Status on ECLTRG DQM

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43rd B2GM

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- ECLTRG 3D bhabha
- ECLTRG timing

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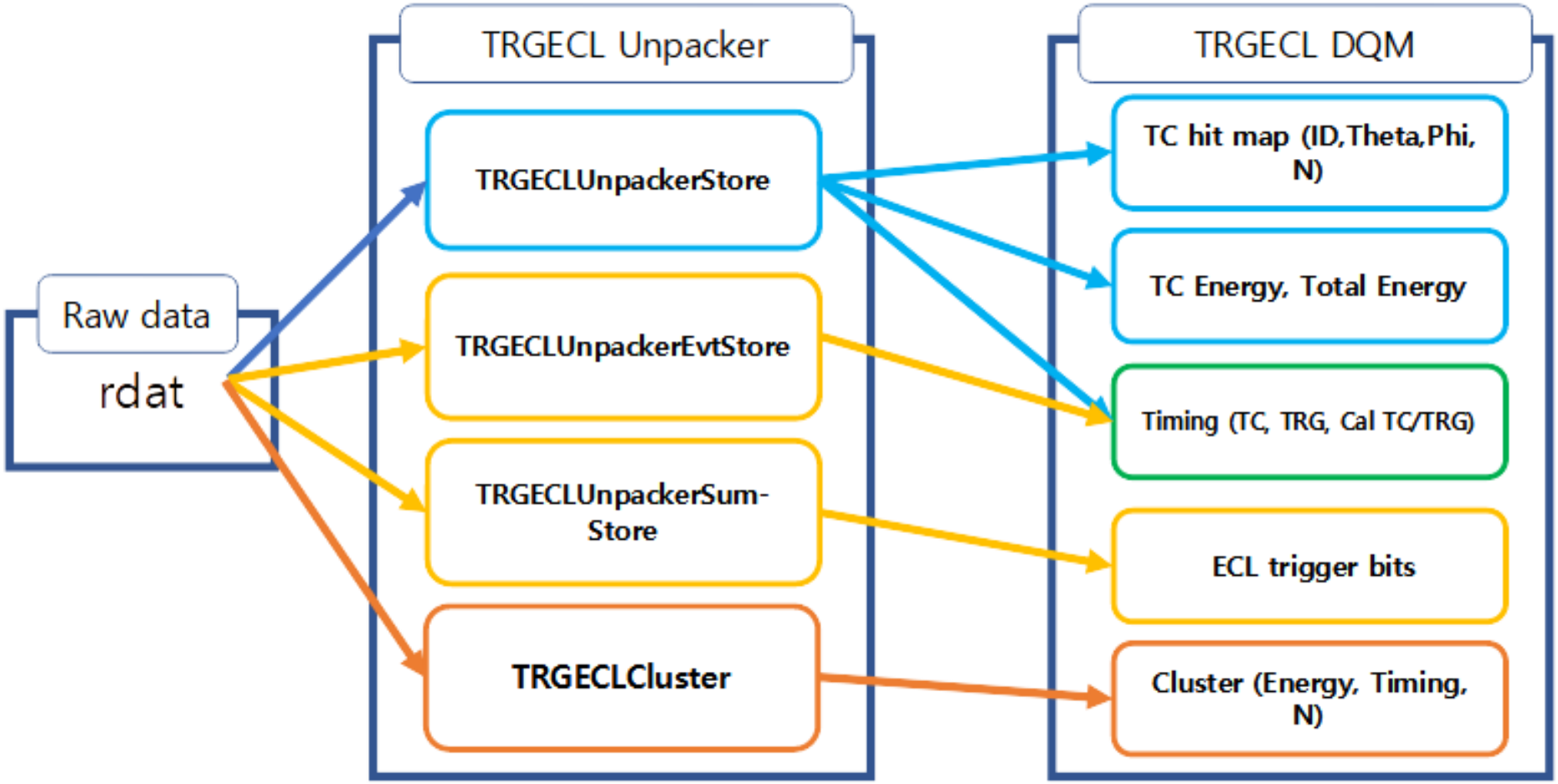
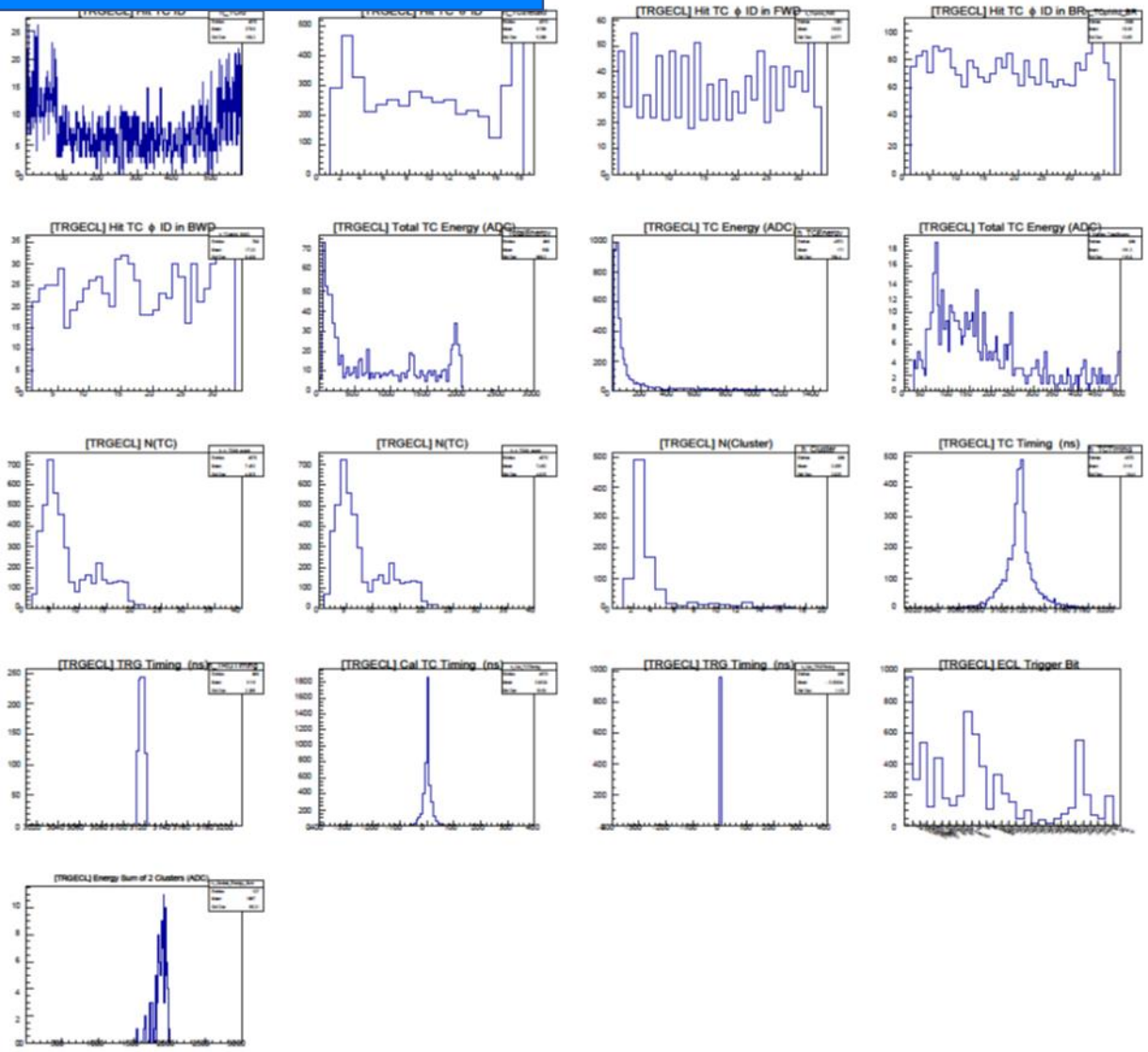
ECLTRG DQM Data flow



