Updated Kinematics and Uncertainty Projection for F_k kinematics

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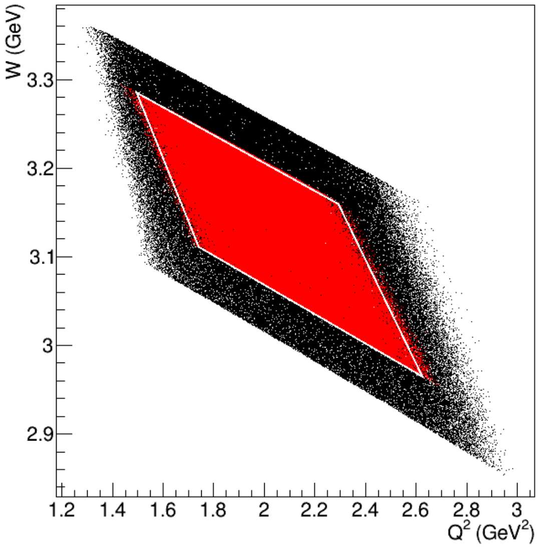
$Q^2 = 2.00\ GeV^2$

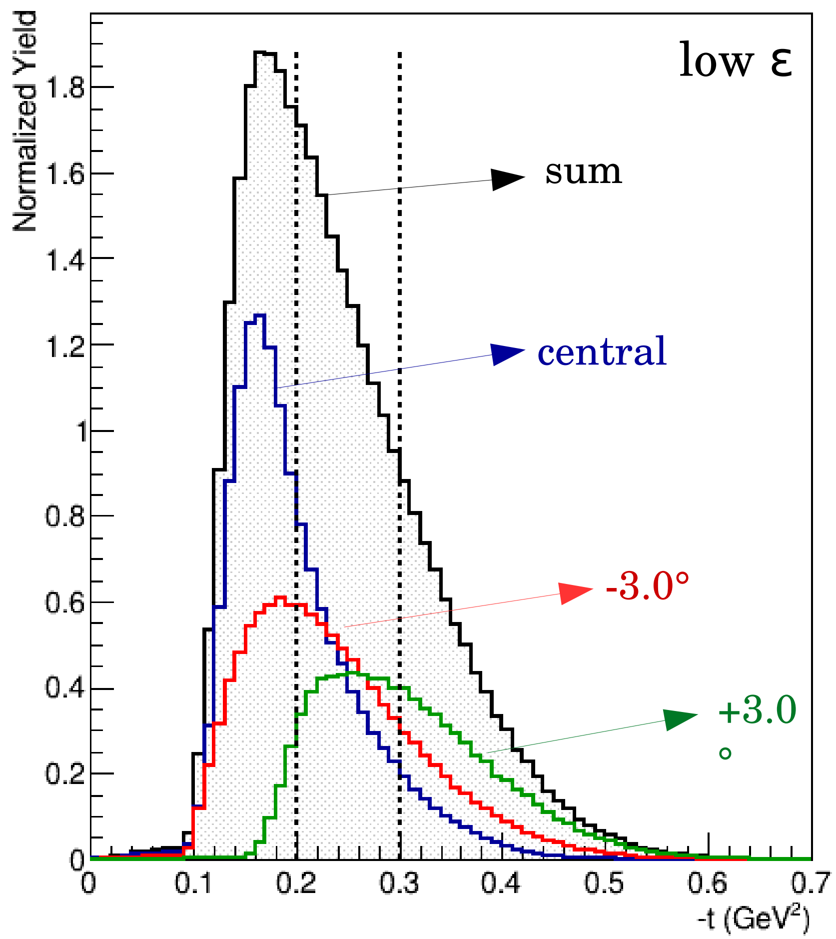
	T_{inc} (GeV)	Q^2 (GeV^2)	W (GeV)	x	$T_{e'}$ (GeV)	$\theta_{e'}$ (deg)	P_K (GeV/c)	θ_q (deg)	angle settings	$-t_{nomial}$ (GeV^2)
FROM RUNPLAN:										
high ε	10.921	2.00	3.14	0.18	5.07	10.90	5.56	9.17	+3,0,-3	0.138
low ε	8.761	2.00	3.14	0.18	2.91	16.10	5.56	7.71	+3,0,-2.2	0.138
δε = 0.17										
OPTIMIZED:										
high ε	10.618	2.00	3.20	0.17	4.56	11.66	5.77	8.53	+3,0,-3	0.131
low ε	8.518	2.00	3.20	0.17	2.46	17.75	5.77	6.94	+3,0,-1.4	0.131
δε = 0.20										

