

KaonLTMeeting

February 1st, 2024

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Overview

1. **Dave's Delta Adjustments**
2. **Weight Iteration Script**
3. **SIMC Weight**

1) Delta Adjustments

Table of values in plot on previous slide

```
h_momentum_list = [0.889, 0.968, 2.185, 2.328, 3.266, 4.2, 4.712, 5.292, 6.59]
c0_list = [-1,0, -2.0, -2.0, -2.0, -3.0, -5.0, -6.0, -6.0, -3.0]

c0_dict = {}

for c0, p in zip(c0_list, h_momentum_list):
    if p == 0.889:
        c0_dict["Q2p1W2p95_lowe"] = c0 # Proper value 0.888
    elif p == 0.968:
        c0_dict["Q0p5W2p40_lowe"] = c0
        c0_dict["Q3p0W3p14_lowe"] = c0 # Proper value 1.821
        c0_dict["Q5p5W3p02_lowe"] = c0 # Proper value 0.962
    elif p == 2.185:
        c0_dict["Q0p5W2p40_highe"] = c0 # Proper value 2.066
        c0_dict["Q3p0W2p32_lowe"] = c0
    elif p == 2.328:
        c0_dict["Q4p4W2p74_lowe"] = c0
    elif p == 3.266:
        c0_dict["Q5p5W3p02_highe"] = c0
    elif p == 4.2:
        c0_dict["Q3p0W3p14_highe"] = c0 # Proper value 4.204
    elif p == 4.712:
        c0_dict["Q4p4W2p74_highe"] = c0
    elif p == 5.292:
        c0_dict["Q2p1W2p95_highe"] = c0
    elif p == 6.59:
        c0_dict["Q3p0W2p32_highe"] = c0
```

P _{HMS}	C0	Unc.
0.889	-1.0	1.0
0.968	-2.0	1.0
2.185	-2.0	1.0
2.328	-2.0	1.0
3.266	-3.0	1.0
4.2	-5.0	0.5
4.712	-6.0	0.5
5.292	-6.0	0.5
6.59	-3.0	1.0

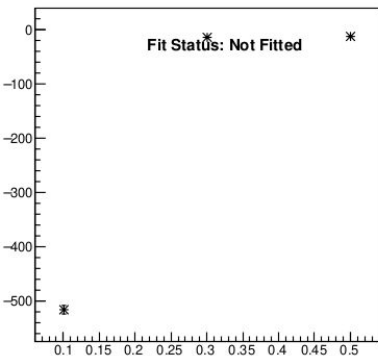
$$\delta_{HMS} = \delta_{HMS} + C_0 * h_{sxpf}$$

```
adj_hsdelta = evt.hsdelta + c0_dict["Q{}W{}_{}_e".format(Q2,W,EPSSSET)]*evt.hsxpf
```

