

# KaonLTMeeting

January 24th, 2024

Richard Trotta

# Overview

1. **Issues with dummy runs**
2. **Weird t-distribution**
3. **Fixed binning issue**
4. **Separated Xsects Script**
5. **SIMC MM**
6. **SIMC High Q2**

# 1) dtype error

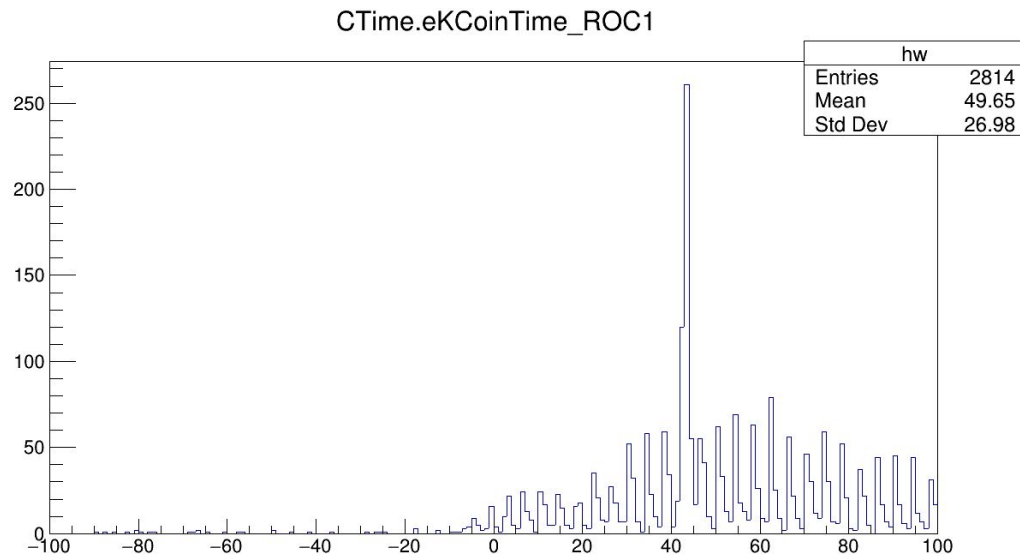
- When applying python cut script, some runs were returning this error and failed to be processed...
  - root\_numpy/\_tree.py:575: UserWarning: converter for dtype('O') is not implemented (skipping) cobj = \_librootnumpy.array2tree\_toCObj(arr, name=name, tree=incobj)
- Fixed code to catch error, which occurs when there is an empty root tree. Code now explicitly says which trees are empty

```
#####  
# COIN kcut #  
#####  
coin_ek_cut_all_noRF = misc.starttime+accept.delta+pid.p_coin_kcut  
#  
coin_ek_cut_prompt_noRF = coin_time.Coin_Kaon_Prompt+misc.starttime+accept.delta+pid.p_coin_kcut  
#  
coin_ek_cut_rand_noRF = coin_time.Coin_Kaon_Rand+misc.starttime+accept.delta+pid.p_coin_kcut  
#  
coin_ek_cut_all_RF = coin_time.SHMS_K_RF+misc.starttime+accept.delta+pid.p_coin_kcut  
#  
coin_ek_cut_prompt_RF = coin_time.Coin_Kaon_Prompt+coin_time.SHMS_K_RF+misc.starttime+accept.delta+pid.p_coin_kcut  
#  
coin_ek_cut_rand_RF = coin_time.Coin_Kaon_Rand+coin_time.SHMS_K_RF+misc.starttime+accept.delta+pid.p_coin_kcut
```

# 1) CT cut issue

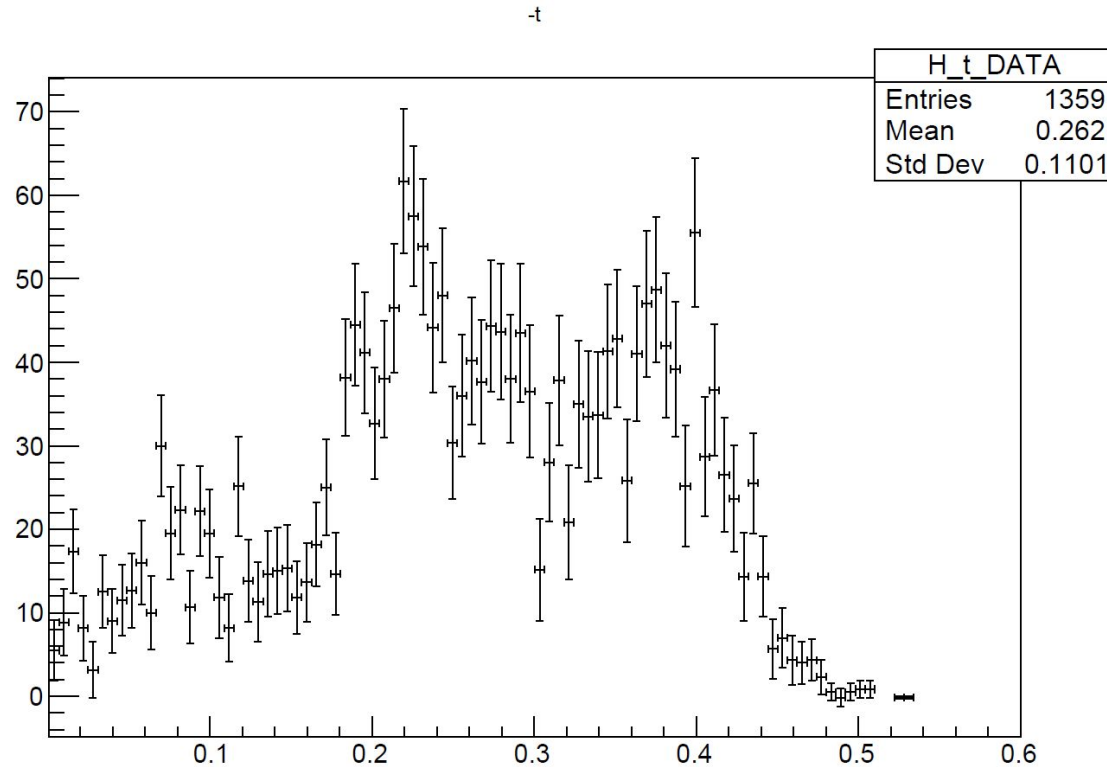
- Stephen and I met yesterday (1/24/24)
- The reason some of these dummy runs were returning empty trees was because the CT offset was not properly applied
- This is applied run by run in standard.kinematics
  - 7897

