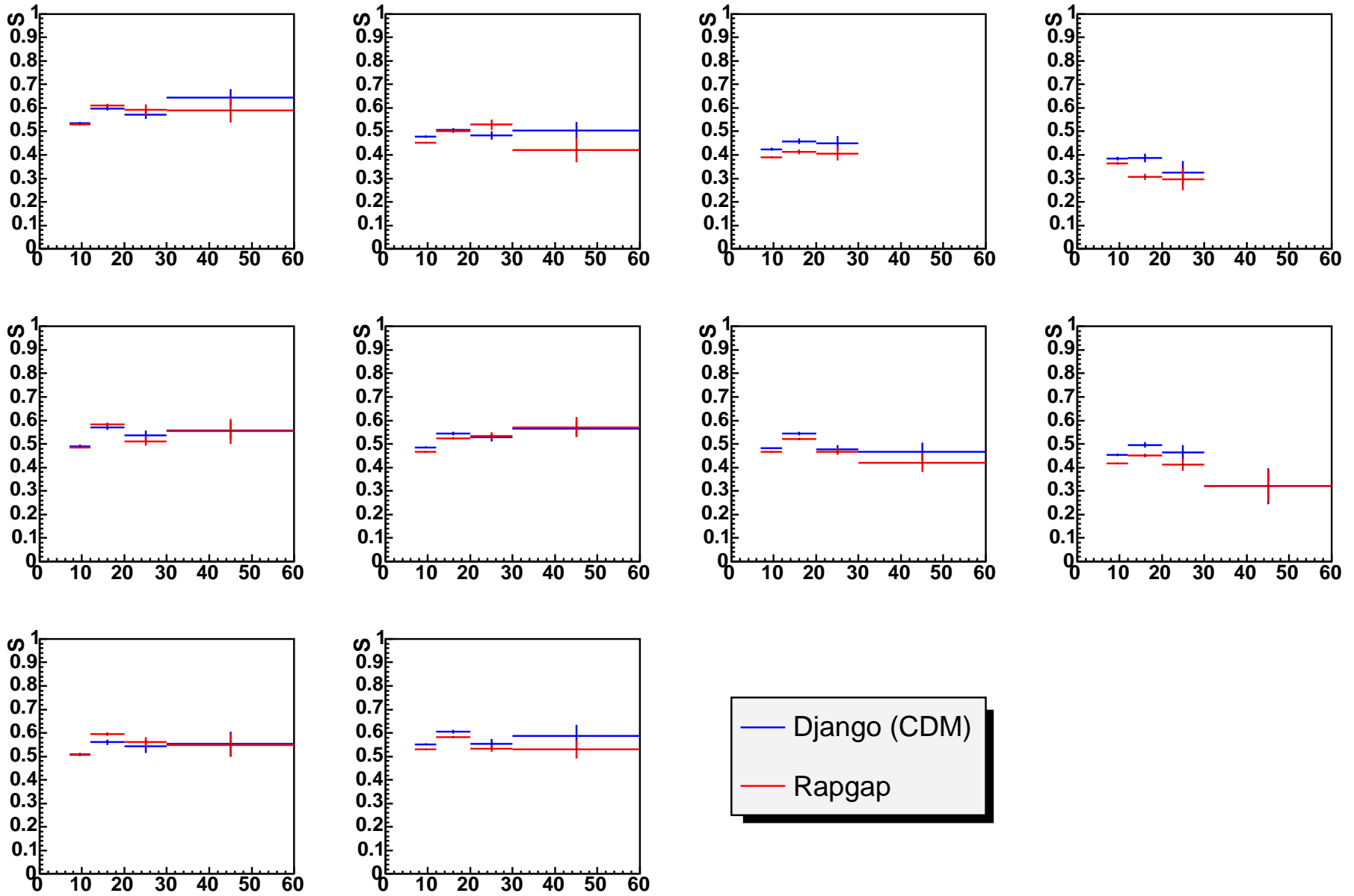


$d\sigma/dQ^2 dx dE_{T,max}$ Purity



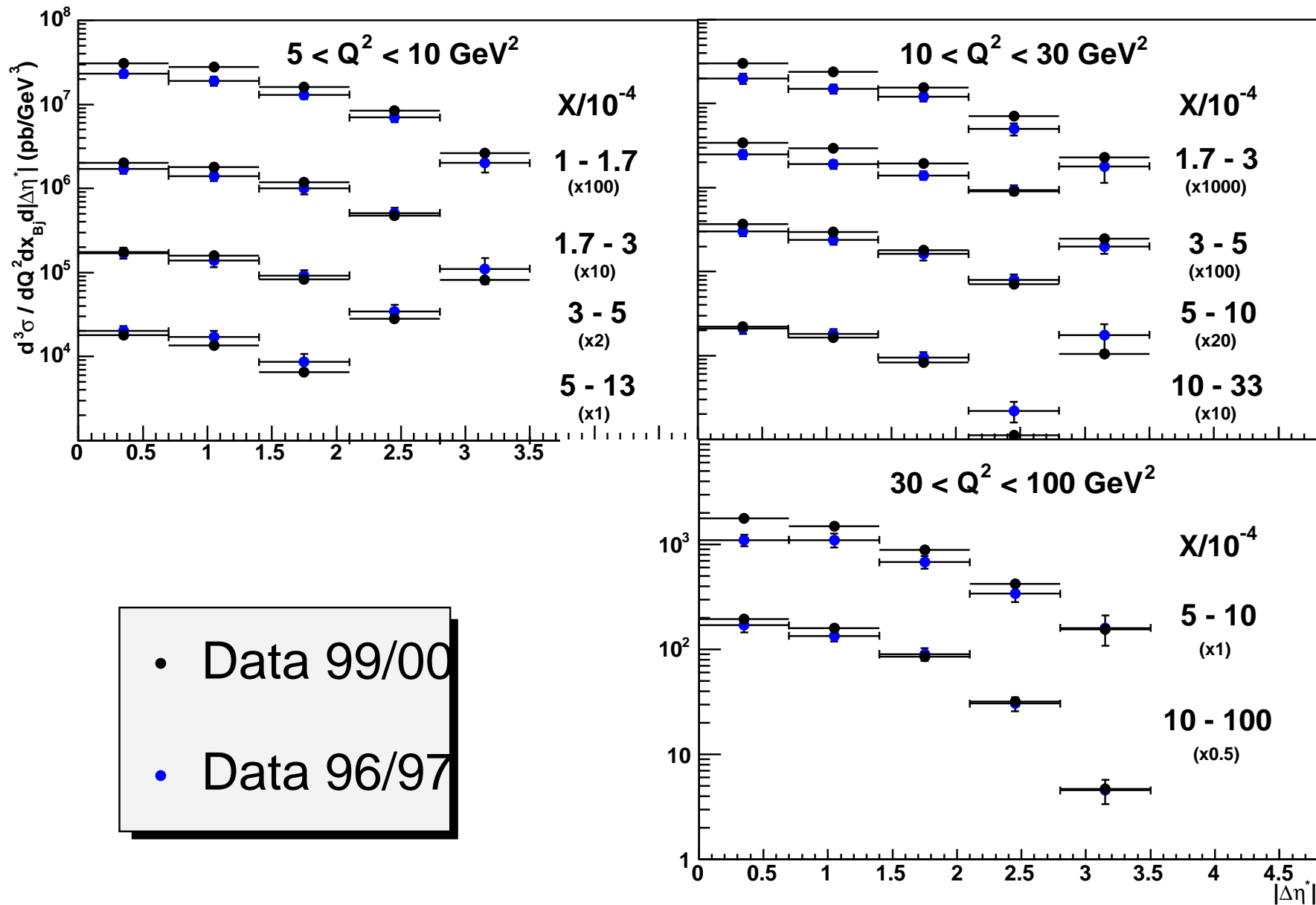
— Django (CDM)
— Rapgap

$d\sigma/dQ^2 dx dE_{T,max}$ Stability