ECLTRG DQM



- The TRGECL DQM has 17 plots.
- TC hit map, energy, timing, the number of hit TCs, trg ecl logics etc…

ECL 3D Bhabha study

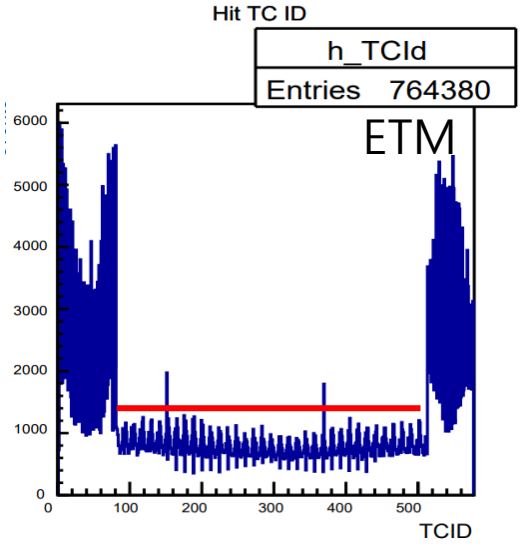
- We analyzed ECL 3D Bhabha for the candidate of new DQM plots.

- We checked TC hit map, the # of hit TC, TC energy, Total energy etc… of ECL 3D Bhabha events

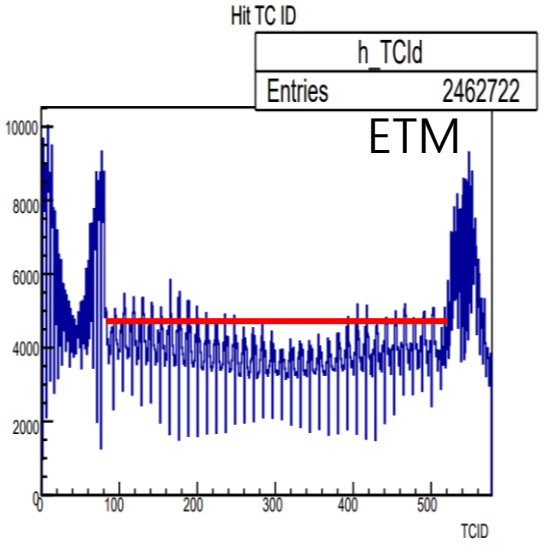
- ECLTRG 3D Bhabha (veto) definition
  - $165^\circ < \Sigma\theta < 190^\circ$
  - $160^\circ < \Delta\phi < 200^\circ$
  - E(CL1) > 3 GeV & E(CL2) > 3 GeV && (E(CL1) > 4.5 GeV || E(CL2) > 4.5 GeV)

ECL 3D Bhabha TC Hit map

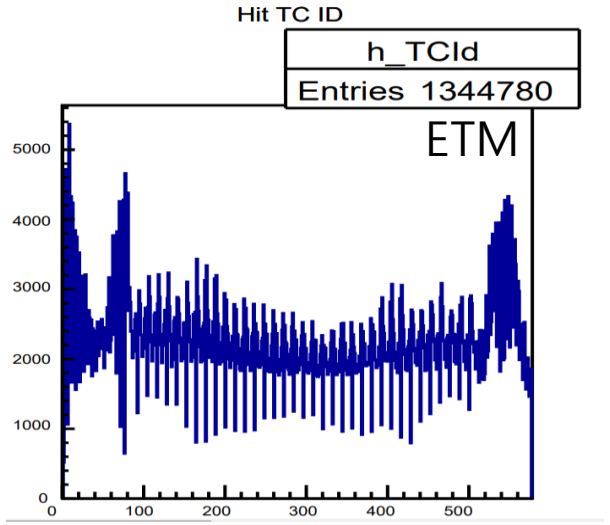
Exp17run205, physics,
beam_reco_filter
L=~1.7x10^{34}, L1 rate =~$4kHz$



Exp18run1550, physics,
beam_reco_filter
L=~2.7x10^{34}, L1 rate =~$4kHz$



Exp26run1893, physics,
beam_reco_filter
L=~3.7x10^{34}, L1 rate =~$6kHz$



We could find the shape changing in 3D Bhabha TC hit map determined by ETM.
We guess the changing was related with pre-scale, because pre-scale was changed in exp18