eHadCoinTime\_Offset = 44.000

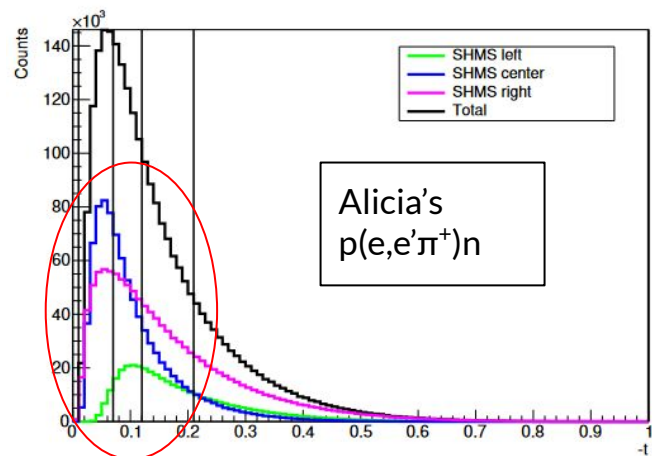


## 2) Weird t-distribution

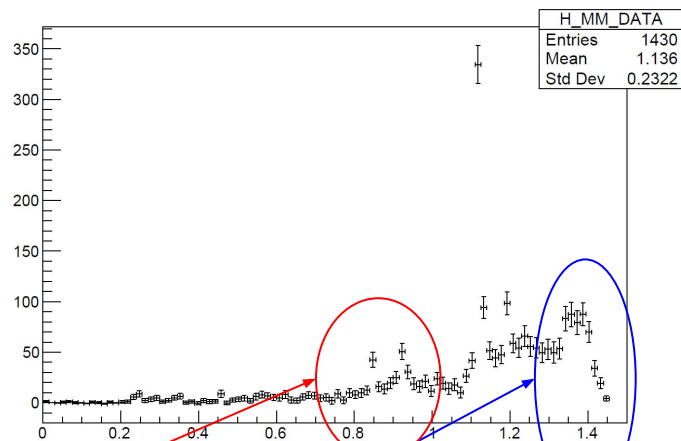
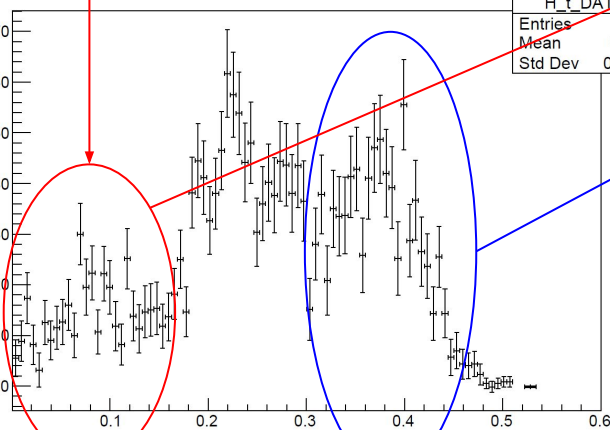
- Some settings (mostly center) see a rather odd t-distribution



