SHMS Tracking Efficiency

Ali Usman







Recall

- A bug in the DEF-files corresponding to efficiency calculation was fixed.
- ➢ Was trying to implement new PID cuts for individual particle efficiency but had issues with pion and proton efficiencies.
- Some of the DEF-files and the Template files were in the process of being updated.
- Looked at the comparison of hadron tracking efficiency for couple of runs before and after the changes.

Updated Files

The DEF-files are now updated with new PID cuts on individual particles.

DEF-files/SHMS/PRODUCTION/CUTS/pstackana_reconstruct_cuts.def

The file also includes updated definitions for the efficiency calculation variables.

'ShmsScinShould' 'ShmsScinDid'

The template file used for the generation of report files is also updated with new variables.

TEMPLATES/SHMS/PRODUCTION/pstackana_production.template

New Cuts

➤ HGC

	E	P.hgcer.npeSum > 1.5
	Pi	P.hgcer.npeSum > 1.5
	Р	P.hgcer.npeSum <= 1.5
Aero		
	E	P.aero.npeSum > 1.5
	Pi	P.aero.npeSum > 1.5
	Ρ	P.aero.npeSum <= 1.5
Cal		

- E P.cal.etotnorm > 0.6 && P.cal.etotnorm < 1.6</p>
 - Pi P.cal.etotnorm <= 0.6 && P.cal.etotnorm > 0

P P.cal.etotnorm <= 0.6 && P.cal.etotnorm > 0

shmsScinShould	shmsScinGood && shmsGoodBetanotrk
shmsScinShoulde	shmsScinShould && pcut_elec_all
shmsScinShouldpi	shmsScinShould && pcut_pi_all
shmsScinShouldp	shmsScinShould && pcut_p_all
shmsScinShouldh	<pre>shmsScinShould && P.cal.etotnorm <= 0.6 && P.cal.etotnorm > 0.</pre>
shmsScinDid	shmsScinShould && P.dc.ntrack > 0
shmsScinDide	shmsScinShoulde && P.dc.ntrack > 0
shmsScinDidpi	shmsScinShouldpi && P.dc.ntrack > 0
shmsScinDidp	shmsScinShouldp && P.dc.ntrack > 0
shmsScinDidh	shmsScinShouldh && P.dc.ntrack > 0
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SHMS Track Parameters

Parameter	Values
pmin_hit	4, 4
pmin_combos	3, 3
pspace_point_criterion	1.2, 1.2
pxt_track_criterion	100.0
pyt_track_criterion	100.0
pxpt_track_criterion	1.0
pypt_track_criterion	1.0
pSmallAngleApprox	0
pstub_max_xpdiff	0.2

SHMS Tracking Efficiencies (50k)

	$\mathbf{E} = 8$	8.2 GeV	P = +6.05 GeV Angl			Angle = 6 .	e = 6.91	
Run #	l (uA)	Rate (¾)	Efficiency (Old Had)	Efficiency (Old E)	Efficiency (New Had)	Efficiency (New E)	Efficiency (New Pi)	Efficiency (New P)
8038	71	706.87	98.92 ± 0.15		91.27 ± 0.39	92.54 ± 1.10	91.69 ± 0.49	92.75 ± 1.24
8051	62	580.95	97.89 ± 0.19	98.94 ± 0.40	93.19 ± 0.32	92.39 ± 1.01	93.37 ± 0.40	93.64 ± 1.06
8042	48	507.71	98.28 ± 0.17	97.67 ± 0.58	92.77 ± 0.33	94.42 ± 0.86	92.71 ± 0.41	93.64 ± 1.08
8091	8??	483.18	98.15 ± 0.19	98.52 ± 0.49	93.11 ± 0.34	93.74 ± 0.97	92.97 ± 0.43	95.66 ± 0.90
8073	19	423.35	98.46 ± 0.17	99.24 ± 0.34	93.38 ± 0.33	94.26 ± 0.90	93.08 ± 0.42	94.15 ± 1.09
8056	41	352.22	97.95 ± 0.17	98.33 ± 0.45	95.35 ± 0.24	96.18 ± 0.67	95.08 ± 0.31	95.73 ± 0.81
8092	2 ??	315.66	97.90 ± 0.22	99.47 ± 0.30	94.09 ± 0.34	94.40 ± 0.96	93.93 ± 0.44	94.77 ± 1.07
8054	10	76.19	99.38 ± 0.10		96.10 ± 0.25	97.53 ± 0.60	96.18 ± 0.30	95.51 ± 0.92

SHMS Tracking Efficiencies (100k)

➢ E = 8.2 GeV

P = +6.05 GeV

Angle = 6.91

Run #	l (uA)	Rate (¾)	Efficiency (New Had)	Efficiency (New Pi)	Efficiency (New P)	Efficiency (New E)
8038	71	706.87	90.84 ± 0.28	90.94 ± 0.36	91.07 ± 0.97	93.47 ± 0.74
8051	62	580.95	92.93 ± 0.23	92.99 ± 0.29	94.15 ± 0.71	93.01 ± 0.70
8042	48	507.71	92.67 ± 0.24	92.55 ± 0.30	93.33 ± 0.78	93.81 ± 0.64
8091	8 ??	483.18	93.07 ± 0.24	93.00 ± 0.30	94.98 ± 0.69	93.62 ± 0.67
8073	19	423.35	93.19 ± 0.23	93.02 ± 0.30	93.72 ± 0.79	94.02 ± 0.64
8056	41	352.22	95.34 ± 0.17	95.96 ± 0.22	96.32 ± 0.53	96.13 ± 0.48
8092	2 ??	315.66	93.34 ± 0.25	93.07 ± 0.32	95.00 ± 0.71	94.25 ± 0.65
8054	10	76.19	96.00 ± 0.25	96.09 ± 0.30	95.54 ± 0.89	97.38 ± 0.60

Summary & Outlook

The changes are now working properly and there is a reasonable trend in the efficiencies.

The 50k replay was giving large error for individual particles so moved to 100k replay now.

Will start looking at the individual track parameters and try to optimize them for a wide range of rates.

Will start ploting these numbers instead of listing in tables.