



University  
of Regina

# $H(e, e')p$ Study

**Abdennacer Hamdi**

Kaon LT Meeting, 08/15/2024

*Department of Physics, University of Regina, Regina, SK S4S 0A2, Canada*

All Cuts

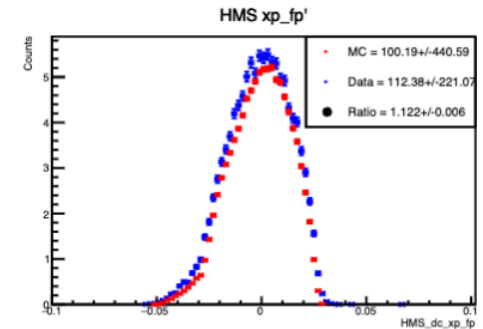
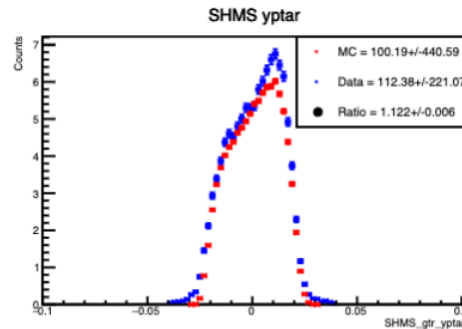
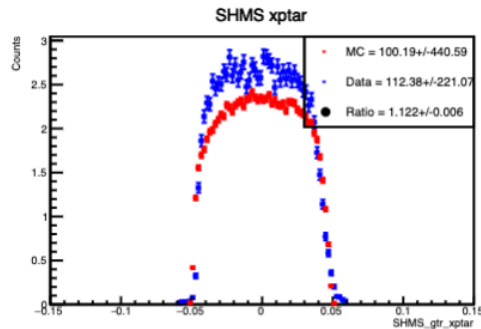
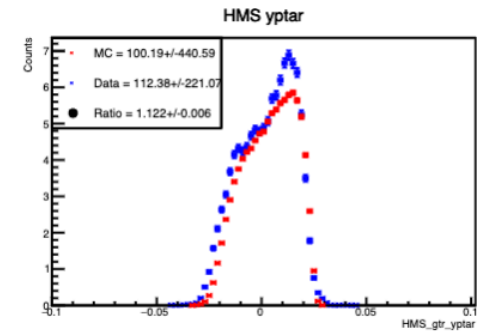
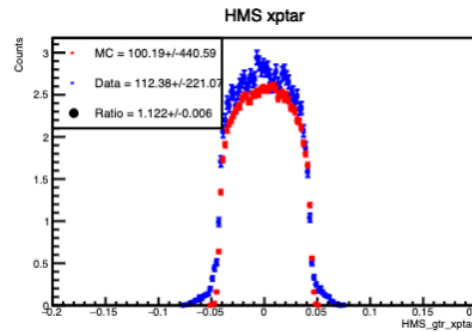
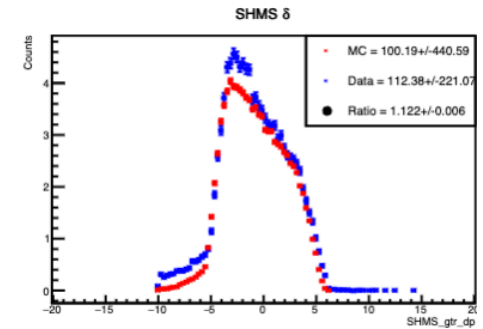
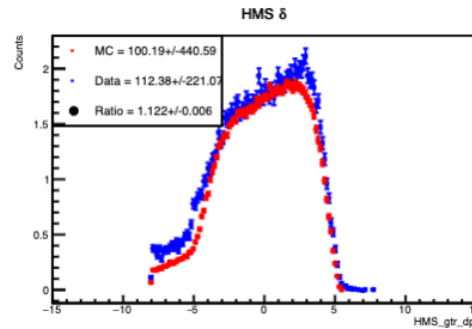
coin\_ep\_cut\_prompt\_RF