ECL 3D Bhabha TC Hit map

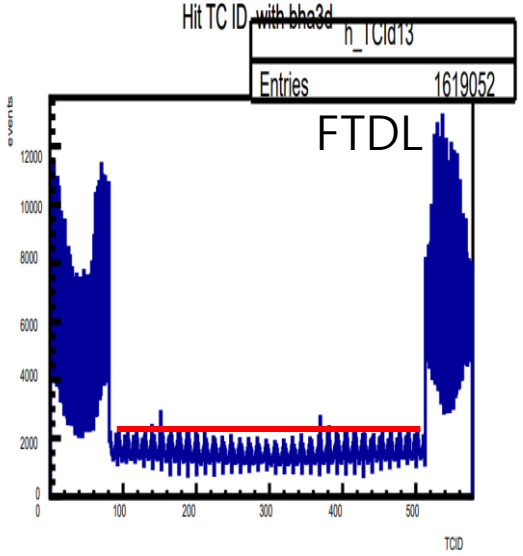
Message ID: **792**	Entry time: **2021/04/ 7 Wed 01:49 UTC**
JSTTime:	2021/04/ 7 10:48 JST
Author:	Taichiro Koga
Type:	Parameter
Category:	GDL Configuration
Subject:	Major prescale change of bhabha related bits
Firmware:	no change
Software:	no change
Slow control:	no change
Parameter:	updated

```
Prescale of bhabha related bits are changed as follows. Exp number will be changed from 17 to 18.
-lume   1->100
-bha3d  1->100
-bhabha 1->100
-bhapur 1->10
-lml3   1->100
-lml5   1->100
-c1hie  1->0
-c1hume 1->0
-n1hie  1->0
-n1lume 1->0
-c3hie  1->0
-c3lume 1->0
-n3hie  1->0
-n3lume 1->0
-lml1   1->2
-lml4   1->10
```

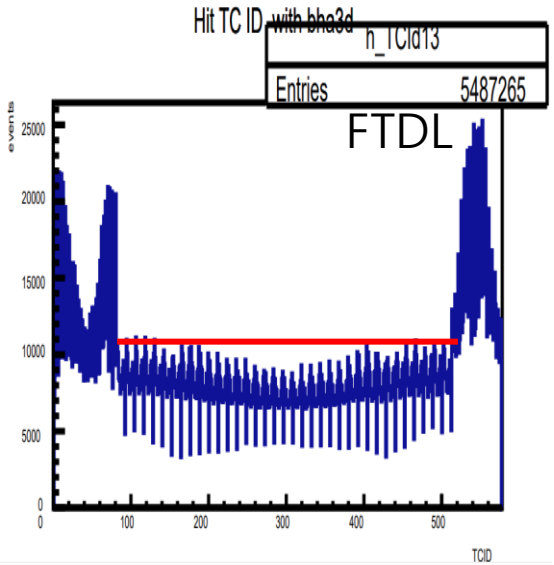
We could find the shape changing in 3D Bhabha TC hit map determined by ETM.
We guess the changing was related with pre-scale, because pre-scale was changed in exp18.

ECL 3D Bhabha TC Hit map

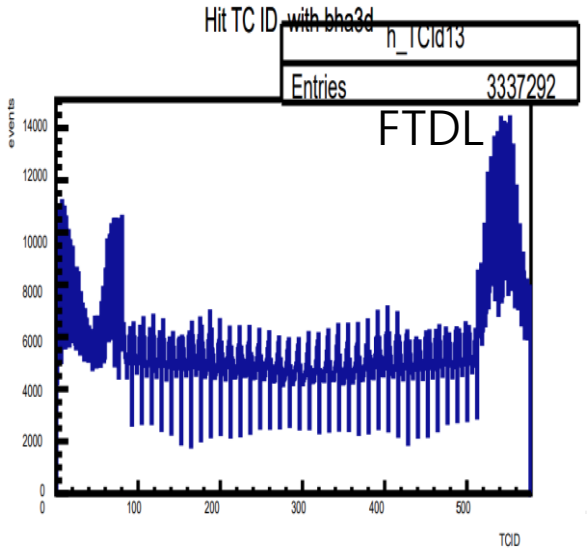
Exp17run205, physics,
beam_reco_filter
L=~1.7x10^{34}, L1 rate =~$4kHz$