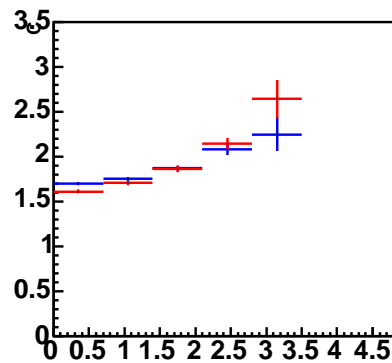
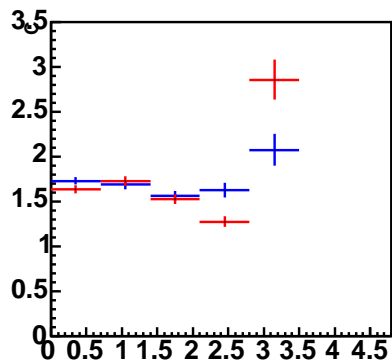
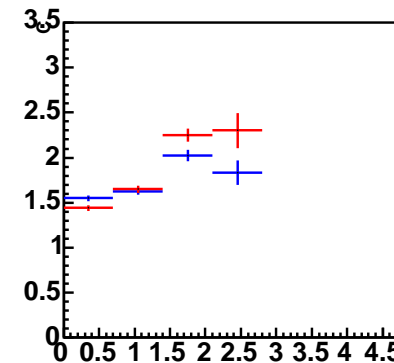
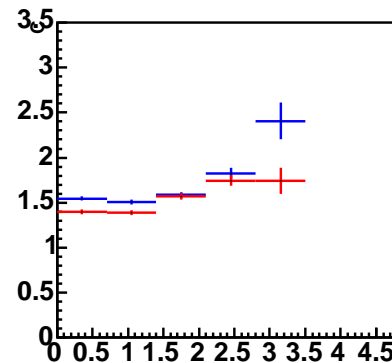
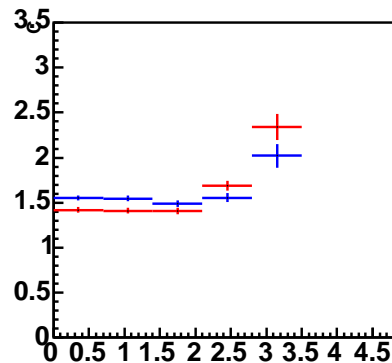