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[{"H_gtr_dp" : ((H_gtr_dp > -8) & (H_gtr_dp < 8))}, {"P_gtr_dp" : ((P_gtr_dp > -10) & (P_gtr_dp < 20))}, {"H_gtr_th" : ((H_gtr_xp > -0.08) & (H_gtr_xp < 0.08))}, {"H_gtr_ph" : ((H_gtr_yp > -0.045) & (H_gtr_yp < 0.045))}, {"P_gtr_th" : ((P_gtr_xp > -0.06) & (P_gtr_xp < 0.06))}, {"P_gtr_ph" : ((P_gtr_yp > -0.04) & (P_gtr_yp < 0.04))}, {"CTime_epCoinTime_ROC1" : (CTime_epCoinTime_ROC1 > ((0)-((4.008)/2.0)-(0.25))) & (CTime_epCoinTime_ROC1 < ((0)+((4.008)/2.0)+(0.25)))}, {"H_gtr_beta" : ((abs(H_gtr_beta-1)) < 0.3)}, {"H_cer_npeSum" : (H_cer_npeSum > 2.0)}, {"H_cal_etottracknorm" : (H_cal_etottracknorm > 0.7)}]
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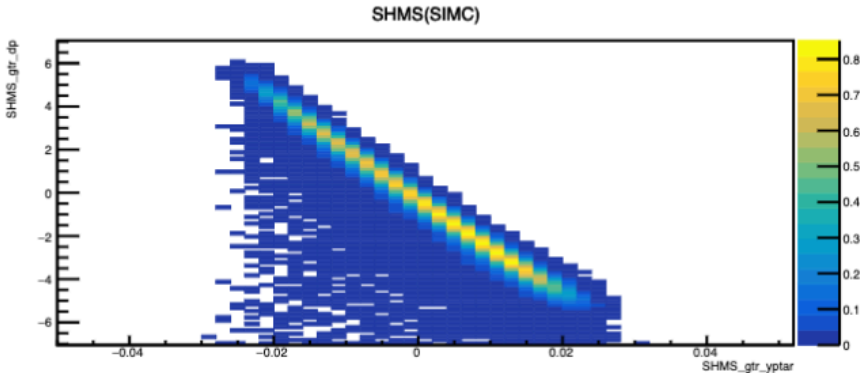
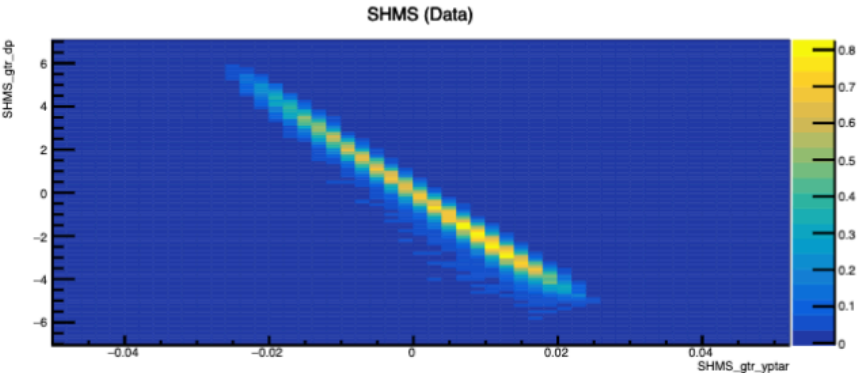
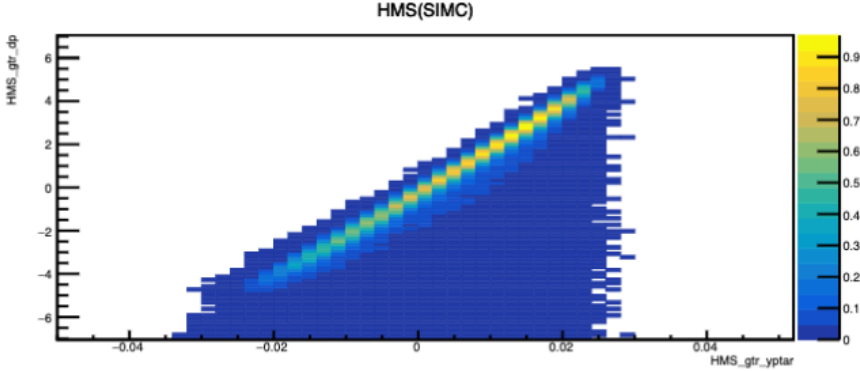
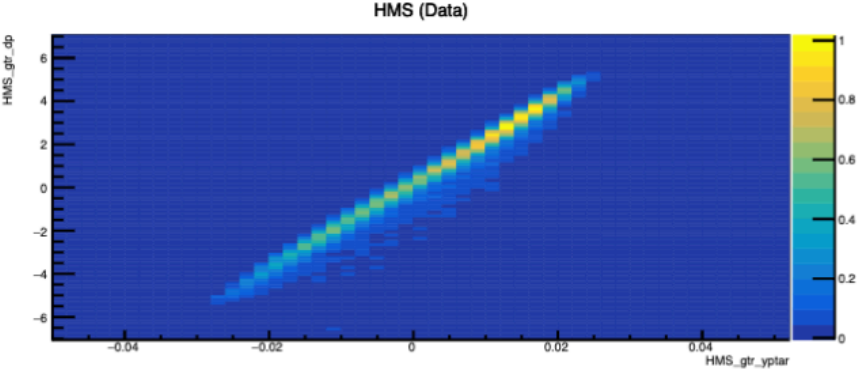
## All Cuts