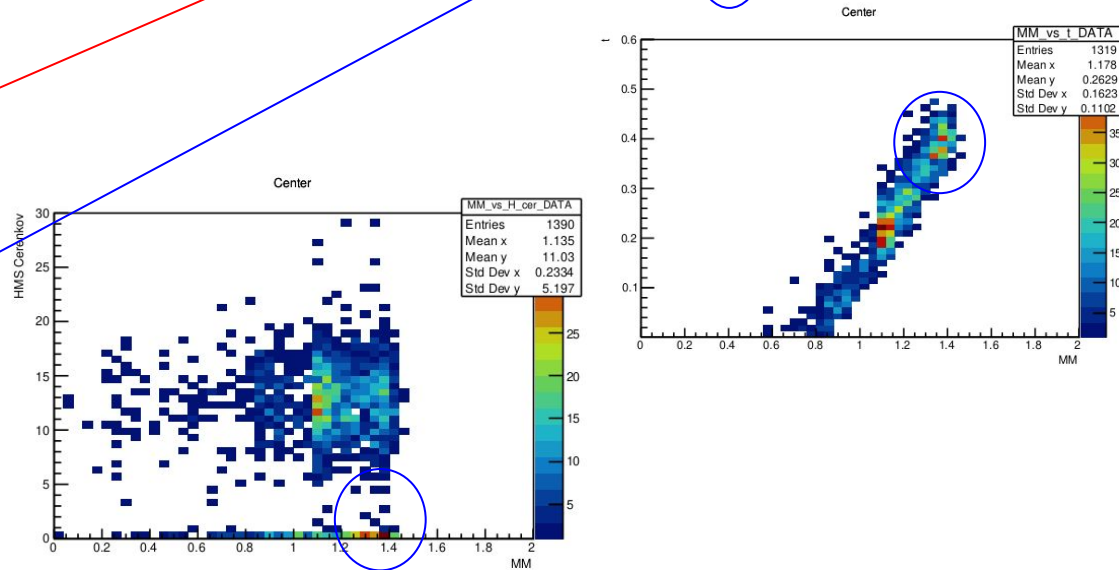
## 2) No HMS Cerenkov cut



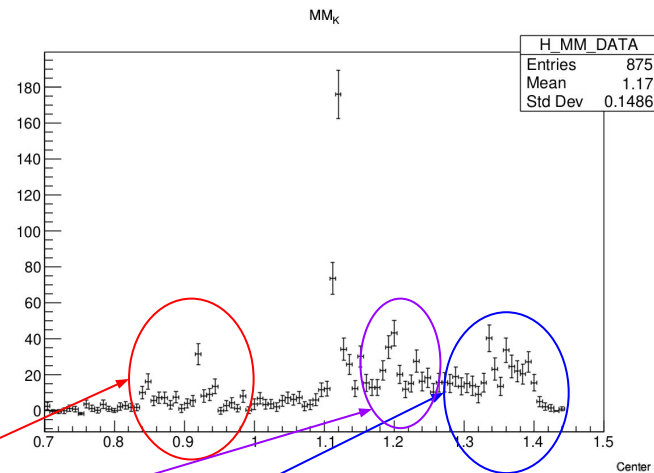
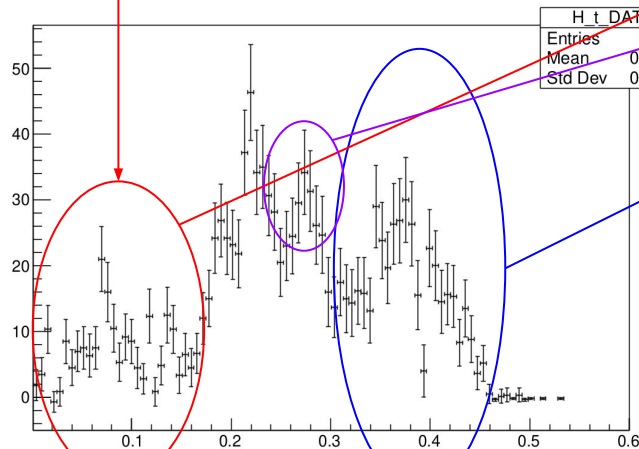
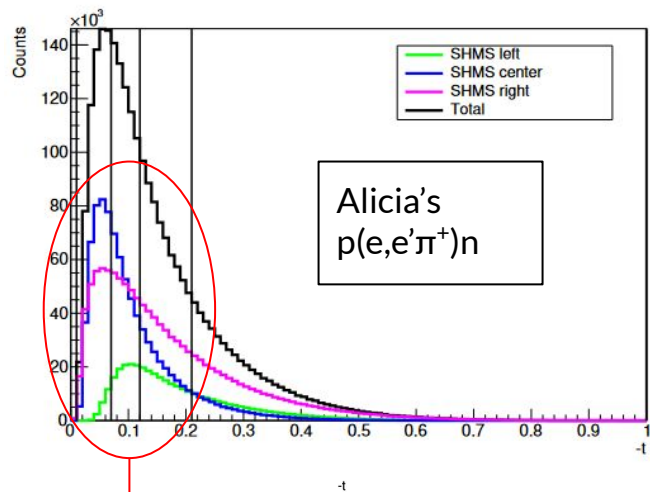
H_t_DATA	
Entries	1359
Mean	0.262
Std Dev	0.1101



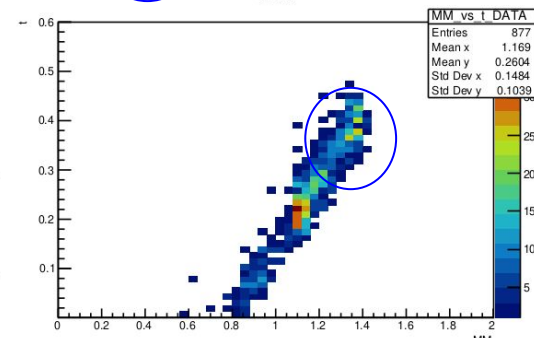
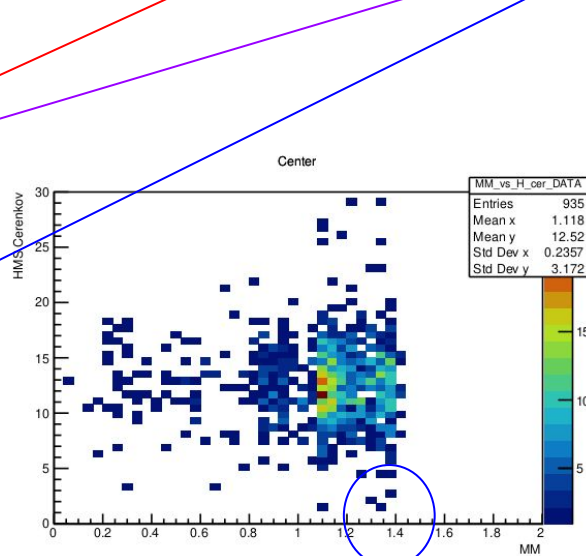
**$Q^2=2.115$**   
**Center**  
**Low eps**