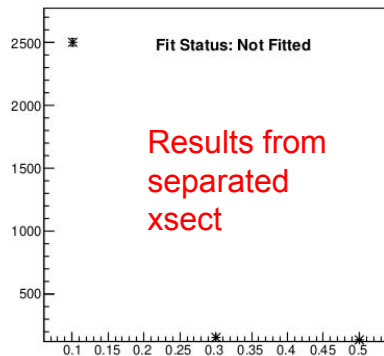
2) Weight Iteration

$$Q^2=2.11 \text{ W}=2.95$$

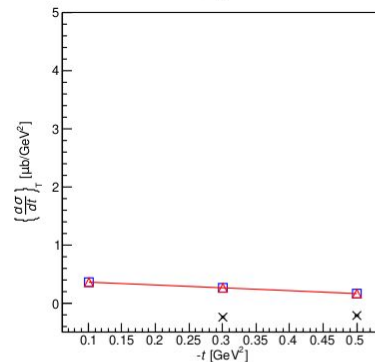
Sigma T Model Fit



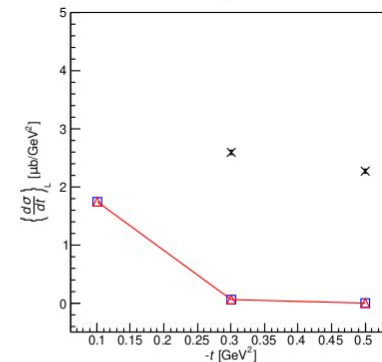
Sigma L Model Fit



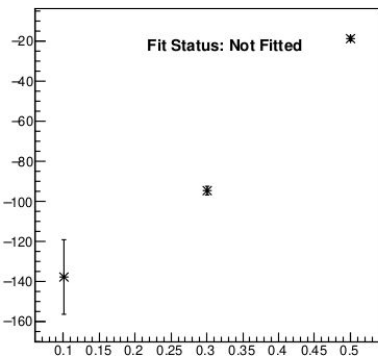
Sig T



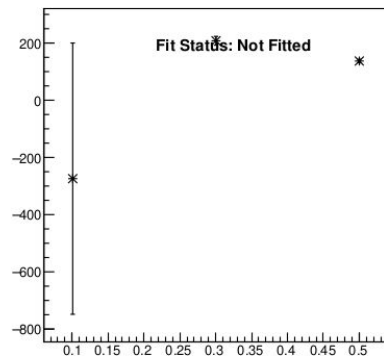
Sig L



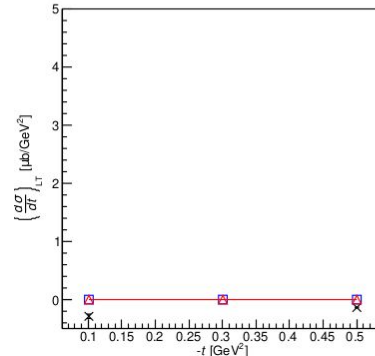
Sigma LT Model Fit



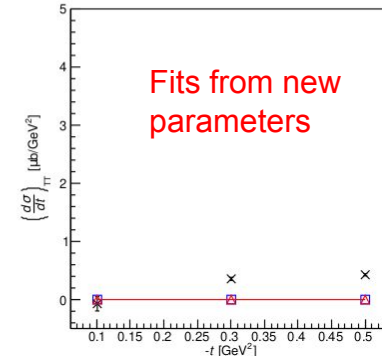
Sigma TT Model Fit



Sig LT



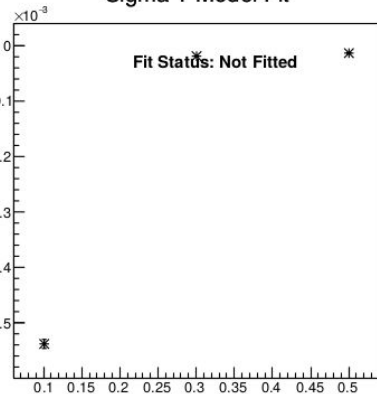
Sig TT



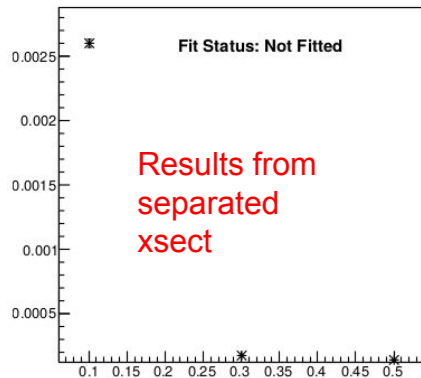
2) Weight Iteration

$$Q^2=2.11 \text{ W}=2.95$$

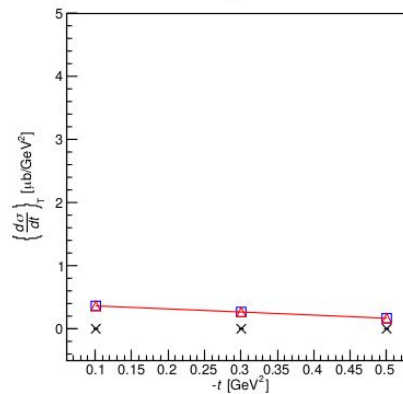
Sigma T Model Fit



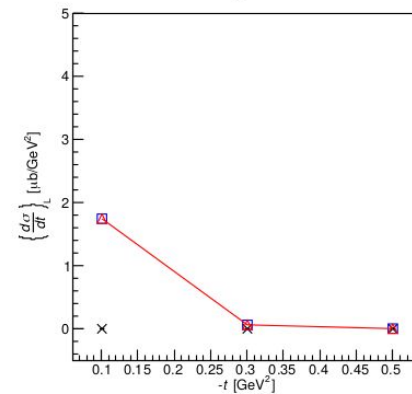
Sigma L Model Fit



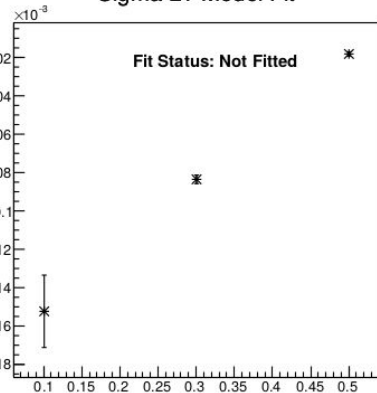
Sig T



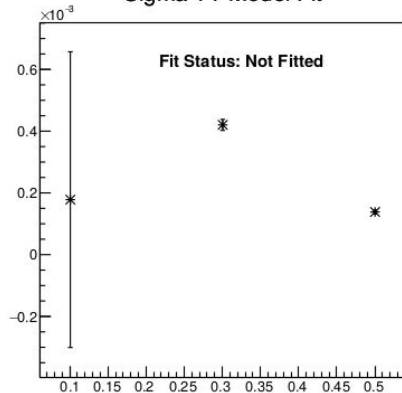
Sig L



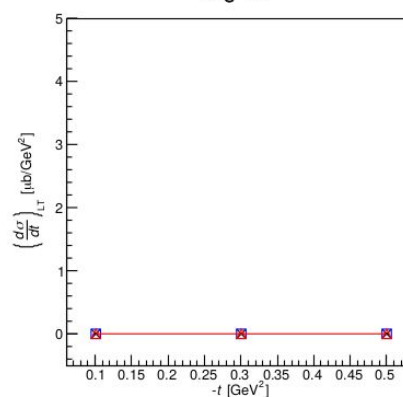
Sigma LT Model Fit



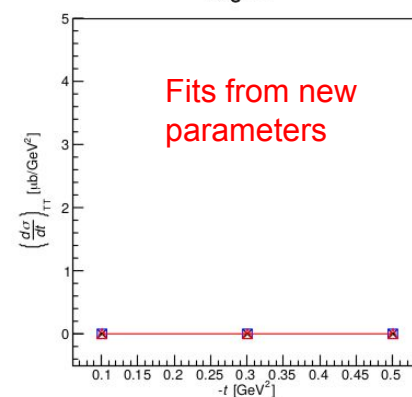
Sigma TT Model Fit



Sig LT



Sig TT



2) SIMC Weight

- In order to get Ydata/Ysimc to be even close to unity I need to divide the SIMC weight by 10^6
- I noticed the units of the output simc xsect was in MeV^2 rather than GeV^2 , which should be the origin of this 10^6
 - But when I rerun SIMC, I still need to incorporate this

```
dummy_target_corr = 4.8579
if phi_setting == "Right":
    normfac_dummy = 1/(dummy_charge_right*dummy_target_corr)
    normfac_data = 1/(data_charge_right)
    normfac_simc = (simc_normfactor)/(simc_nevents*1e6)