HeePCoin Setting  
Beam Energy = 8.213  
HMS\_p = 4.672  
HMS\_theta = 24.000  
SHMS\_p = 4.371  
SHMS\_theta = 25.775  
Red = SIMC  
Blue = DATA

Data/SIMC Ratio = 1.122 +/- 0.006



All Cuts



No PID Cut

coin\_ep\_cut\_prompt\_RF

```
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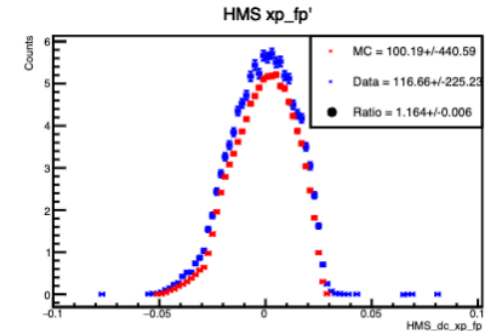
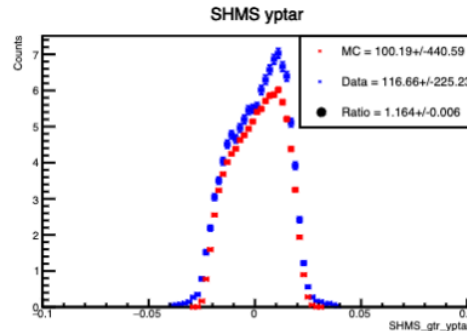
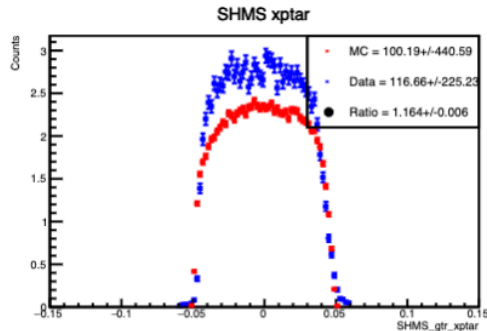
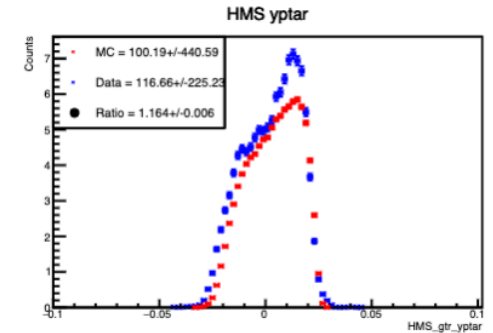