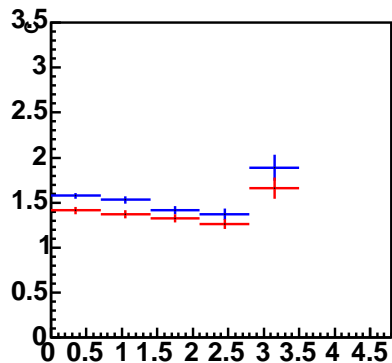
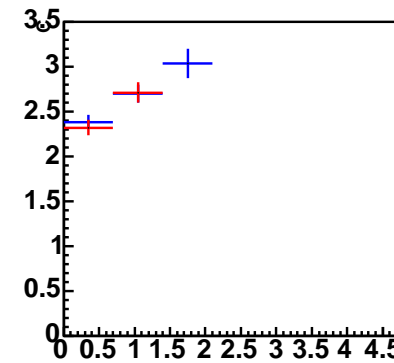
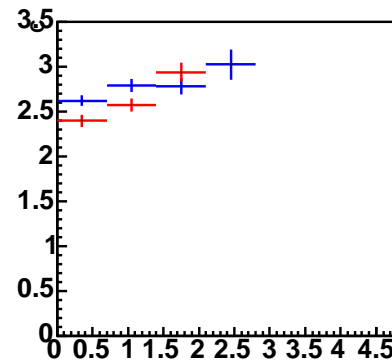
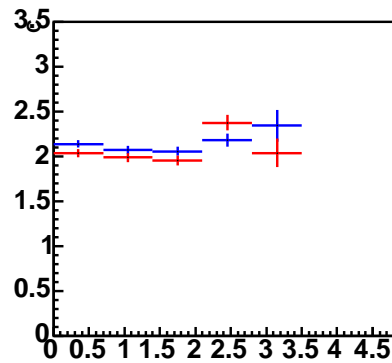
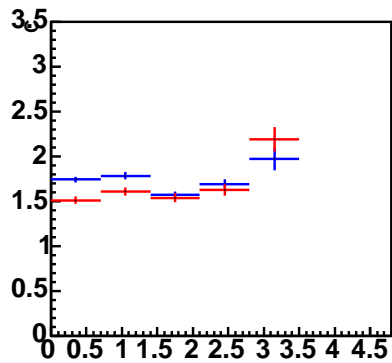