Exp18run1550, physics,
beam_reco_filter
L=~2.7x10^{34}, L1 rate =~$4kHz$



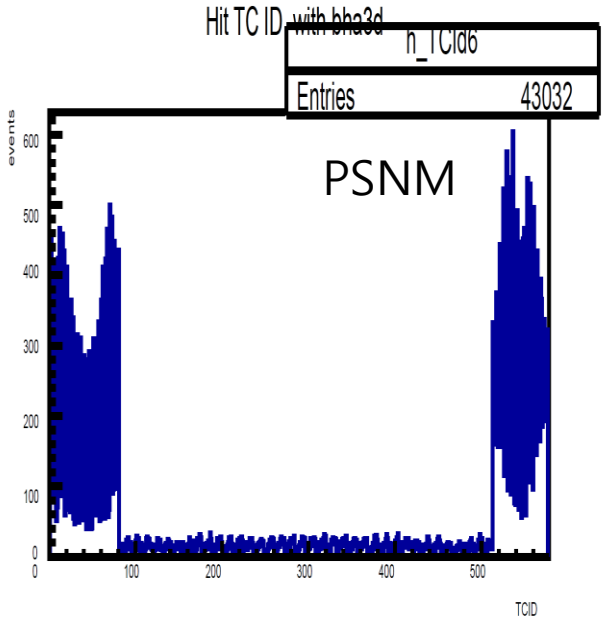
Exp26run1893, physics,
beam_reco_filter
L=~3.7x10^{34}, L1 rate =~$6kHz$

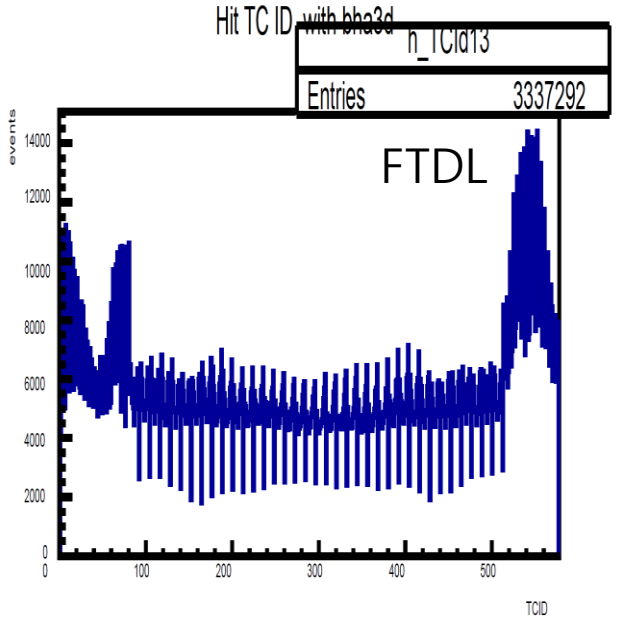


We could find the shape changing in 3D Bhabha TC hit map determined by FTDL.

ECL 3D Bhabha TC Hit map

Exp26run1893, physics,
beam_reco_filter
L=~3.7x10^{34}, L1 rate =~$6kHz$





- PSNM and FTDL shape of bha3d same run have discrepancy.
- PSNM is like MC, exp17.

