

Update on Tracking Analysis

Ali Usman



Online Replay

- Started with looking at online efficiencies.
- Looked at SHMS for now using different calibration files.
- Using online replay file located in

SCRIPTS/SHMS/PRODUCTION/replay_production_shms_coin.C

- Comparing the efficiencies for the online and offline calibrations.
- The offline calibration file being used is

DBASE/COIN/standard_KaonLTCalib.database

Efficiency Calculation

- Efficiency is calculated in the Report files generated from template file located in

TEMPLATES/SHMS/PRODUCTION/pstackana_production.template

- Following formula is used in by the template file for tracking efficiency calculation

$$\textit{Hadron Efficiency} = \frac{\textit{shmsScinDidh.npassed}}{\textit{shmsScinShouldh.npassed}}$$

- These variables depend on variable “goodscinhit”.

Report Files

- The report files are very non-intuitive and hard to work with.
- Online replay uses a very entangled combination of DEF-files.
- Following DEF-files are being used

DEF-files/SHMS/PRODUCTION/pstackana_production.def

DEF-files/SHMS/PRODUCTION/pstackana_production_cuts.def

- Looking at Richard's template file and DEF-file, it appears that we can remove the entanglement both in the template file and DEF-file.
- That method directly grabs information from root tree rather than scattering things within different DEF-files.
- Not sure how he is calculating the efficiency.

DEF Files

- The number of variables for efficiency calculation are scattered in these files.

```
#include "DEF-files/SHMS/PRODUCTION/TRIG/ptrig_histos.def"
#include "DEF-files/SHMS/PRODUCTION/AERO/paero_histos.def"
#include "DEF-files/SHMS/PRODUCTION/CAL/pcal_histos.def"
#include "DEF-files/SHMS/PRODUCTION/DC/pdc_histos.def"
#include "DEF-files/SHMS/PRODUCTION/DC/pdc_eff_histos.def"
#include "DEF-files/SHMS/PRODUCTION/HGCER/phgcer_histos.def"
#include "DEF-files/SHMS/PRODUCTION/HODO/phodo_histos.def"

#include "DEF-files/SHMS/PRODUCTION/KIN/pkin_histos.def"
#include "DEF-files/SHMS/PRODUCTION/GTR/pgtr_histos.def"
#include "DEF-files/SHMS/PRODUCTION/RASTER/praster_histos.def"
#include "DEF-files/SHMS/PRODUCTION/REACT/preact_histos.def"
#include "DEF-files/SHMS/PRODUCTION/PID/ppid_histos.def"
#include "DEF-files/SHMS/PRODUCTION/EXTCOR/pextcor_histos.def"

#include "DEF-files/SHMS/PRODUCTION/DC/pdc_vars.def"
#include "DEF-files/SHMS/PRODUCTION/GTR/pgtr_vars.def"
#include "DEF-files/SHMS/PRODUCTION/PID/ppid_vars.def"
#include "DEF-files/SHMS/PRODUCTION/EPICS/pepics_vars.def"
#include "DEF-files/SHMS/PRODUCTION/KIN/pkin_vars.def"■
```

DEF Cuts

➤ This is what DEF Cut file looks like

■ Report file for SHMS stack

```
Block: RawDecode
#include "DEF-files/SHMS/PRODUCTION/CUTS/pstackana_rawdecode_cuts.def"
RawDecode_master 1

Block: Decode
#include "DEF-files/SHMS/PRODUCTION/CUTS/pstackana_decode_cuts.def"
Decode_master ALL_SHMS_NO_EDTM

Block: CoarseTracking
#include "DEF-files/SHMS/PRODUCTION/CUTS/pstackana_coarsetracking_cuts.def"
CoarseTracking_master ALL_SHMS_NO_EDTM

Block: CoarseReconstruct
CoarseReconstruct_master ALL_SHMS_NO_EDTM

Block: Tracking
Tracking_master ALL_SHMS_NO_EDTM

Block: Reconstruct
#include "DEF-files/SHMS/PRODUCTION/CUTS/pstackana_reconstruct_cuts.def"
Reconstruct_master ALL_SHMS_NO_EDTM

Block: Physics
#include "DEF-files/SHMS/PRODUCTION/CUTS/pstackana_physics_cuts.def"
Physics_master ALL_SHMS_NO_EDTM
```

SHMS Hadron Efficiencies

➤ Looked at production runs for SHMS

Run Number	P , Angle	Rate (KHz)	Efficiency (Online)	Efficiency (Offline)
6639	+2.583 , 6.79	537	95.85 ± 0.23	99.21 ± 0.10
6640	+2.583 , 6.79	530	95.98 ± 0.23	99.24 ± 0.10
6642	+2.583 , 6.79	221	98.17 ± 0.14	99.43 ± 0.08
6645	+2.583 , 6.79	476	97.59 ± 0.16	99.45 ± 0.08
6650	+2.583 , 6.79	340	97.19 ± 0.18	99.24 ± 0.10

Outlook

- Looked at the SHMS using online replay and did a quick comparison b/w different calibrations.
- It appears that the template file is using vladas' algorithm for efficiency calculation.
- Efficiencies are improving with new calibrations.
- Need to understand in detail different versions of template file formats.