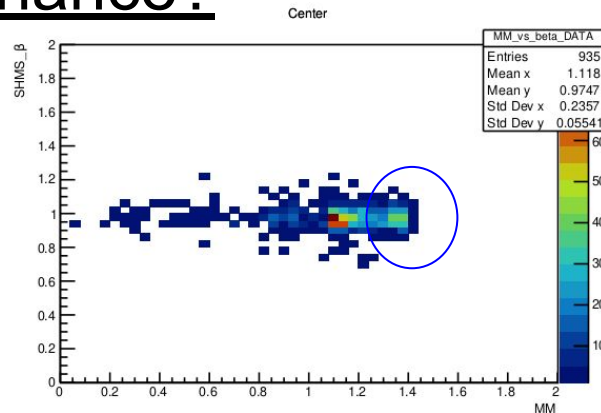
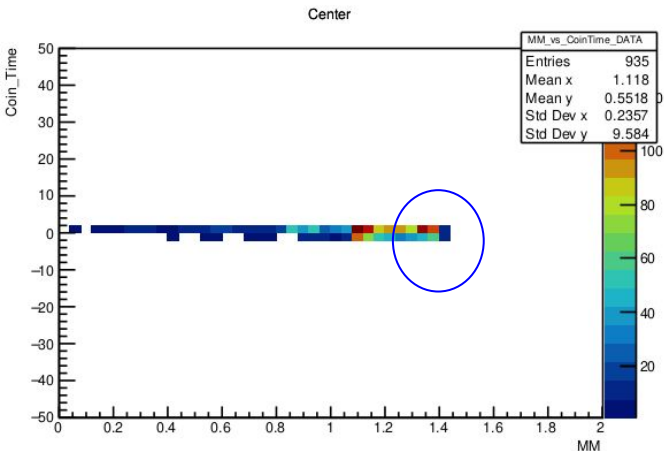
## 2) HMS Cerenkov cut ( $>1.5$ )



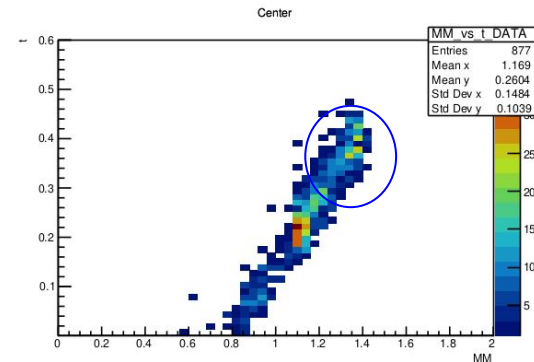
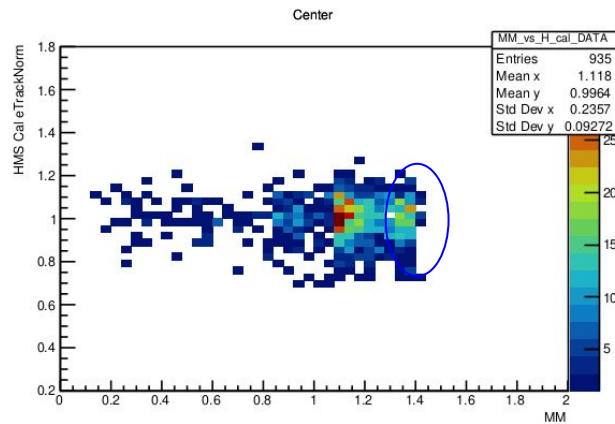
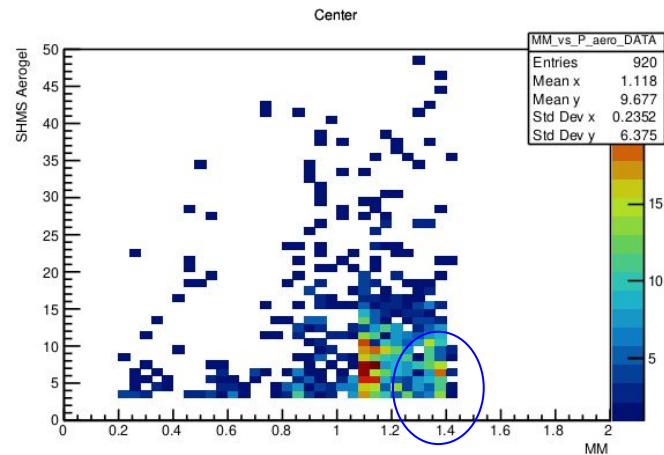
$Q^2=2.115$   
Center  
Low eps