Bits related with ECL 3D bhabha

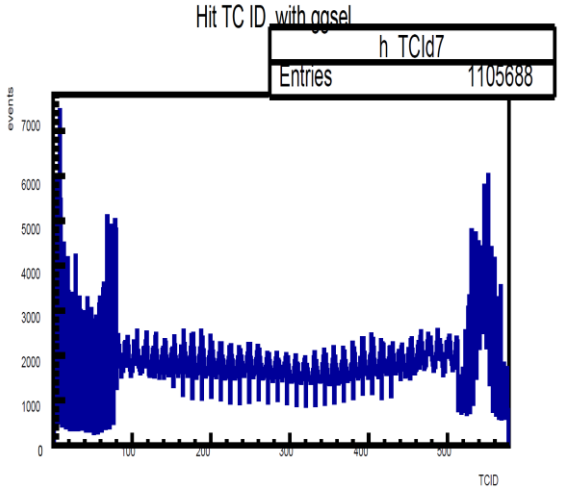
Exp26run1260, physics, beam_reco_monitor
L=~$4.5x10^{34}$, L1 rate =~$9kHz$

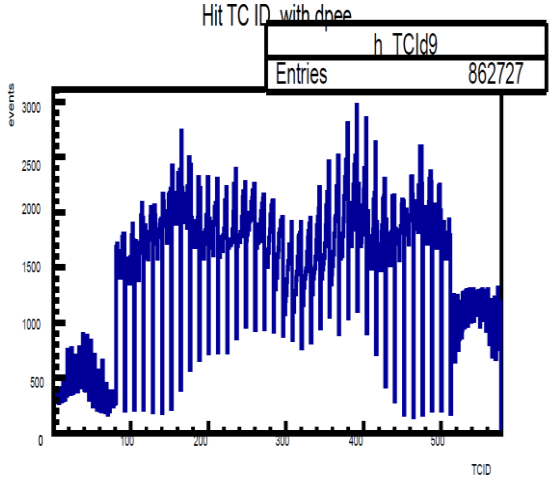
Bit name	PSNM with FTDL bha3d	FTDL 3D w/o PSNM	PSNM only Rate	Bhabha veto	PSV
lml1	0.019456	0.6858	0.003310999	No	2
dpee	0.019267	0.6888	0.00580959	No	1
bhapur	0.014844	0.7603	0.009610758	No	10
ggsel	0.014546	0.7651	0.009653969	No	1
ffy	0.012465	0.7987	0.002776296	No	1
bhie	0.002675	0.9568	0.00149802	No	50
stt	0.002025	0.9673	0.000113087	Veto	1
bha3d	0.001492	0.9759	0.000866493	No	100
bhabha	0.001434	0.9768	0.000859969	No	100
lume	0.001305	0.9789	0.000715301	No	100
cdcecl3	0.000955	0.9846	7.03482E-05	No	1

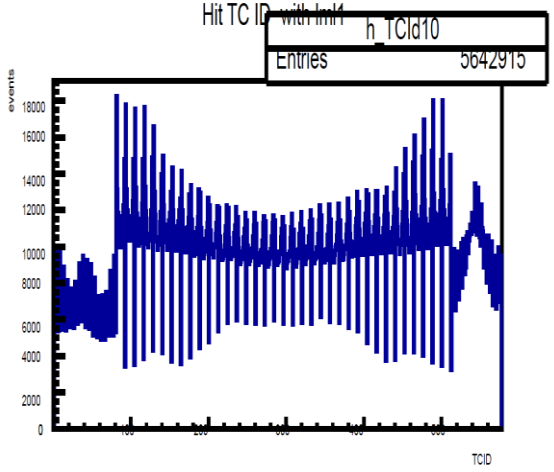
Overlap Check
1. PSNM on with FTDL bha3d(inclusive) / All events
2. FTDL bha3d on without PSNM (inclusive) / FTDL bha3d on events
3. FTDL and bha3d on (exclusive) / All events

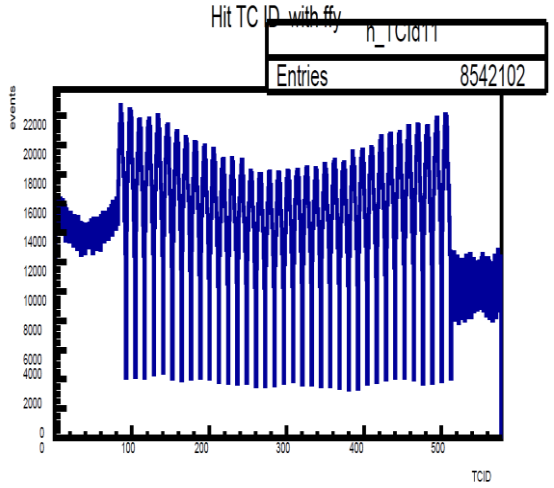
Lml1, dpee, ggsel, ffy are looks like overlapped bha3d.