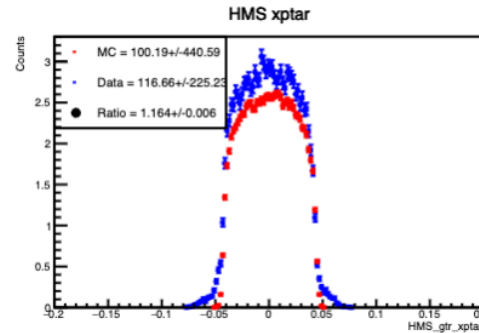
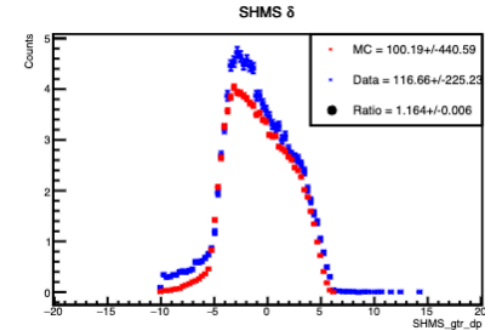
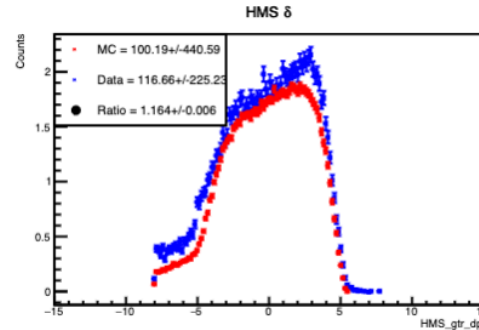
# HeeP Data vs. SIMC

## 8.2 GeV

No PID Cut

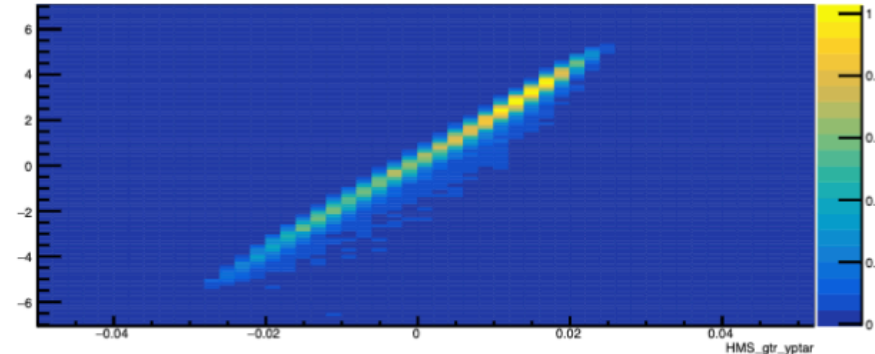
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Data/SIMC Ratio = 1.164 +/- 0.006

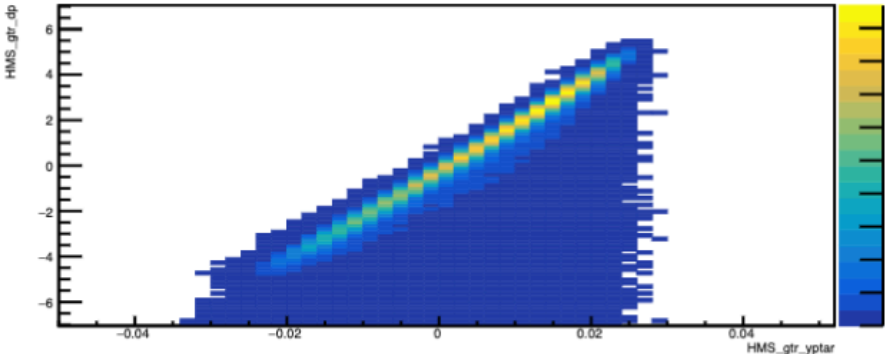


No PID Cut

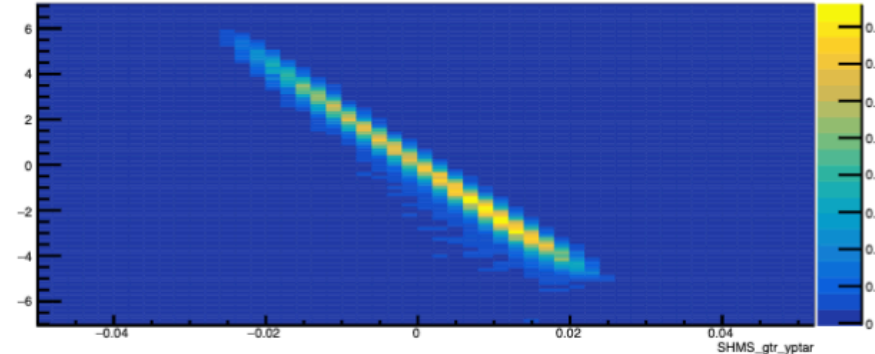
HMS (Data)



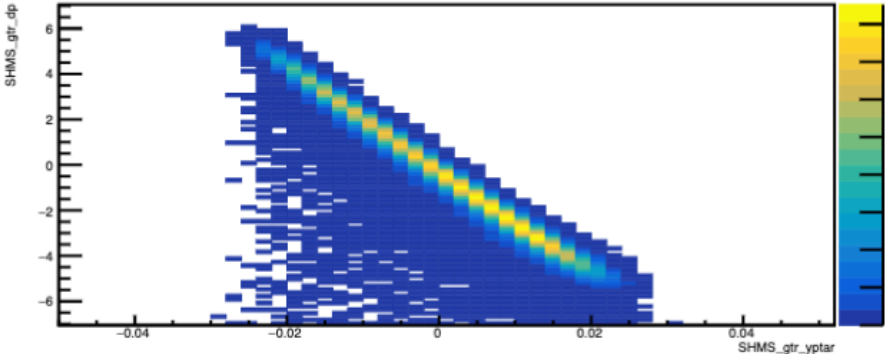
HMS(SIMC)