## 2) Possibly high $\Lambda$ resonance?



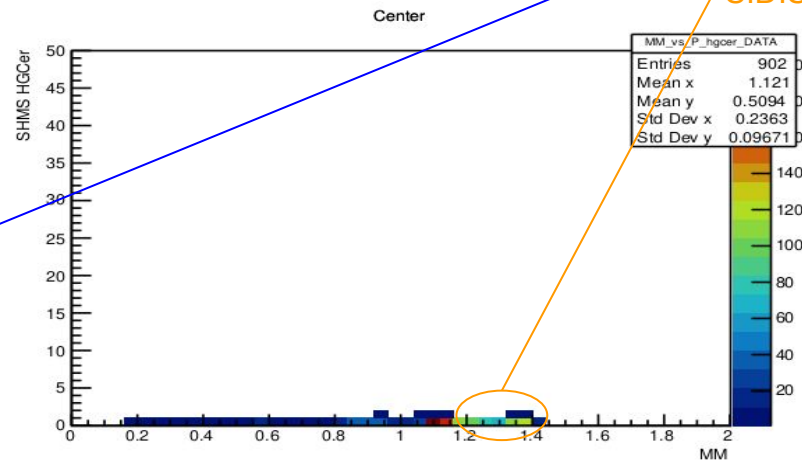
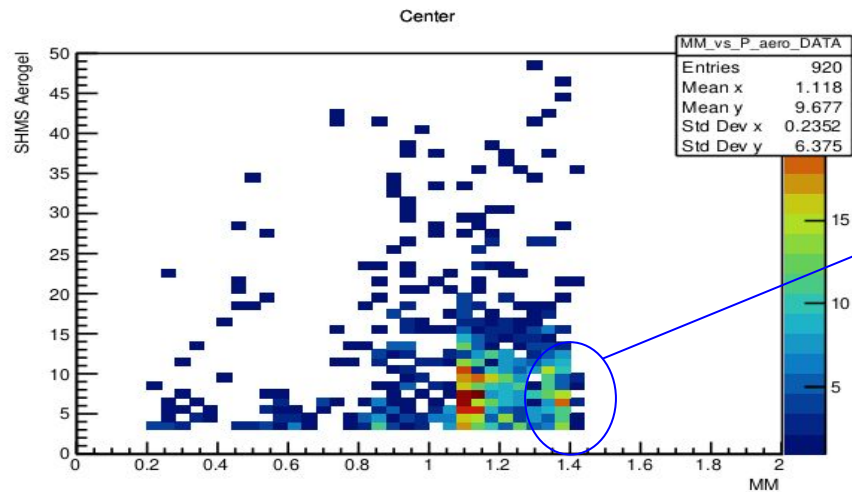
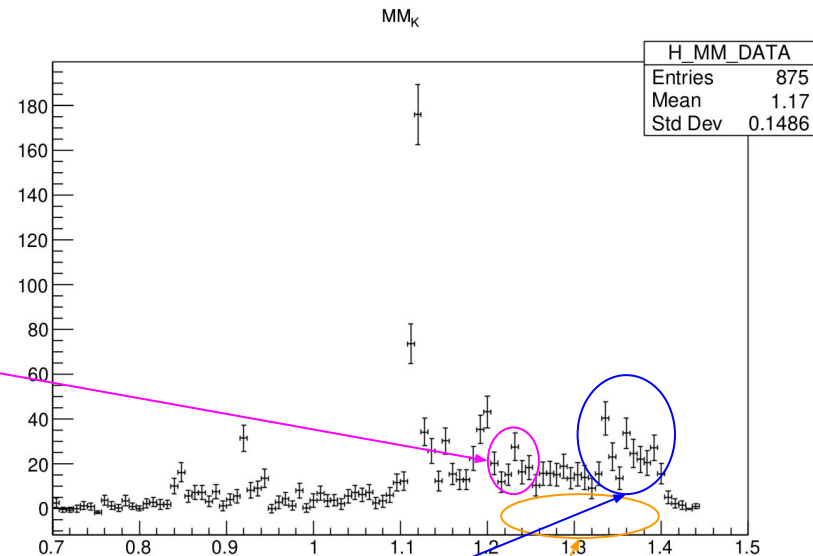
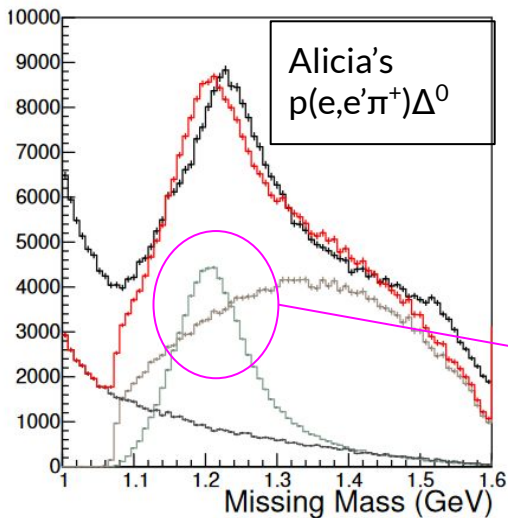
$Q^2=2.115$   
Center  
Low eps