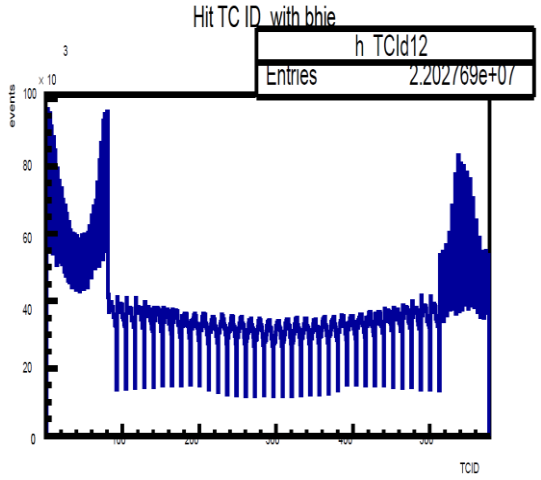
FTDL bit TC Hit map

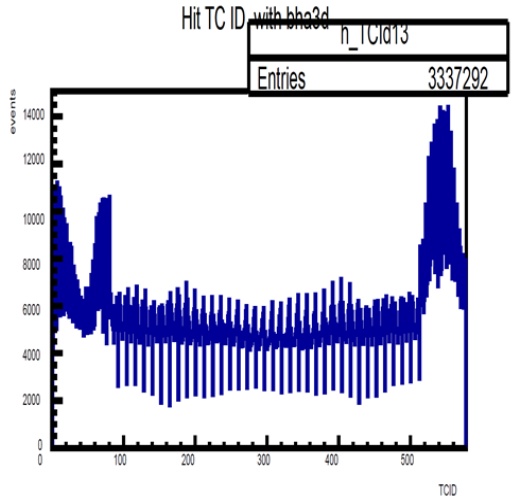












ggsel, dpee, lml1, ffy, bhie, bha3d FTDL TC hit map

Will draw each plots with previous 3 condition.

Contents

- ECLTRG 3D bhabha
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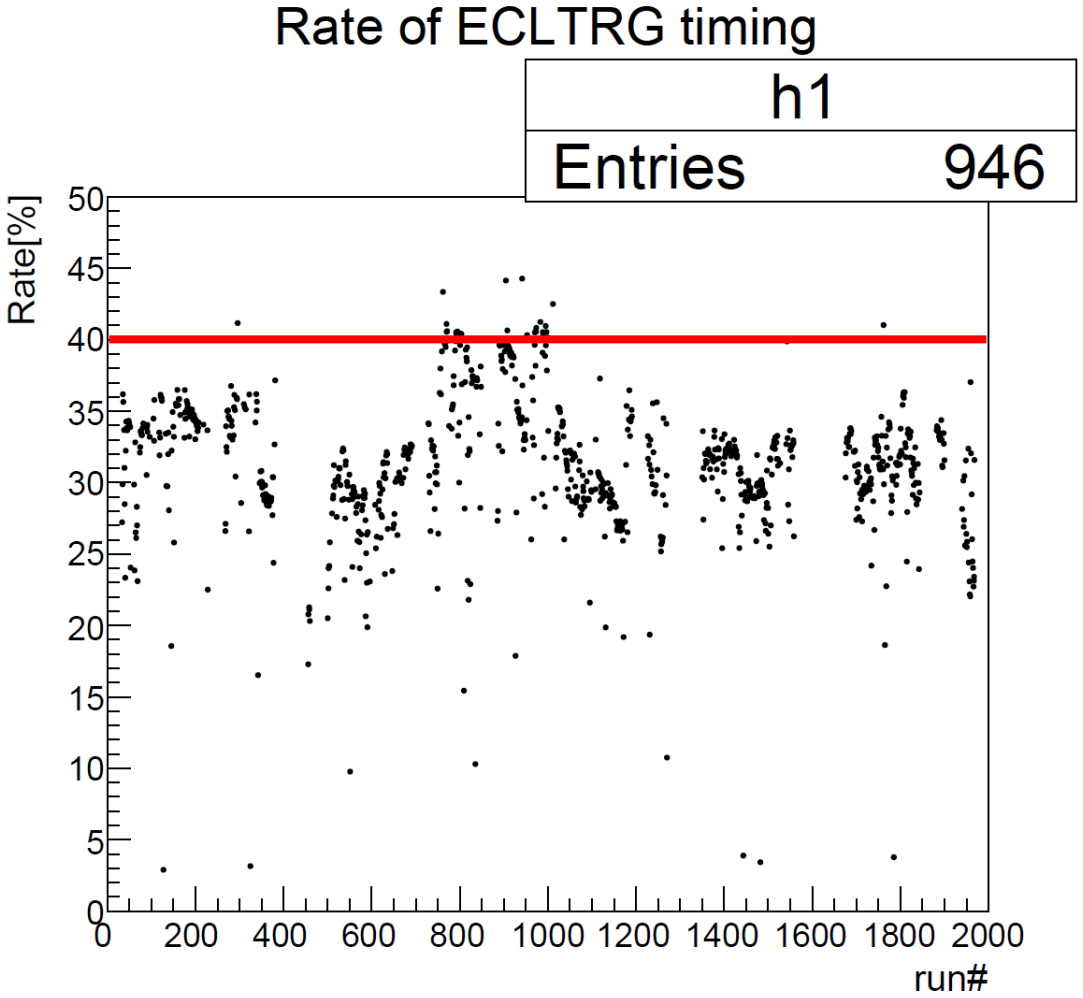
ECLTRG timing