— Django (CDM)
— Rapgap

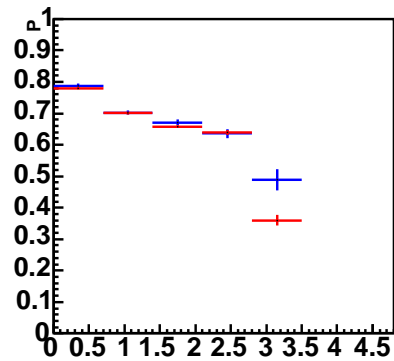
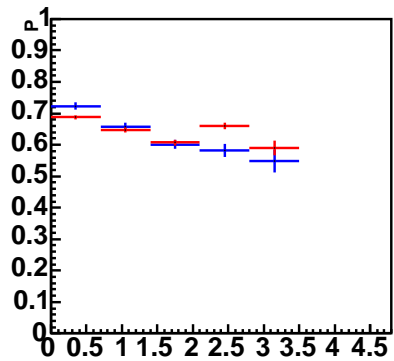
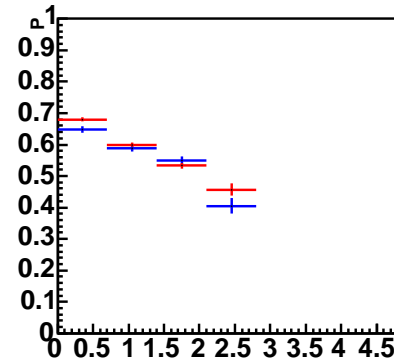
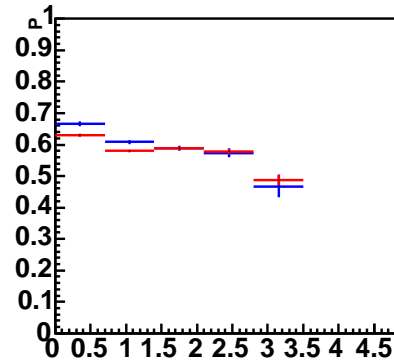
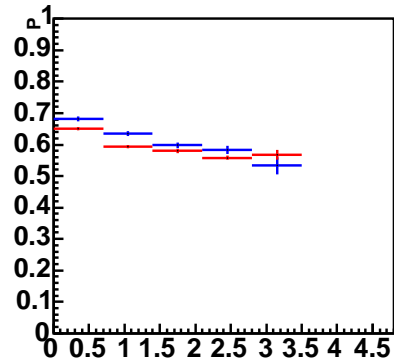
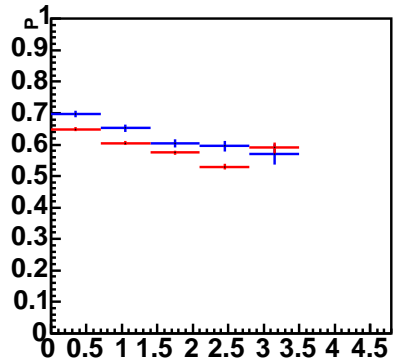
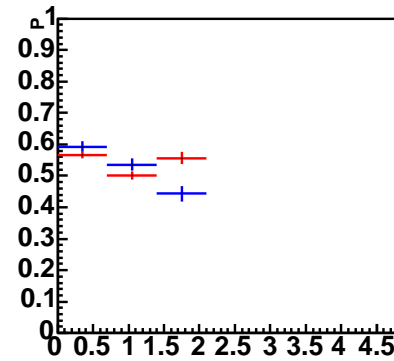
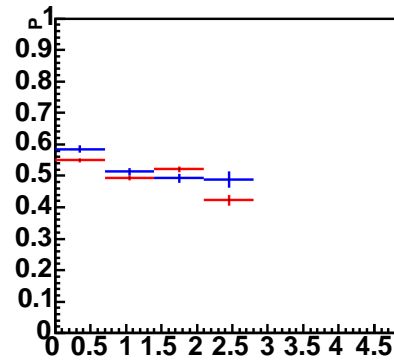
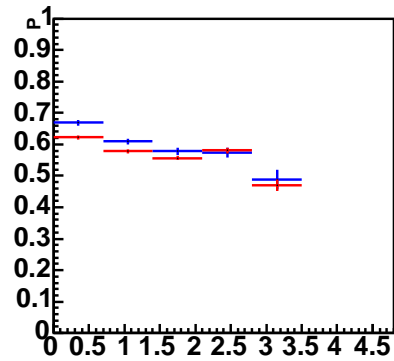
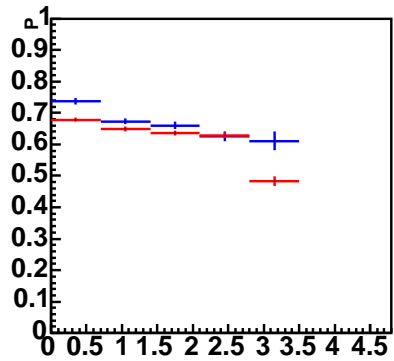
$d\sigma/dQ^2 dx d|\Delta\eta^*|$ (No Calibration)