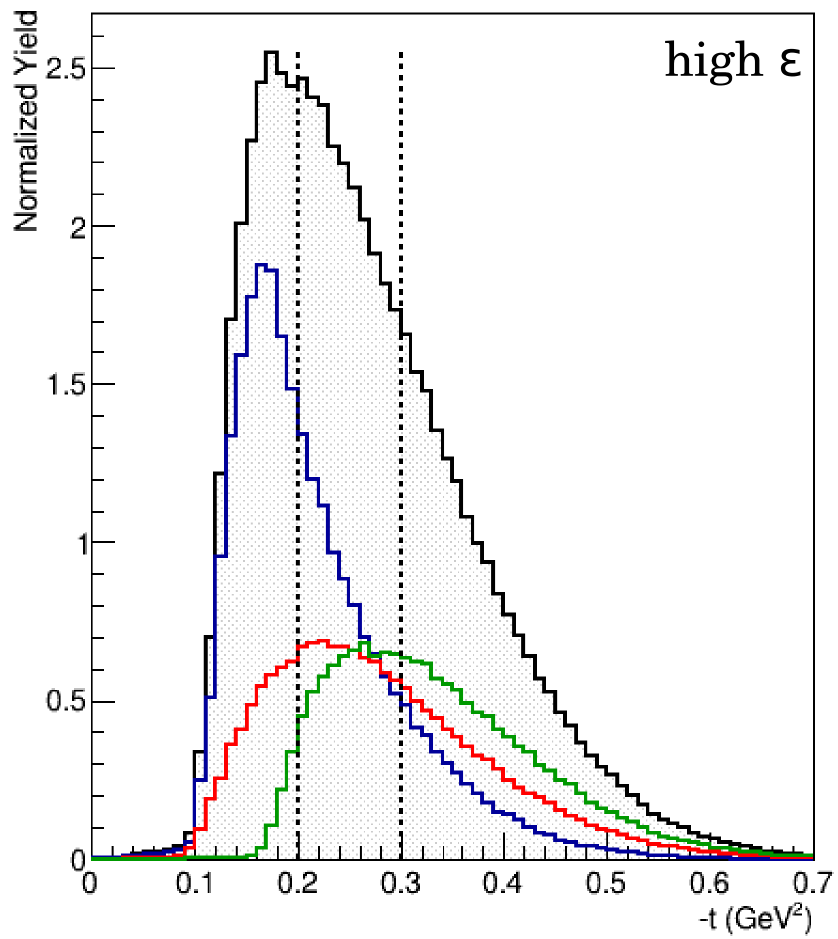
$Q^2 = 3.00\ GeV^2$

	T_{inc} (GeV)	Q^2 (GeV^2)	W (GeV)	x	$T_{e'}$ (GeV)	$\theta_{e'}$ (deg)	P_K (GeV/c)	θ_q (deg)	angle settings	$-t_{nomial}$ (GeV^2)
FROM RUNPLAN:										
high ε	10.921	3.00	3.14	0.25	4.54	14.13	6.05	9.64	+3,0,-3	0.219
low ε	8.191	3.00	3.14	0.25	1.81	26.01	6.05	6.88	+3,0	0.219
δε = 0.30										
OPTIMIZED:										
high ε	10.618	3.00	3.14	0.25	4.23	14.84	6.05	9.44	+3,0,-3	0.219
low ε	8.518	3.00	3.14	0.25	2.13	23.43	6.05	7.37	+3,0,-1.8	0.219
δε = 0.23										

- Spectrometer Acceptance Cuts
- Diamond Cut
- 3 unequal -t bins (with roughly equal statistics)
  e.g. in the plot below, bin #1 => 0.00 – 0.20;
  bin #2 => 0.20 – 0.30; bin #3 => 0.30 – 0.70







