

Efficiency in BCAL

Ahmed Foda

Department of Physics

University of Regina

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Efficiency Study Over Mod7/Mod8 Runs

- ▶ Scanned run summary for runs of identical configuration and different mod.
- ▶ Modified efficiency condition for Layer 1 (if layer 2 AND layer 3 have hits).
- ▶ Forward Shower cut ($z > 260$ cm) shows negligible effect on ϕ efficiency modulation.

Efficiency Algorithm (Slide copied from Mark Dalton)

- Find track and match to BCAL shower
 - Calculate efficiency on layer basis
- if layer 2 has a hit in that cluster then layer 1 must have a hit in that cluster
- Do this on a module-by-module basis
 - Add in hits missing from clustering algorithm (Enhanced Efficiency)

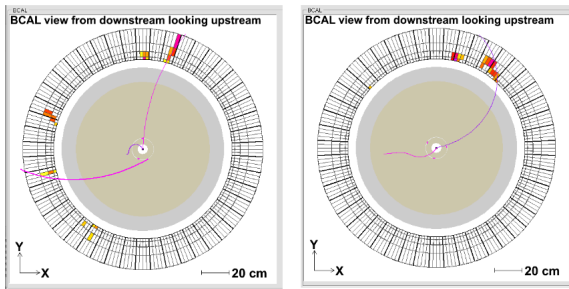
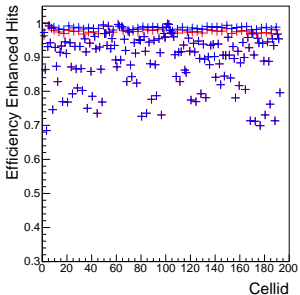
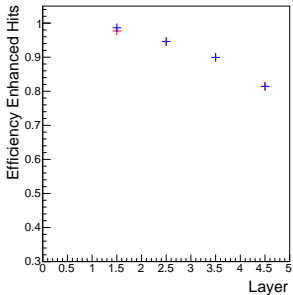
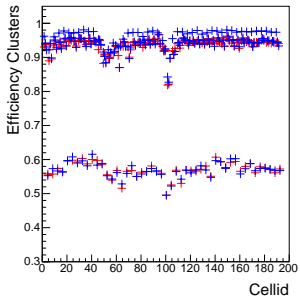
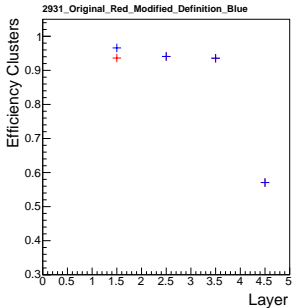


Figure: Cluster efficiency per layer (Event examples from run 1506)



Run	Beam C.	Beam E.	Solenoid C.	Trigger	Mod
2931	70.3852	5.54733	799.846	FCAL BCAL	8
1852	70.9962	10.082	150.15	BCAL	8

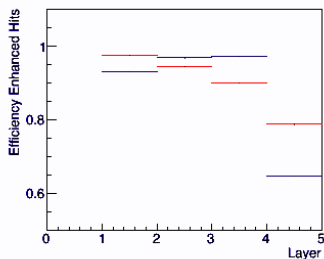
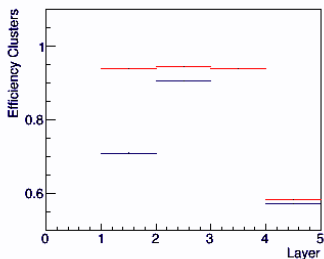


Figure: Red: Run 2931 Mod 7, Blue: Run 1852 Mod 8. (BCAL Trig)

Run	Beam C.	Beam E.	Solenoid C.	Trigger	Mod
2157	38.7235	10.082	1199.79	FCAL BCAL	7
3079	38.91	5.54707	1199.92	FCAL BCAL	8

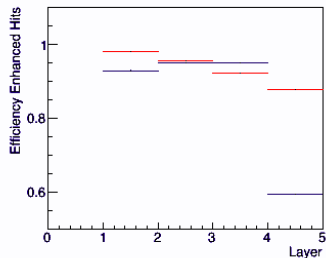
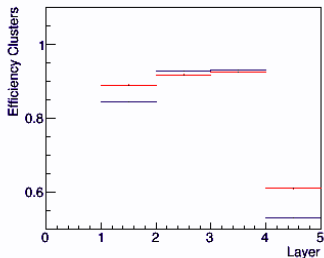


Figure: Red: Run 2157 Mod 7, Blue: Run 3079 Mod 8.

Run	Beam C.	Beam E.	Solenoid C.	Trigger	Mod
2157	38.7235	10.082	1199.79	FCAL BCAL	7
2126	39	10.1	1199.97676745	FCAL BCAL	8

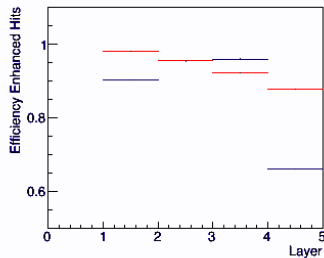
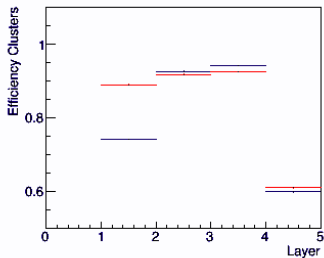


Figure: Red: Run 2157 Mod 7, Blue: Run 2126 Mod 8.

