



Kaon LT Status Update

March 3rd, 2021

Richard Trotta

FullReplay.C

```
analyzer->SetEvent(event);  
// Set EPICS event type  
analyzer->SetEpicsEvtType(180);  
// Define crate map  
analyzer->SetCrateMapFileName("MAPS/db_cratemap.dat");  
// Define output ROOT file  
analyzer->SetOutFile(ROOTfileName.Data());  
// Define DEF-file+  
analyzer->SetOdeffile("DEF-files/COIN/PRODUCTION/coin_production_hElec_pProt.def");  
// Define cuts file  
analyzer->SetCutFile("DEF-files/COIN/PRODUCTION/CUTS/coin_production_cuts.def");
```

FullReplay_Lumi.C

```
analyzer->SetEvent(event);  
// Set EPICS event type  
analyzer->SetEpicsEvtType(180);  
// Define crate map  
analyzer->SetCrateMapFileName("MAPS/db_cratemap.dat");  
// Define output ROOT file  
analyzer->SetOutFile(ROOTfileName.Data());  
// Define DEF-file+  
analyzer->SetOdeffile("DEF-files/COIN/PRODUCTION/coin_production_hElec_pProt.def");  
// Define cuts file  
analyzer->SetCutFile("UTIL_PION/DEF-files/luminosity_coin_production_cuts.def"); // optional
```

```

ALL_events          g.evtyp >= 1 && g.evtyp <= 7
ALL_HMS_events     HMS_event || COIN_ONLY_event || HMS_COIN_event || COIN_ALL_event
ALL_SHMS_events    SHMS_event || COIN_ONLY_event || SHMS_COIN_event || COIN_ALL_event

RawDecode_master ALL_events

Block: Decode

pTRIG1_ROC2       T.coin.pTRIG1_ROC2_tdcTimeRaw > 0
pTRIG2_ROC2       T.coin.pTRIG2_ROC2_tdcTimeRaw > 0
pTRIG3_ROC2       T.coin.pTRIG3_ROC2_tdcTimeRaw > 0
pTRIG4_ROC2       T.coin.pTRIG4_ROC2_tdcTimeRaw > 0
pTRIG5_ROC2       T.coin.pTRIG5_ROC2_tdcTimeRaw > 0
pTRIG6_ROC2       T.coin.pTRIG6_ROC2_tdcTimeRaw > 0

ALL_HMS_events_NOEDTM  T.coin.hEDTM_tdcTime == 0.0 && ALL_HMS_events
ALL_SHMS_events_NOEDTM T.coin.pEDTM_tdcTime == 0.0 && ALL_SHMS_events
ALL_COIN_events_NO_EDTM T.coin.hEDTM_tdcTime == 0.0 && T.coin.pEDTM_tdcTime == 0.0 && ALL_COIN_events
ALL_events_NO_EDTM     T.coin.hEDTM_tdcTime == 0.0 && T.coin.pEDTM_tdcTime == 0.0 && ALL_events

```

Decode_master ALL_events

FullReplay_Lumi.C

EDTM events != 0

FullReplay.C

EDTM events -> 0

```

ALL_events          g.evtyp >= 1 && g.evtyp <= 7
ALL_HMS_events     HMS_event || COIN_ONLY_event || HMS_COIN_event || COIN_ALL_event
ALL_SHMS_events    SHMS_event || COIN_ONLY_event || SHMS_COIN_event || COIN_ALL_event

RawDecode_master ALL_events

Block: Decode

pTRIG1_ROC2       T.coin.pTRIG1_ROC2_tdcTimeRaw > 0
pTRIG2_ROC2       T.coin.pTRIG2_ROC2_tdcTimeRaw > 0
pTRIG3_ROC2       T.coin.pTRIG3_ROC2_tdcTimeRaw > 0
pTRIG4_ROC2       T.coin.pTRIG4_ROC2_tdcTimeRaw > 0
pTRIG5_ROC2       T.coin.pTRIG5_ROC2_tdcTimeRaw > 0
pTRIG6_ROC2       T.coin.pTRIG6_ROC2_tdcTimeRaw > 0

ALL_HMS_events_NOEDTM  T.coin.hEDTM_tdcTime == 0.0 && ALL_HMS_events
ALL_SHMS_events_NOEDTM T.coin.pEDTM_tdcTime == 0.0 && ALL_SHMS_events
ALL_COIN_events_NO_EDTM T.coin.hEDTM_tdcTime == 0.0 && T.coin.pEDTM_tdcTime == 0.0 && ALL_COIN_events
ALL_events_NO_EDTM     T.coin.hEDTM_tdcTime == 0.0 && T.coin.pEDTM_tdcTime == 0.0 && ALL_events

Decode_master ALL_events_NO_EDTM

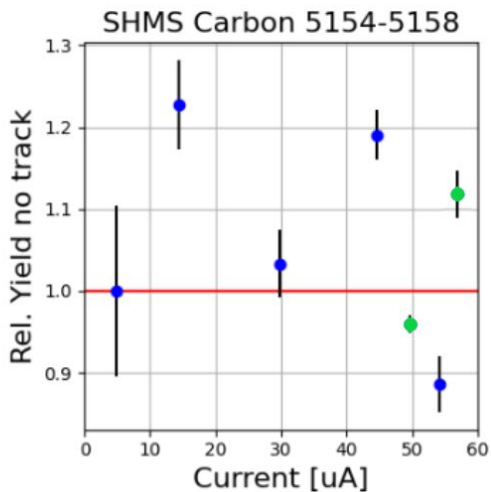
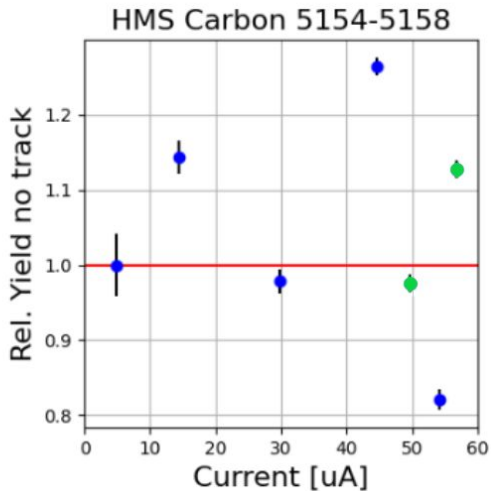
```