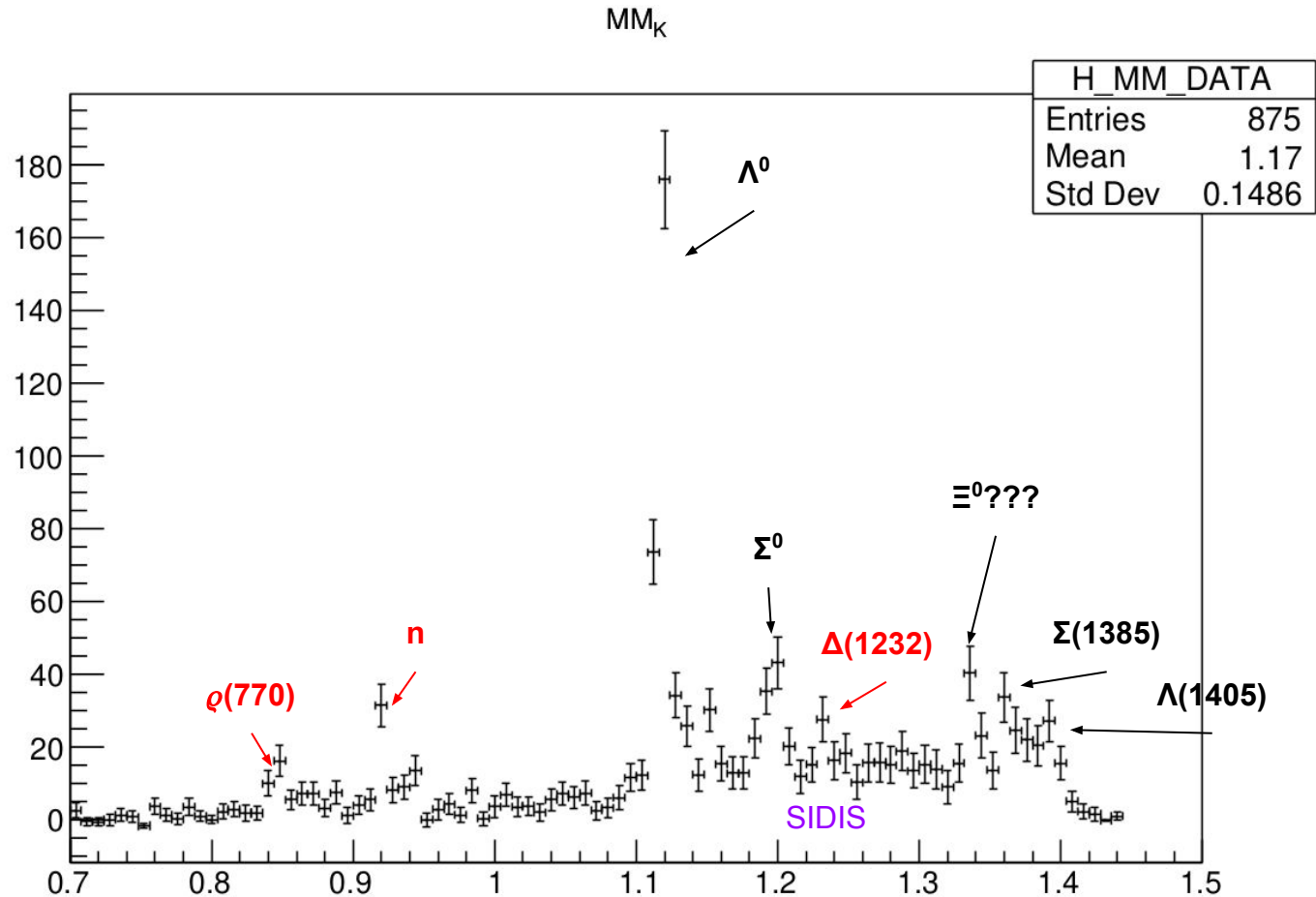
2)  $p(e, e' \pi^+) \Delta^0$

$Q^2=2.115$   
Center  
Low eps



## 2) Resonance Summary

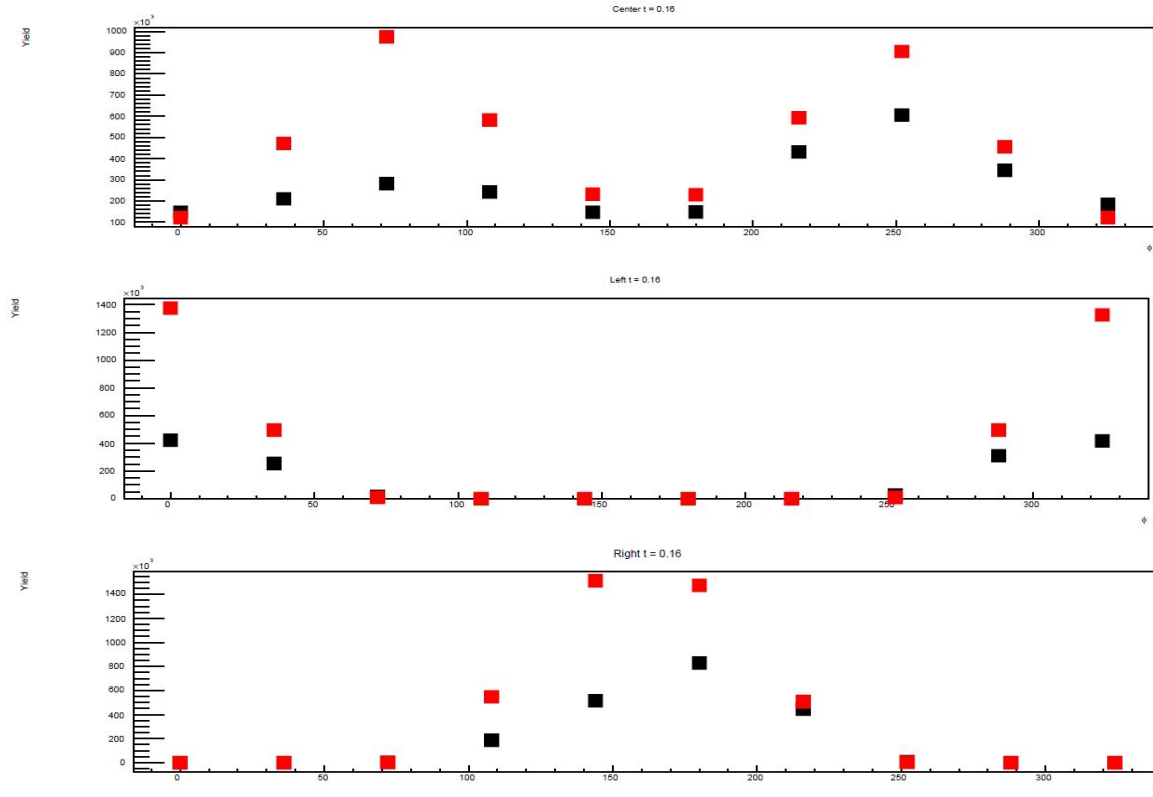
$Q^2=2.115$   
Center  
Low eps



### 3) Binning issue

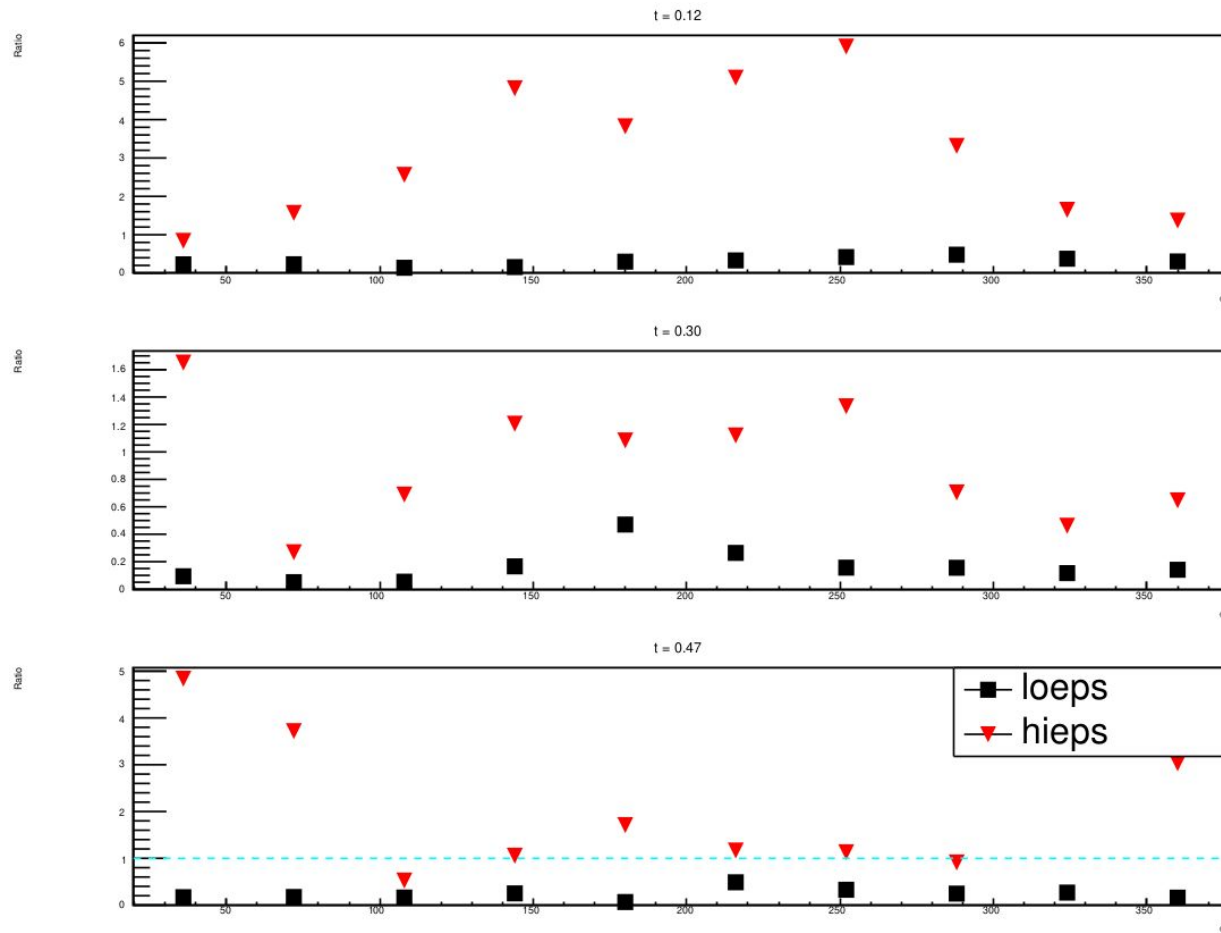
- When binning average  $Q^2$ ,  $W$ ,  $t$ ,  $\epsilon$ s I noticed that certain bins were always zero no matter what I set my  $t/\phi$  binning and  $t$  range.
- Ended up rewriting all the binning scripts for both binning average and yields (night before my Hall C talk 😞)
- Fixed the issue and everything finally makes sense!