if phi_setting == "Left":
    normfac_dummy = 1/(dummy_charge_left*dummy_target_corr)
    normfac_data = 1/(data_charge_left)
    normfac_simc = (simc_normfactor)/(simc_nevents*1e6)
if phi_setting == "Center":
    normfac_dummy = 1/(dummy_charge_center*dummy_target_corr)
    normfac_data = 1/(data_charge_center)
    normfac_simc = (simc_normfactor)/(simc_nevents*1e6)
```

```
* RLT (1/30/2024): Removed 1.d+06 because
*                 units are GeV**2 not MeV**2
* sig=sig/2./pi/1.d+06      ldsig/dtdphicm in microbarns/MeV**2/rad
* sig=sig/2./pi      ldsig/dtdphicm in microbarns/GeV**2/rad
```

2) SIMC Weight

- I also checked units charge of SIMC and Data
 - But they seem to be consistent in mC

SIMC unit charge

```
CENTRAL.sigcc = 0.478920E-06
AVERAGE.sigcc = 0.216814E-06
charge = 0.100000E+01 mC
targetfac = 0.370858E-09
luminosity = 0.269645E+10 ub^-1
luminosity = 0.104994E+05 GeV^2
genvol = 0.439219E+01
normfac = 0.167946E+08
```

Data unit charge

```
KLT_BCM1_Beam_Cut_Current : 59.272 uA
KLT_Unser_Beam_Cut_Current : 46.737 uA

KLT_BCM1_Beam_Cut_Charge : 51.095 mC
KLT_Unser_Beam_Cut_Charge : 40.290 mC
```

```
KLT_BCM1_Beam_Cut_Current : {H.BCM1.scalerChargeCut/H.1MHz.scalerTimeCut:%.3f} uA
KLT_Unser_Beam_Cut_Current : {H.Unser.scalerChargeCut/H.1MHz.scalerTimeCut:%.3f} uA

KLT_BCM1_Beam_Cut_Charge : {H.BCM1.scalerChargeCut/1000.:%.3f} mC
KLT_Unser_Beam_Cut_Charge : {H.Unser.scalerChargeCut/1000.:%.3f} mC
```