SHMS (Data)



SHMS(SIMC)



No Acceptance Cut

coin\_ep\_cut\_prompt\_RF

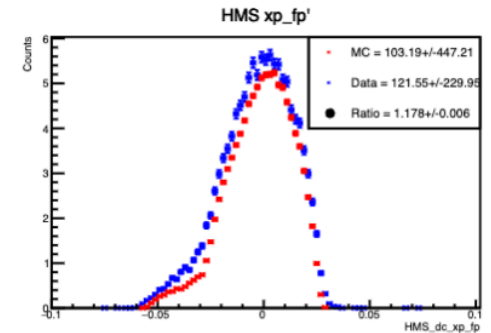
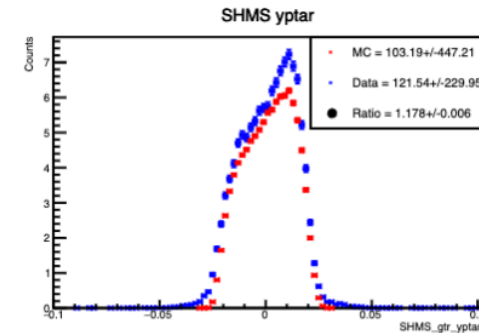
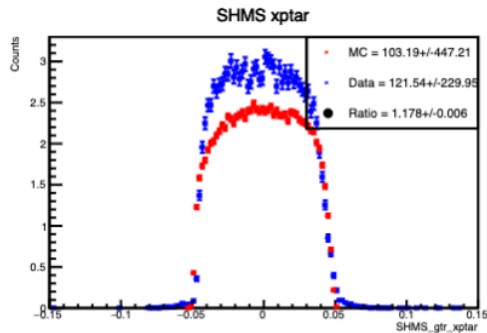
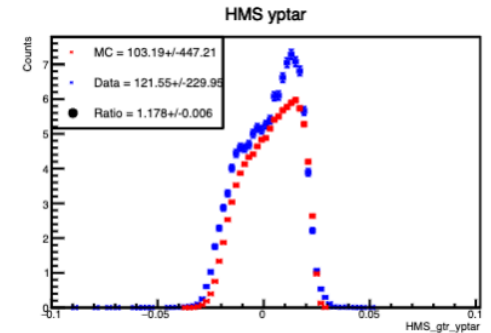
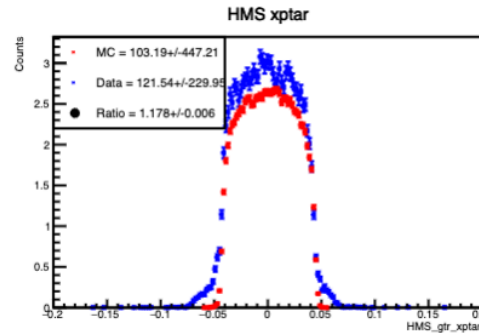
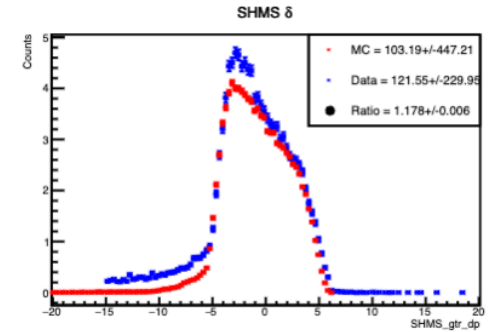
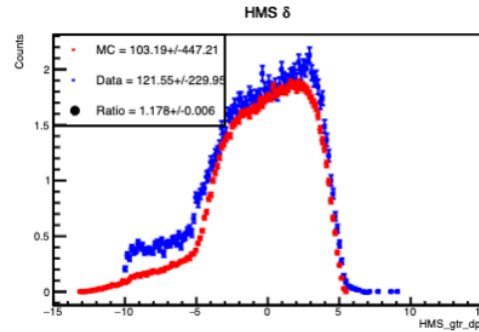
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(H_cal_etottracknorm > 0.7)}]
```



