Inclusive NC reduced cross sections

ePIC inclusive PWG meeting April 29, 2024



Cross section from simulation files

$$\frac{d\sigma}{dx_B dQ^2} = \frac{N}{C_{acc} \cdot C_{bin} \cdot L \cdot \Delta x_B \Delta Q^2} \qquad \bullet Ac$$

$$\bullet Ac$$

- cceptance and bin migration corrections from simulation
- Keep separate to assess size of resolution effects
- Applying corrections to same MC events used for corrections...obtain exact generated distributions
- otain bin volumes from Monte Carlo (account for cuts)
- ale counts to integrated luminosity of 10 fb⁻¹.
- irrently only using electron track reconstruction
- Combination of tracking/calorimetry for electron reconstruction in-progress
- Working on fix to hadronic final state reconstruction methods





Bin volumes with kinematic cuts $dx_{B}dQ^{2}$ (10x100 GeV)







Bin volumes relative to no kinematic cuts $dx_B dQ^2/dx_B dQ_{no cuts}^2$ (10x100 GeV)



										0.392
									0.402	0.972
								0.403	0.995	0.967
							0.406	0.995	0.998	0.947
						0.402	0.993	1.001	0.998	0.924
					0.402	0.994	0.998	1.002	1.000	0.878
				0.402	0.991	0.999	0.999	0.999	0.999	0.763
			0.403	0.996	1.001	0.999	0.999	0.998	0.875	0.121
		0.400	0.995	1.003	0.998	1.000	1.002	0.877	0.122	
	0.401	0.992	1.003	1.002	1.003	1.000	0.875	0.121		
).402	0.994	0.998	0.998	1.001	1.002	0.876	0.121			
.994	0.998	1.001	1.001	0.998	0.875	0.121				
.000	0.997	0.998	1.000	0.874	0.121					
.004	1.001	0.998	0.872	0.120						
).997	0.998	0.876	0.122							
.002	0.872	0.120								
0.551	0.121									
			<u> </u>				<u> </u>	<u> </u>		
10 ⁻²		10 ⁻¹								X _R







Reduced cross section (5x41, electron track)





Reduced cross section (10x100, electron track)



Reduced cross section (18x275, electron track)





Next steps

Reconstruction

Systematics!

- Resolution
- •Energy calibration
- •MC/generator uncertainty?
- •Need electron ID to assess purity

•Still working on hadronic reconstruction methods