- SVD group requested ECLTRG T0 information for 3-sample mode.
- The fine trigger timing (TC energy > 200 ADC) fraction as a function of run.

- For this study, we used GDL logs in btrgsrv0 server.

```
[b2trg@btrgsrv0 ~]$ egrep 'adm_tot_rnent003|adm_tot_rnent008|RC:start|RC:end:|runno' ~/log/trggdld/trggdl/2022.06.06.log | grep -A 2 "end:physics"
config : TRGGDL@RC:end:physics:00026:1177
adm_tot_rnent003 : int(47131434)
adm_tot_rnent008 : int(14712382)
--
config : TRGGDL@RC:end:physics:00026:1178
adm_tot_rnent003 : int(13789288)
adm_tot_rnent008 : int(4877197)
```

Fraction of ECLTRG timing



$$\text{Fraction} = \frac{Fine\ ECL\ timing}{ECL\ timing}$$

- According to SVD group, more than 40% is preferable value in the L1 rate 30kHz.
- During the exp26, the fraction was between 25%~35%.

Back up

Bit 이름	PSNM with FTDL bha3d	3D w/o P	PSNM only Rate	Bhabha veto	PSV	FTDL/PSNM Rate	PSNM Rate	FTDL Rate
lml1	205766	0.6858	0.003310999	No	2	1.8995	0.0317	0.0602
dpee	203767	0.6888	0.00580959	No	1	1.0016	0.0193	0.0193
bhapur	156987	0.7603	0.009610758	No	10	4.7617	0.0182	0.0866
ggsel	153843	0.7651	0.009653969	No	1	1.0020	0.0145	0.0146
ffy	131834	0.7987	0.002776296	No	1	1.0056	0.1978	0.1989
bhie	28295	0.9568	0.00149802	No	50	37.8140	0.0060	0.2283
stt	21419	0.9673	0.000113087	Veto	1	1.0022	0.2578	0.2584
bha3d	15777	0.9759	0.000866493	No	100	41.5055	0.0015	0.0619
bhabha	15161	0.9768	0.000859969	No	100	46.2807	0.0017	0.0789
lume	13805	0.9789	0.000715301	No	100	63.5030	0.0020	0.1246
cdcecl3	10101	0.9846	7.03482E-05	No	1	1.0032	0.0114	0.0115