No Acceptance Cut

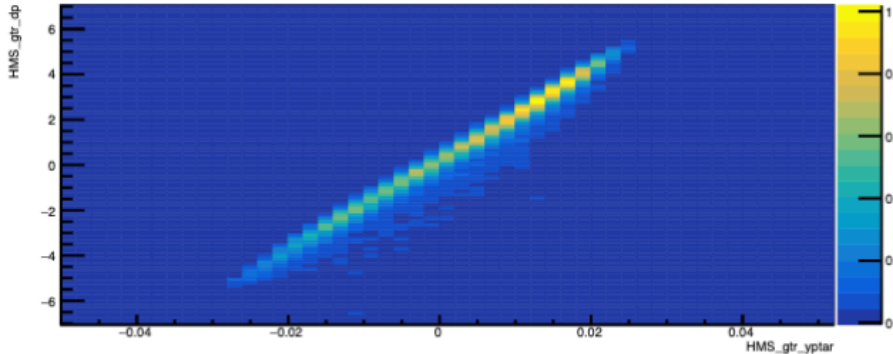
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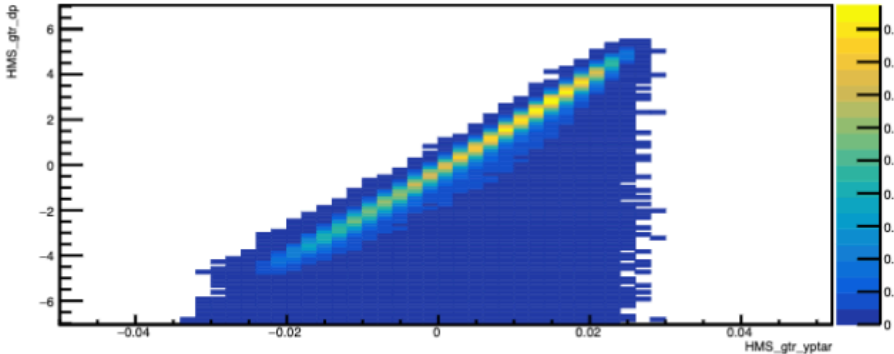


No Acceptance Cut

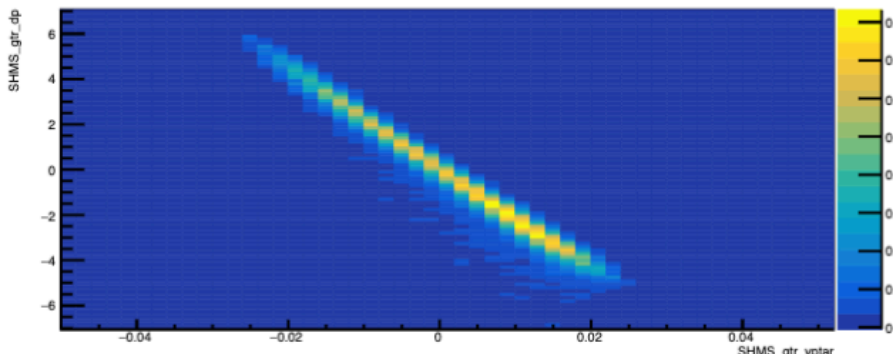
HMS (Data)



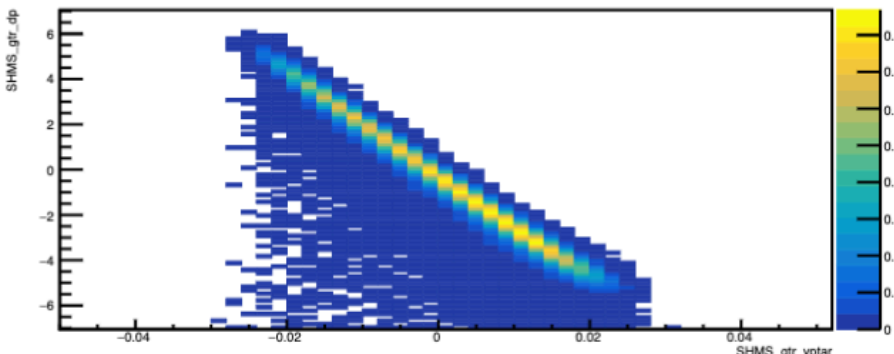
HMS(SIMC)