Uncertainties in σ_L and σ_T

high ε ⟶ $\sigma_1 = \sigma_T + \epsilon_1 \sigma_L = \sigma_T \,(1 + \frac{\epsilon_1}{R})$

where, $R = \frac{\sigma_T}{\sigma_L}$

low ε ⟶ $\sigma_2 = \sigma_T + \epsilon_2 \sigma_L = \sigma_T \,(1 + \frac{\epsilon_2}{R})$

Separated cross sections

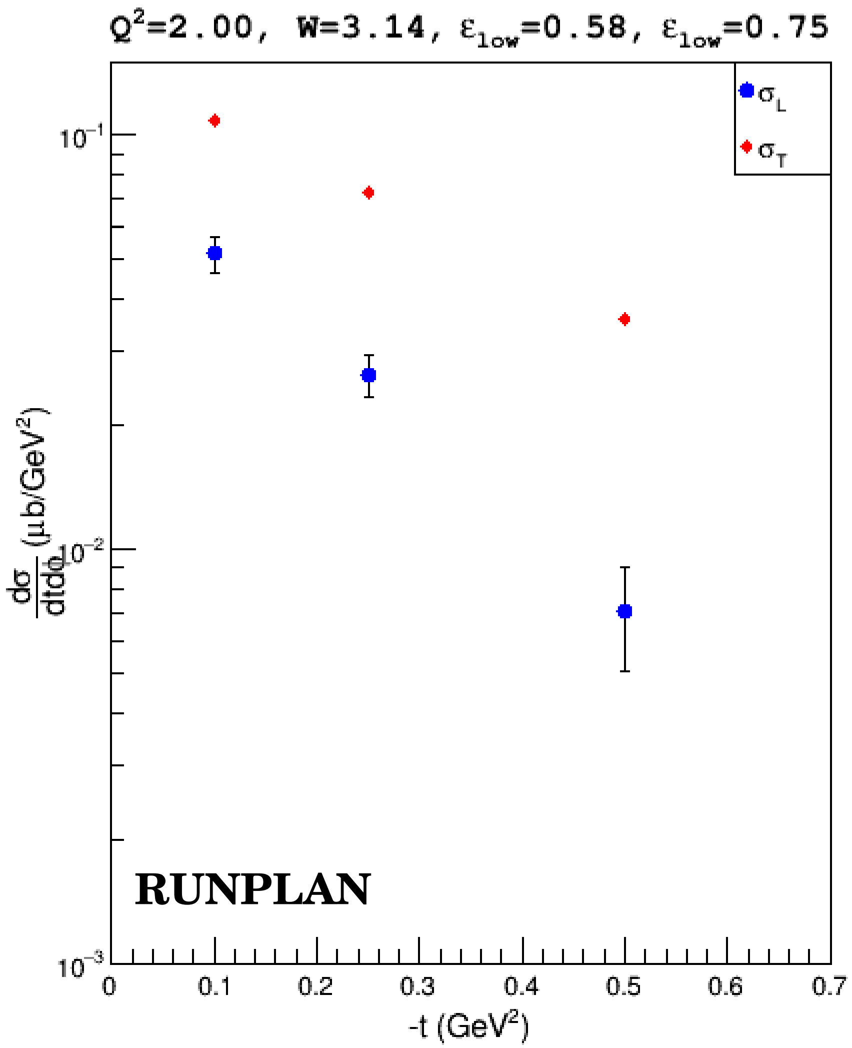
$$\sigma_L = \frac{\sigma_1 - \sigma_2}{(\epsilon_1 - \epsilon_2)}$$

$$\sigma_T = \frac{\sigma_2\,\epsilon_1 - \sigma_1\,\epsilon_2}{(\epsilon_1 - \epsilon_2)}$$