FullReplay.C



EDTM events $\rightarrow 0$

Decode Master
ALL_events

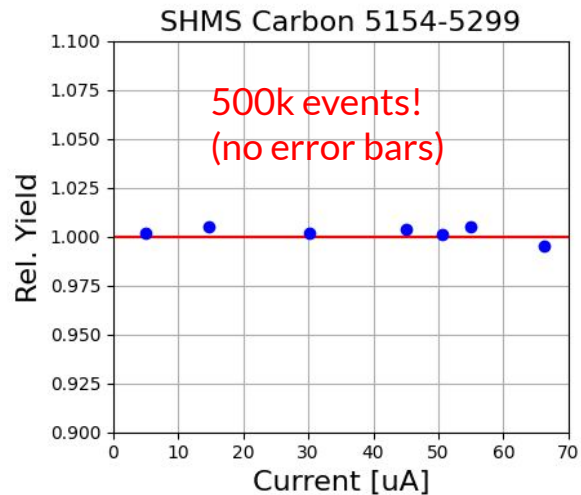
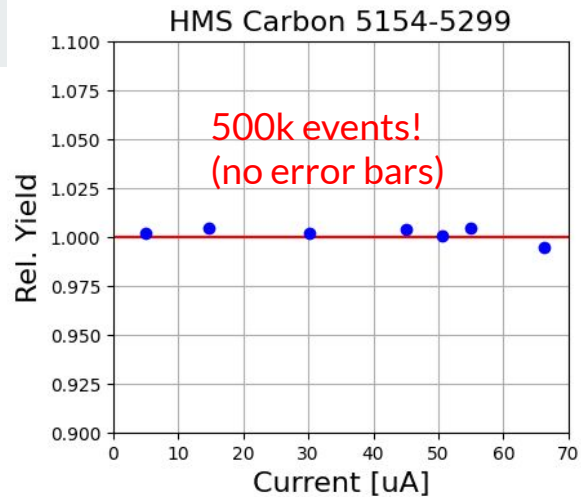


FullReplay_Lumi.C

EDTM events $\neq 0$

Decode Master
ALL_events_NO_E
DTM

Better data
because EDTM
decoupled from
events???



PS calculation (1)



- I tried to calculate the PS explicitly
- Using the 6 GeV era calculation...
 - $(\text{trig-coin})/(\text{aadc-sadc})$
 - where trg =valid triggers, ctrig =coincidence trigger aadc =all adc gates, sadc =adc gates of the other arm
- I am currently only testing this for single-arm runs so, in principle, this should be easier to reproduce
- For these runs I am using $\text{trg}=\text{T.coin.pTRIG1_ROC1_tdcTimeRaw}$ and $\text{aadc}=\text{T.coin.pFADC_TREF_ROC2_adcPulseTimeRaw}$ for the calculation
 - coin and sadc are zero, I'm assuming since it is a singles run
- Issues arose with the ADC part of the calculation

PS calculation (2)



- I emailed Mark Jones asking for his input
- He doesn't know a way to directly calculate the prescale factor.
 - There are no equivalent to adc gate in the 12 GeV era.
- If it was set up, then the TS can put out data which includes the bit pattern of the trigger input before and after prescale.
 - If that was set up, then one could increment counters for the triggers before and after the prescale according to if the bit was set in the pattern.
- I emailed Brad about this, TBD