$$Q^2=3.0$$
$$W=3.14$$



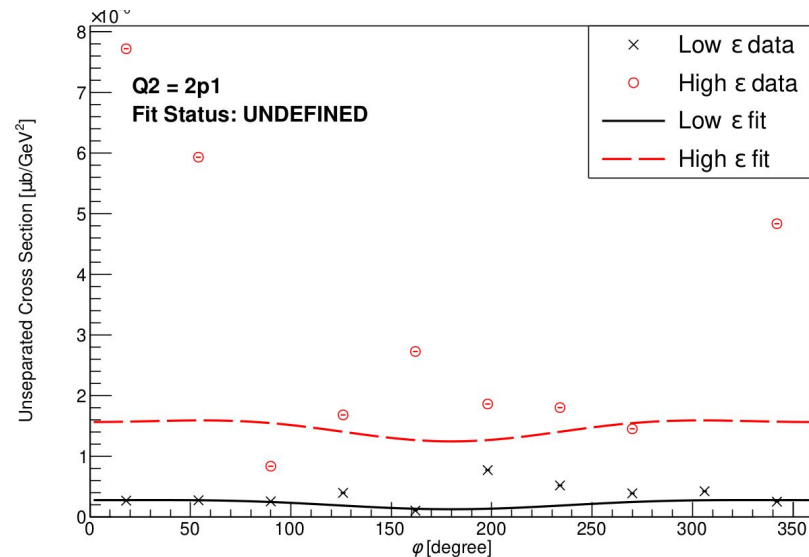
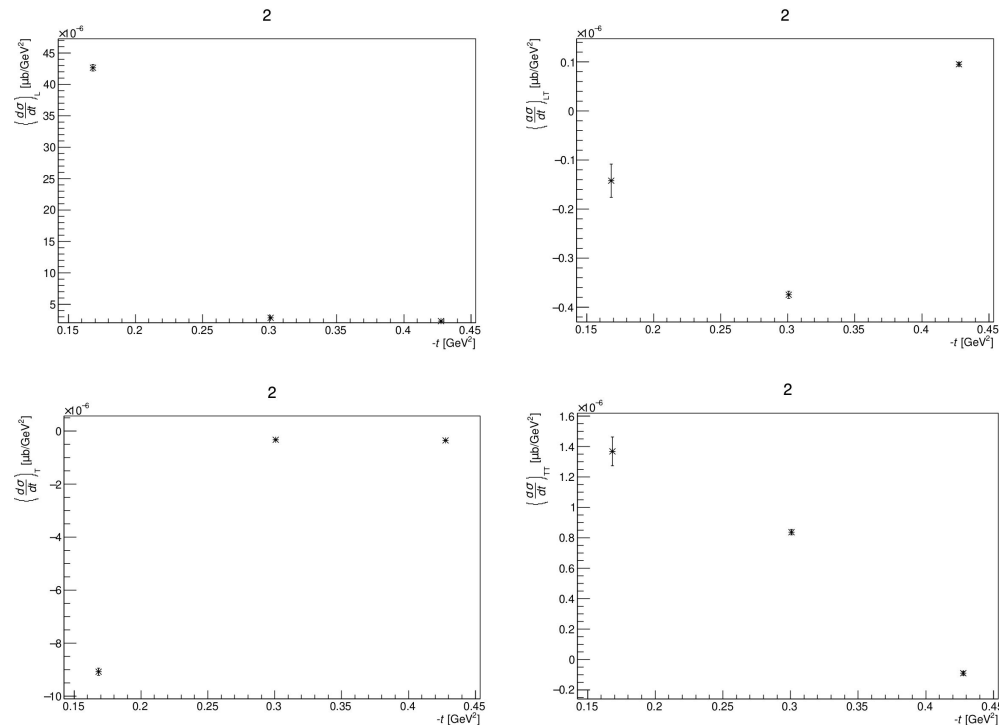
## 4) Separated Xsects Script Working

$Q^2=2.115$



# 4) Separated Xsects Script Working

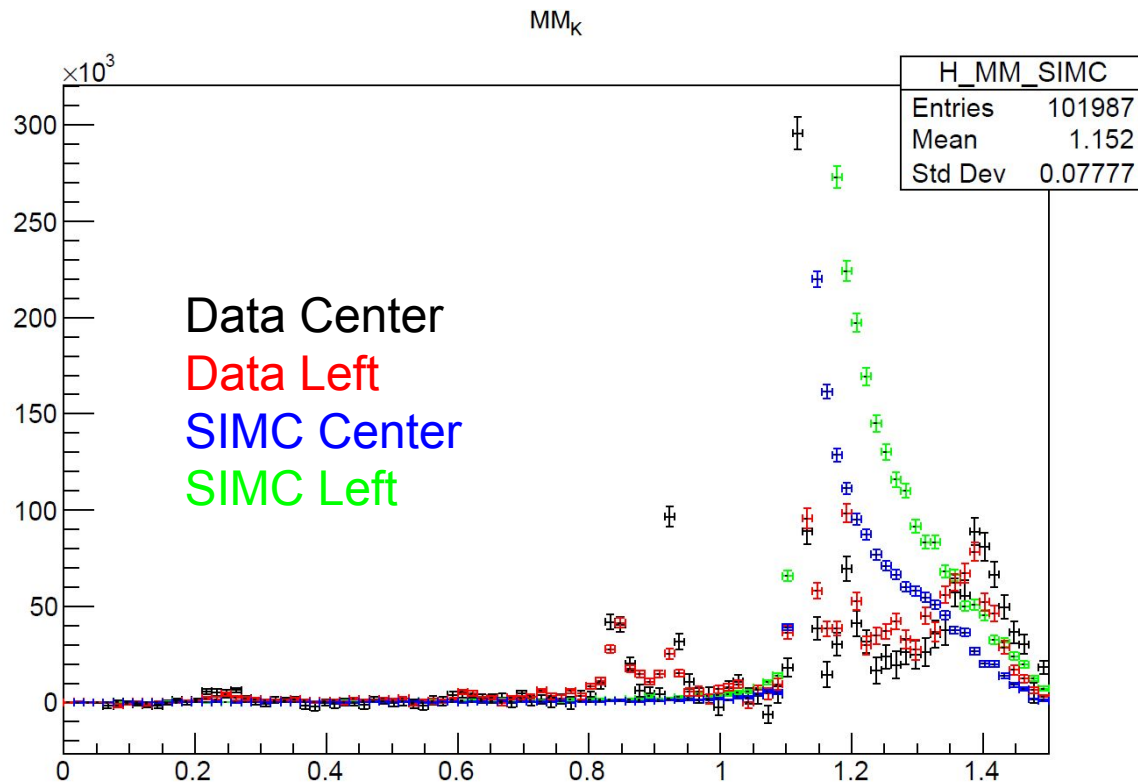
$Q^2=2.115$



## 5) Weird SIMC MM Distribution

- Very long radiative tail (??) for SIMC MM distribution
- Possibly a resolution issue?

**$Q^2=3.0$   
 $W=3.14$   
Low eps**



## 6) Negative Kinematics at High Q<sup>2</sup>

- Negative sigT driving this
- Setting parameterization to zero for sigT should resolve this
- SIMC currently running