SHMS (Data)



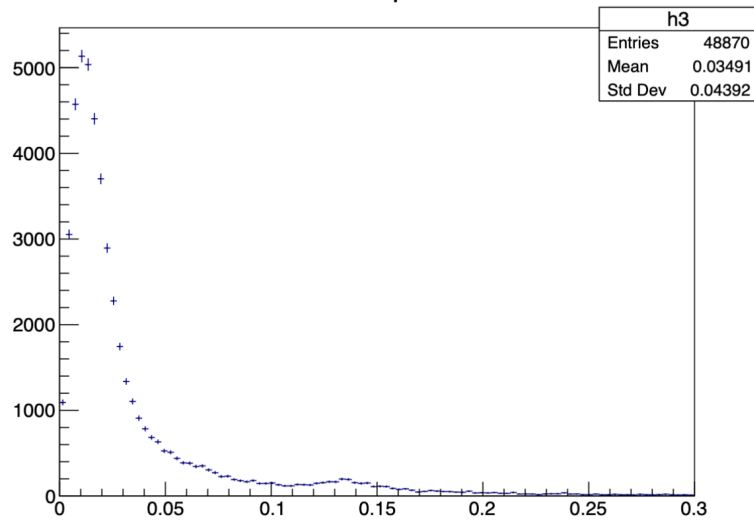
SHMS(SIMC)