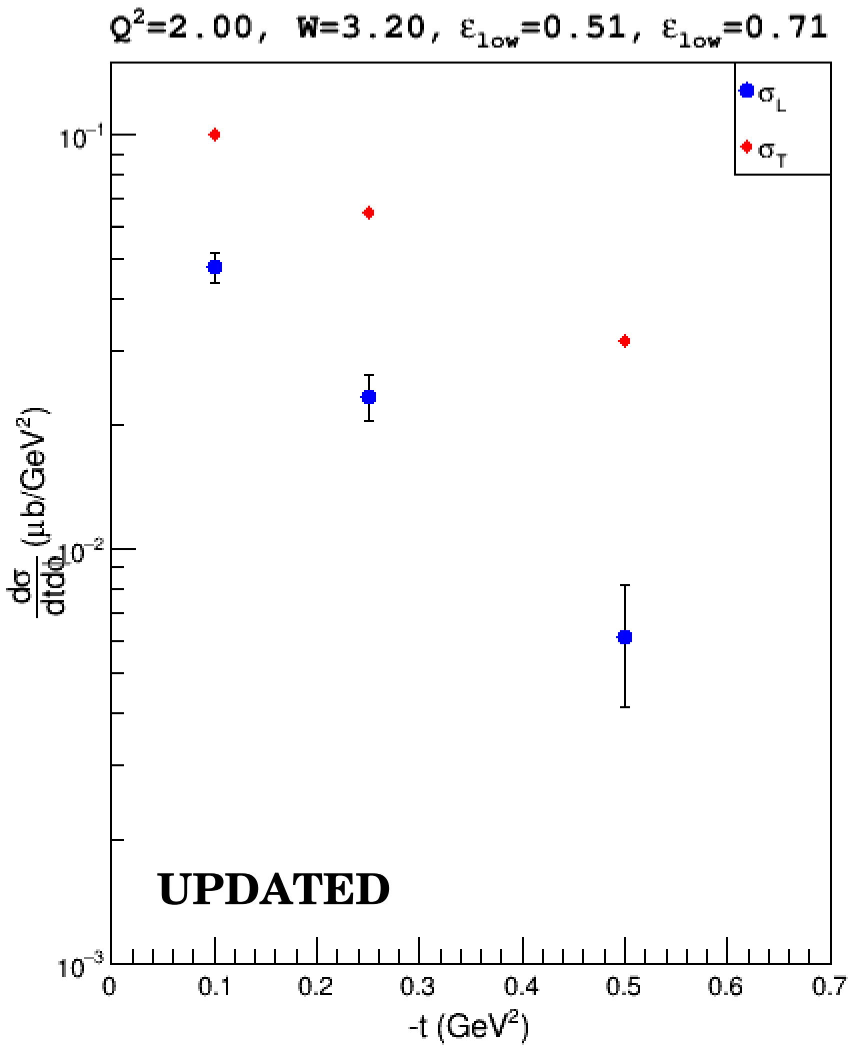
$$\frac{\delta\sigma_T}{\sigma_T}(\%) = \frac{1}{(\epsilon_1 - \epsilon_2)}\sqrt{\epsilon_1^2\left(\frac{\delta\sigma_1}{\sigma_1}\right)^2\left(1 + \frac{\epsilon_2}{R}\right)^2 + \epsilon_2^2\left(\frac{\delta\sigma_2}{\sigma_2}\right)^2\left(1 + \frac{\epsilon_1}{R}\right)^2}$$

$$\frac{\delta\sigma_L}{\sigma_L}(\%) = \frac{1}{(\epsilon_1 - \epsilon_2)}\sqrt{\left(\frac{\delta\sigma_1}{\sigma_1}\right)^2(R + \epsilon_1)^2 + \left(\frac{\delta\sigma_2}{\sigma_2}\right)^2(R + \epsilon_2)^2}$$