Summary & Questions

- ▶ Layers 1,4 have always higher efficiency in Mod 7 runs compared to Mod 8 runs under same conditions. This indicates:
 - a) 2 and 3 benefit from a better “neighbour” trigger (layer above and below them).
 - b) junk hitting layer 1 but not 2, 3, 4.
 - c) threshold-energy deposition combo in L4 is not favourable (i.e. energy deposited is too low to make the threshold or make it into L4 altogether).
- ▶ A modified definition for layer 1 efficiency shows negligible enhancement in mod 7 run (2931).

Run	Beam C.	Beam E.	Solenoid C.	Trigger	Mod
3179	63.4041	5.54954	1299.91	FCAL BCAL	7
3126	63.8268	5.55003	999.343	FCAL BCAL	8

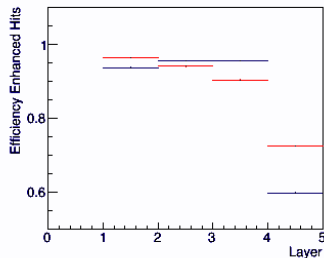
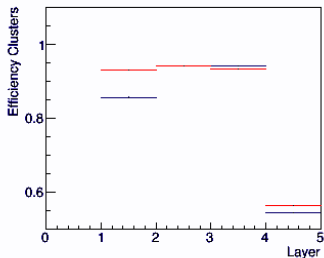


Figure: Red: Run 3179 Mod 7, Blue: Run 3126 Mod 8.

Run	Beam C.	Beam E.	Solenoid C.	Trigger	Mod
2154	37.8297	10.082	1199.32	FCAL BCAL	7
3079	38.91	5.54707	1199.92	FCAL BCAL	8

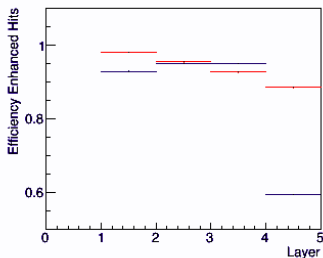
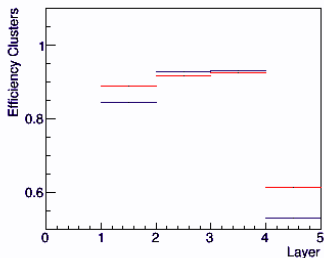


Figure: Red: Run 2154 Mod 7, Blue: Run 3079 Mod 8.

Run	Beam C.	Beam E.	Solenoid C.	Trigger	Mod
2154	37.8297	10.082	1199.32	FCAL BCAL	7
2126	39	10.1	1199.97676745	FCAL BCAL	8

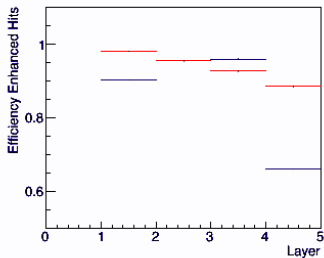
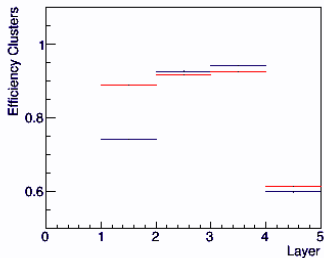


Figure: Red: Run 2154 Mod 7, Blue: Run 2126 Mod 8.

Run	Beam C.	Beam E.	Solenoid C.	Trigger	Mod
3183	8.28376	5.54962	1300.51	FCAL BCAL	8
3182	8.4929	5.55563	1299	FCAL BCAL	8

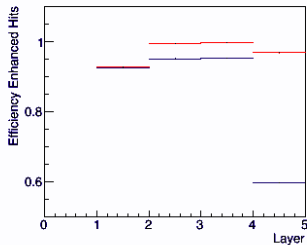
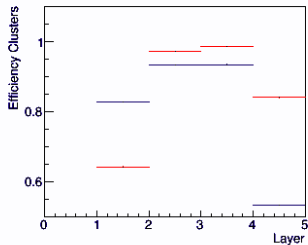


Figure: Red: Run 3183 Mod 8, Blue: Run 3182 Mod 8.

Run	Beam C.	Beam E.	Solenoid C.	Trigger	Mod
3220	0	5.55563	0.17519	BCAL	7
3301	0	5.55563	0.167271	BCAL	8

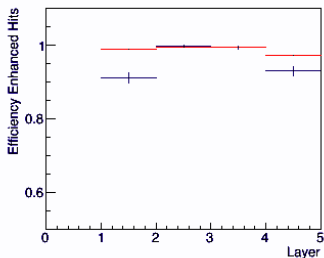
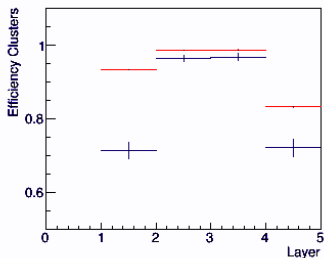


Figure: Red: Run 3220 Mod 7, Blue: Run 3301 Mod 8.

Run	Beam C.	Beam E.	Solenoid C.	Trigger	Mod
3220	0	5.55563	0.17519	BCAL	7
3218	0	5.55563	0.193313	BCAL	8

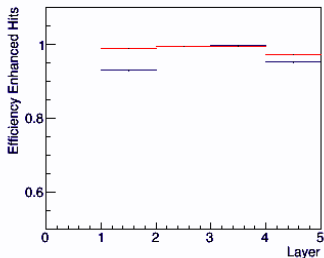
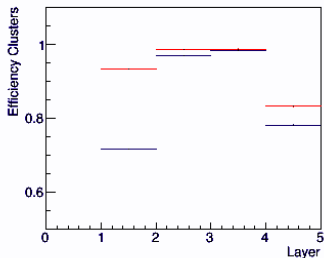


Figure: Red: Run 3220 Mod 7, Blue: Run 3218 Mod 8.