# HeeP Data vs. SIMC

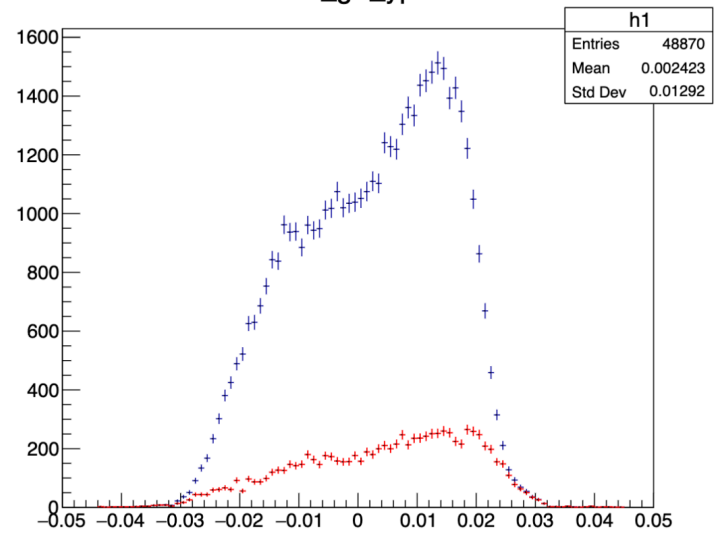
# 8.2 GeV

MMp



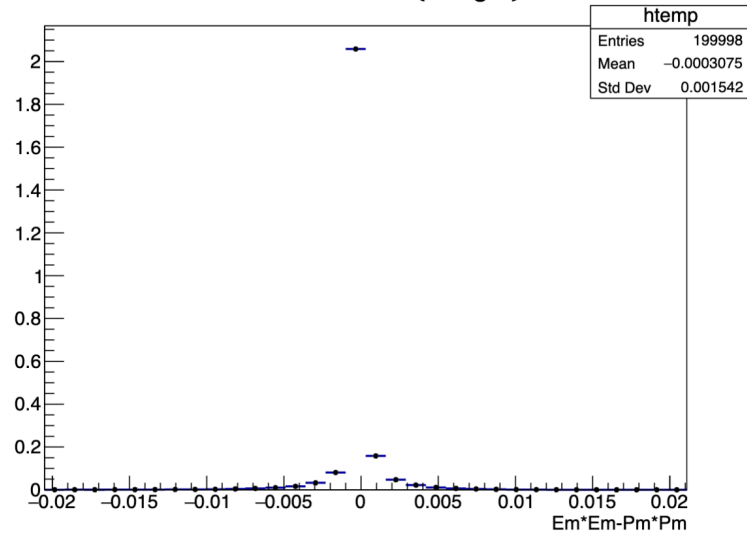
Data

H\_gtr\_yp

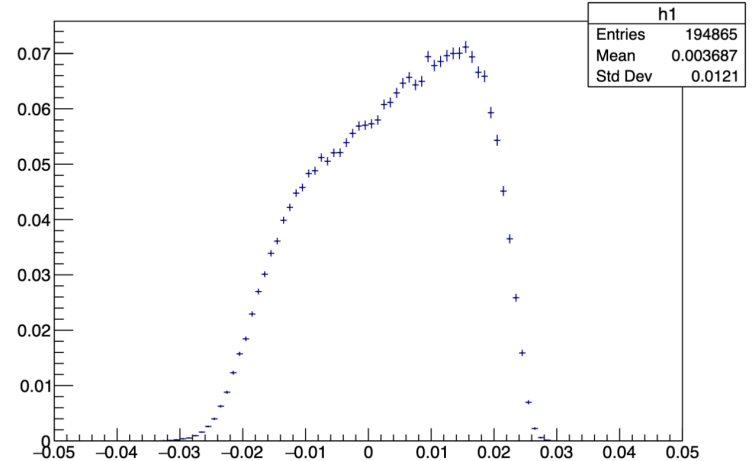


Em\*Em-Pm\*Pm {Weight}

SIMC



hxytar (Weight\*(hdelta==8 && hdelta<=8 && hxpfp==0.08 && hxpfp<=0.08 && hxyfp==0.045 && hxyfp<=0.045))



# HeeP ratio ingredients

## 8.2 GeV

1	Run_Number	7974.0	7975.0	7976.0	7977.0
2	charge	113.204	217.584	211.754	42.133
3	charge_error	0.0	0.0	0.0	0.0
4	HMS_Tracking_Eff	0.9974	0.9974	0.9972	0.9974
5	HMS_Tracking_Eff_error	0.0002	0.0002	0.0002	0.0005
6	SHMS_Tracking_Eff	0.9925	0.9931	0.9929	0.996
7	SHMS_Tracking_Eff_error	0.0003	0.0002	0.0002	0.0003
8	HMS_Cer_Detector_Eff	0.973	0.973	0.973	0.973
9	HMS_Cer_Detector_Eff_error	0.0006	0.0006	0.0006	0.0006
10	HMS_Cal_Detector_Eff	0.9961	0.9961	0.9961	0.9961
11	HMS_Cal_Detector_Eff_error	0.0005	0.0005	0.0005	0.0005
12	HMS_Hodo_3_4_Eff	0.999677	0.999673	0.999666	0.999692
13	HMS_Hodo_3_4_Eff_error	0.0002	0.0002	0.0002	0.0005
14	SHMS_Hodo_3_4_Eff	0.972946	0.973222	0.973266	0.966059
15	SHMS_Hodo_3_4_Eff_error	0.0003	0.0002	0.0002	0.0003
16	EDTM_Live_Time	0.897	0.9011	0.9019	1.0005
17	EDTM_Live_Time_error	0.0011	0.0015	0.0015	0.0
18	Boiling_factor	0.945062455	0.9464155537	0.9456604093	NA
19	Boiling_factor_error	0.0	0.0	0.0	NA
20	effective_charge	89.5527285217324	173.3124738909242	168.6223942433079	39.1970900371934
21	effective_charge_error	0.13881334055646652	0.32729189626979527	0.31821677202937265	0.04504829894769587
22	target_corr	NA	NA	NA	4.8579
23	target_corr_error	NA	NA	NA	0.01

# HeeP ratio ingredients

## 8.2 GeV

1	total_data_effective_charge	431.48759665596447	0.4771279103983728
2	total_dummy_effective_charge	190.4155436916818	0.045095306532067975
3	N_data	48870.0	221.06560112328648
4	N_dummy	167.0	12.922847983320086
5	N_simc	194121.0	440.5916476738977
6	normfac_data	0.0023175637208346553	NA
7	normfac_dummy	0.005251672109390325	NA
8	normfac_simc	41.6184	NA
9	N_data_norm	113.2593390371896	0.5274188184306069
10	N_dummy_norm	0.8770292422681842	0.06786687816104113
11	N_simc_norm	100.18876343603007	0.22739596623080885
12	dataSimcRatio_pmiss	1.121705727675507	0.005886666696810623