Pion-LT/Kaon-LT Collaboration Meeting

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LTSep Analysis

- **Next steps are listed as follows:**
  - **Unseparated cross-section calculations**
  - **Model iterations**
  - **Rosenbluth equation fitting**
  - **L/T separated cross-section calculations**
  - **Pion Form Factor measurements**

Weight Re-calculation

- Results from the weight re-calculation script.
- Previously, using the wrong variables (RECON) to calculate weights.
- Added "epsiloni", "phicm" and "thetacm" variables to SIMC to calculate the correct weights using the weight calculation script.
- First, ran one of the physics settings through SIMC.
- Used the same parameters to recalculate the weights using the weight calculations script.

```
p1=3.9, p2=5.8, p3=0.0, p4=0.0, p5=214.0, p6=8.6, p7=0.7, p8=1.77, p9=0.05, p10=3.98, p11=-0.8, p12=0.7, p13=22.5, p14=14.9, p15=0.0, p16=0.0
Fit parameters loaded from new iteration file:
Progress: [                          ] 0% (0/899532)Event 0: Q2=3.5192832946777344, W=2.6738343238830566, theta_cm(rad)=0.20509770512580872, epsilon=0.2
77149498462677, phi_cm=4.379927635192871, t=0.2631569802761078, cross_section=9.946350370177152e-08
Event 0: sigcm_prev_iter = 9.9463484559692e-08, sigcm (new) = 9.946350370177152e-08
Event 0: Weight_prev_iter = 7.198261755547719e-07, Weight (new) = 7.198263140877214e-07
Progress: [>                         ] 0% (1/899532)Event 1: Q2=3.3427963256835938, W=2.754152536392212, theta_cm(rad)=0.21659457683563232, epsilon=0.26
61615014076233, phi_cm=3.7567152976989746, t=0.2486429363489151, cross_section=6.312315431804355e-08
Event 1: sigcm_prev_iter = 6.312313871603692e-08, sigcm (new) = 6.312315431804355e-08
Event 1: Weight_prev_iter = 3.545968922935572e-07, Weight (new) = 3.5459697993848705e-07
Progress: [>                         ] 0% (2/899532)Event 2: Q2=3.508849859237671, W=2.7293996810913086, theta_cm(rad)=0.09994568675756454, epsilon=0.25
95612406730652, phi_cm=4.906927585601807, t=0.17899467051029205, cross_section=5.55286770657013e-08
Event 2: sigcm_prev_iter = 5.5528687425976386e-08, sigcm (new) = 5.55286770657013e-08
Event 2: Weight_prev_iter = 4.144862657540216e-07, Weight (new) = 4.1448618842117024e-07
Progress: [->                        ] 8% (78258/899532)
```

- Getting the same weights.
- Calculated SIMC yields for both ROOT files.

Weight Re-calculation

- Change the **NtupleInit.f** and **results_write.f** files in SIMC.

nc_gfortran > NtupleInit.f

```
c    endif
     if (doing_pion .or. doing_kaon .or. doing_delta) then
        NtupleTag(m) = 'pdotqhat' ! 49
        m = m+1
        NtupleTag(m) = 'Q2i'      ! 50
        m = m+1
        NtupleTag(m) = 'Wi'       ! 51
        m = m+1
        NtupleTag(m) = 'ti'       ! 52
        m = m+1
        NtupleTag(m) = 'phicm'    ! 53
        m = m+1
        NtupleTag(m) = 'thetacm'  ! 54
        m = m+1
        NtupleTag(m) = 'epsiloni' ! 55
        if(using_tgt_field) then
           m = m+1
           NtupleTag(m) = 'th_tarq' ! 56
           m = m+1
           NtupleTag(m) = 'phitarq' ! 57
           m = m+1
           NtupleTag(m) = 'beta' ! 58
           m = m+1
           NtupleTag(m) = 'phis' ! 59
```

c_gfortran > results_write.f

```
c       ntu(11) = vertex%p%xptar          !mr
     if (doing_pion .or. doing_kaon .or. doing_delta) then
        dummy = pferx*vertex%uq%x + pfery*vertex%uq%y + pferz*vertex%uq%z
        if (dummy.eq.0) dummy=1.e-20
        ntu(43) = pfer/1000.*abs(dummy)/dummy     !p_fermi - GeV/c
        ntu(44) = main%sigcc              !d5sig
        ntu(45) = ntup%sigcm              !pion sig_cm
        ntu(46) = main%weight
        ntu(47) = decdist             !decay distance (cm)
        ntu(48) = sqrt(Mh2_final)
        ntu(49) = pfer/1000.*dummy            !p_fermi along q.
        ntu(50) = vertex%Q2/1.e6
        ntu(51) = main%w/1.e3
        ntu(52) = main%t/1.e6
        ntu(53) = main%phicm
        ntu(54) = main%thetacm
        ntu(55) = main%epsilon
        if(using_tgt_field) then
           ntu(56) = recon%theta_tarq
           ntu(57) = recon%phi_targ
           ntu(58) = recon%beta
           ntu(59) = recon%phi_s
           ntu(60) = recon%phi_c
           ntu(61) = main%beta
           ntu(62) = vertex%phi_s
```

LTSep Analysis

- **Working on physics setting: "Q2 = 3.85, W = 2.62, t = 0.21 (2 epsilons)"**

- **The following studies have been finalized for Pion Form Factor measurement:**
  - **Unseparated cross-section calculations**
  - **Model iterations**
  - **Rosenbluth equation fitting**
  - **L/T separated cross-section calculations**

- **In progress:**
  - Checking Implementation of functional fits to LT-separated cross-sections.
  - Working on model iterations.