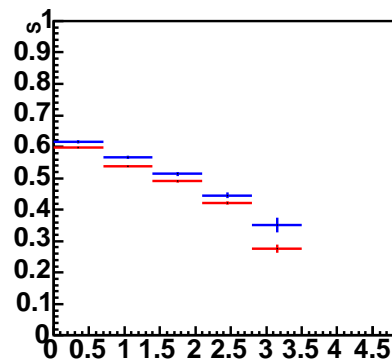
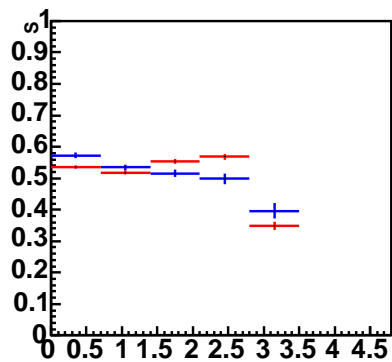
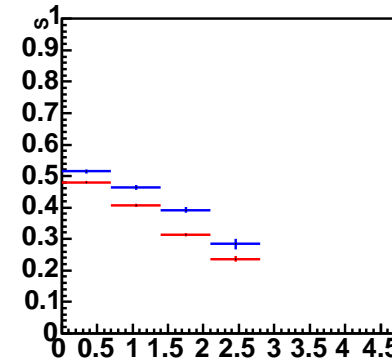
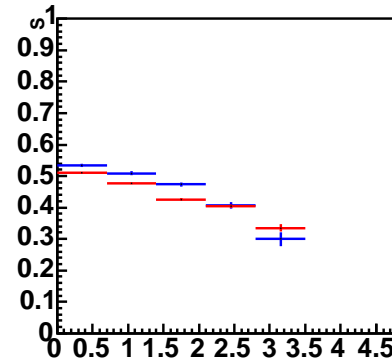
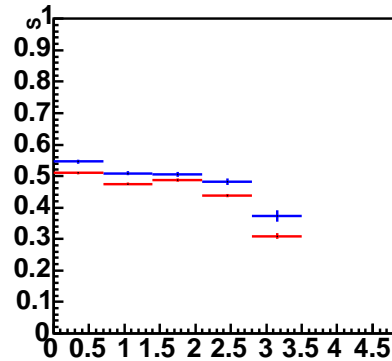
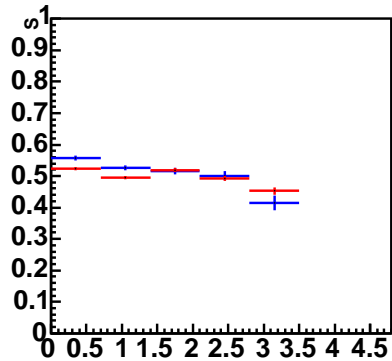
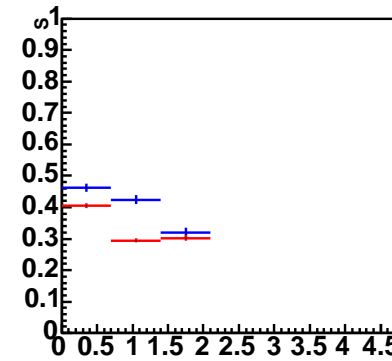
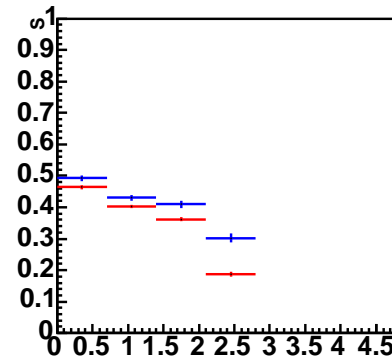
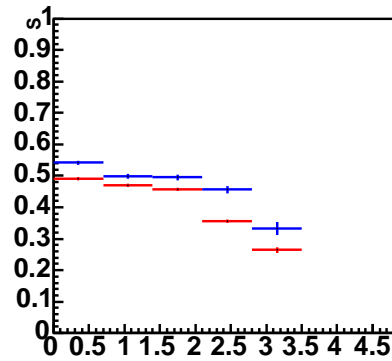
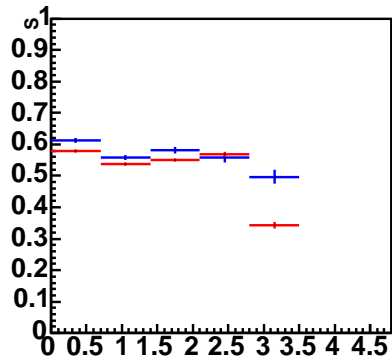
$d\sigma/dQ^2 dx d|\Delta\eta^*|$ Correction factors



$d\sigma/dQ^2 dx d|\Delta\eta^*|$ Purity



$d\sigma/dQ^2 dx d|\Delta\eta^*|$ Stability



Summary

- Control Plots: Correct for bg-finder and reweight $E - p_z$?
- $\Delta\phi$: Large correction factors. P & S > 0.4
- Jet Calibration. 30 % more dijetevents on detector level.
- 9900 Vs. 9697: Shape described, but 9900 \sim 20 % larger...