$Q^2 = 2.00\ GeV^2$

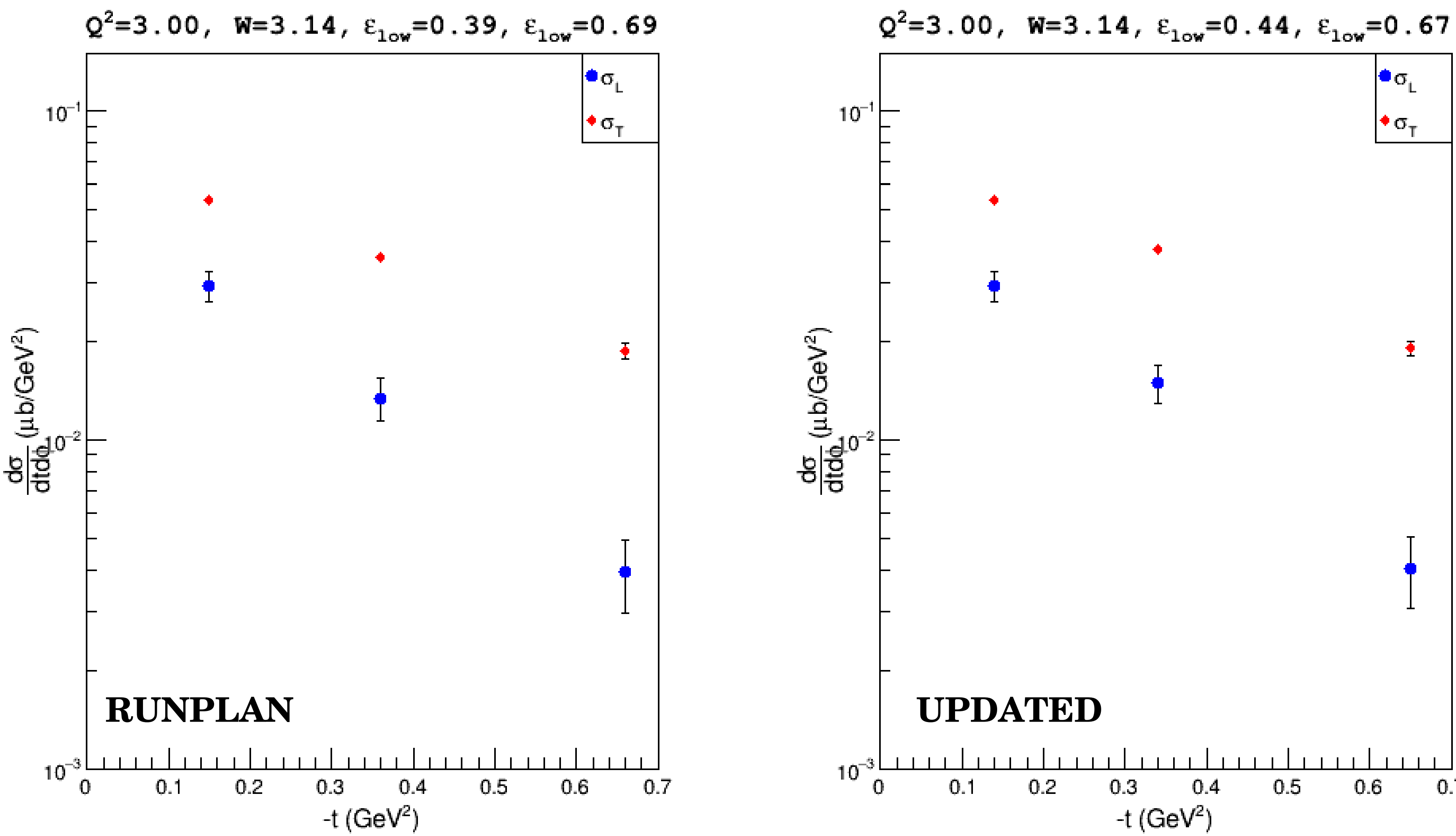


Q2=2.00, W=3.14, εlow=0.58, εlow=0.75
σL
σT
dσ/dtdφ (μb/GeV2)
10−1
10−2
10−3
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
-t (GeV2)
RUNPLAN



Q2=2.00, W=3.20, εlow=0.51, εlow=0.71
σL
σT
dσ/dtdφ (μb/GeV2)
10−1
10−2
10−3
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
-t (GeV2)
UPDATED

$Q^2 = 3.00\ GeV^2$



Q²=3.00, W=3.14, ε_low=0.39, ε_low=0.69
σ_L
σ_T
dσ/dtdφ (μb/GeV²)
-t (GeV²)
RUNPLAN
Q²=3.00, W=3.14, ε_low=0.44, ε_low=0.67
σ_L
σ_T
dσ/dtdφ (μb/GeV²)
-t (GeV²)
UPDATED

Further Work

- Update factorization kinematics @ $x = 0.40$ ($Q^2 = 3.00$, 4.40, and 5.50 GeV^2)
- Finalize the h(e,ep) kinematics