Improving b$_1$ π full event reconstruction

March 15, 2010   David Lawrence

In a nutshell:

◆ Options to draw several more reconstructed objects added to *hdview2*

◆ Merging of multiple DFCALCluster objects when creating DFCALPhoton objects

◆ Merging of multiple DBCALShower objects when creating DBCALPhoton objects

◆ Improved matching of reconstructed photons to charged tracks

◆ Too many reconstructed photons in final state

Source: hdgeant_smeared.hddm

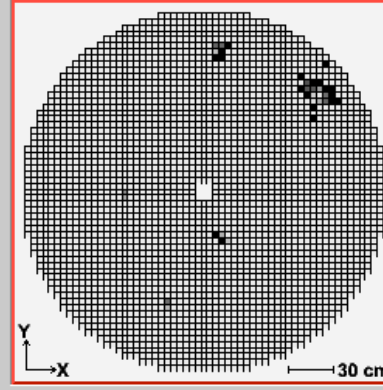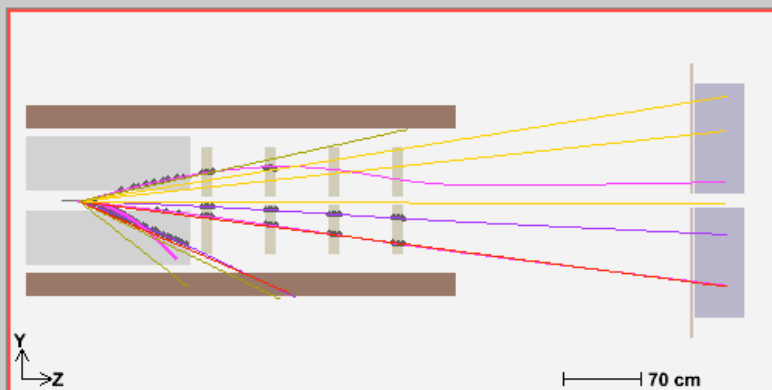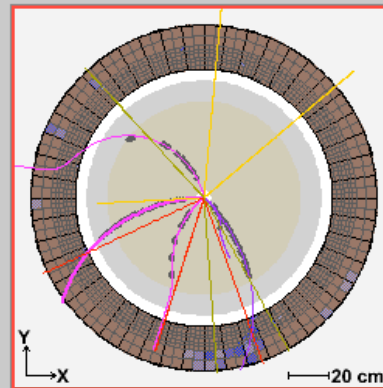**View Controls**
-X X+   ZOOM   Transverse Coordinates
-Y Y+   - +   ● x/y
-Z Z+   ○ r/phi
    Reset

Event Controls
☐ continuous
<-- Prev | Next --> | delay: 0.25 ▼

Info
Run: ----------
Event: 1

Inspectors
Track Inspector
TOF Inspector
BCAL Inspector   Quit
FCAL Inspector
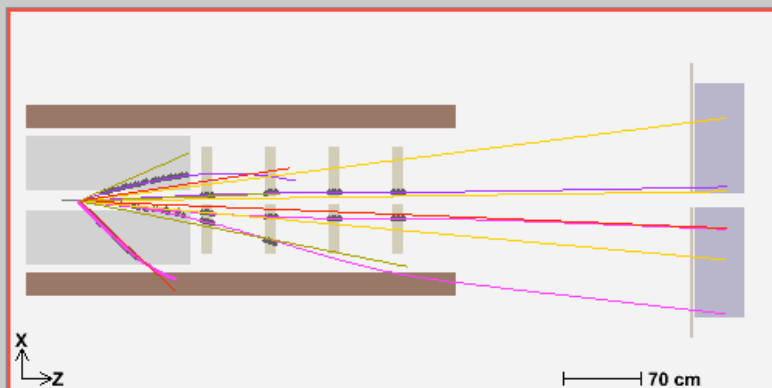
Track Draw Options
☐ DTrackCandidate: FDC ▼
☐ DTrackWireBased: <default> ▼
☐ DTrackTimeBased: <default> ▼
☑ DChargedTrack: <default> ▼
☑ DPhoton
☐ DMCThrown
☐ DMCTrajectoryPoint

Hit Draw Options
☐ CDC
☐ CDC Drift Time
☑ CDCTruth
☐ FDC Wire
☐ FDC Pseudo
☑ FDCTruth
☐ TOF
☐ TOFTruth
☑ FCAL
☑ BCAL
More options

X ↑ →Z |——— 70 cm
Y ↑ →X |——— 20 cm
Y ↑ →Z |——— 70 cm
Y ↑ →X |——— 30 cm

Track Info

Thrown

trk:	type:	p:	theta:	phi:	z:
1	pi+	0.9384	15.91	1.805	65
2	pi-	1.649	3.647	5.788	65
3	gamma	2.587	9.561	0.6973	65
4	gamma	0.4627	9.286	1.47	65
5	pi+	1.989	8.653	3.85	65
6	pi-	1.128	25.52	5.509	65

Reconstructed

DTrackTimeBased: ▼

trk:	type:	p:	theta:	phi:	z:	chisq/Ndof:	Ndof:	FOM:
1	pi+	1.977	8.557	3.85	63.99	0.1534	38	.94960
2	proton+	1.979	8.558	3.849	64.02	0.1359	38	.84660
3	pi-	1.613	3.66	5.766	66.62	3.181	39	1815e-
4	pi-	1.169	25.7	5.512	65.69	2.499	16	006809
5	pi+	0.9552	16.32	1.832	67.45	0.2408	12	.99408
6	proton+	0.8692	16.38	1.787	67.64	0.6851	14	.16451

Additional drawing options added to *hdview2*
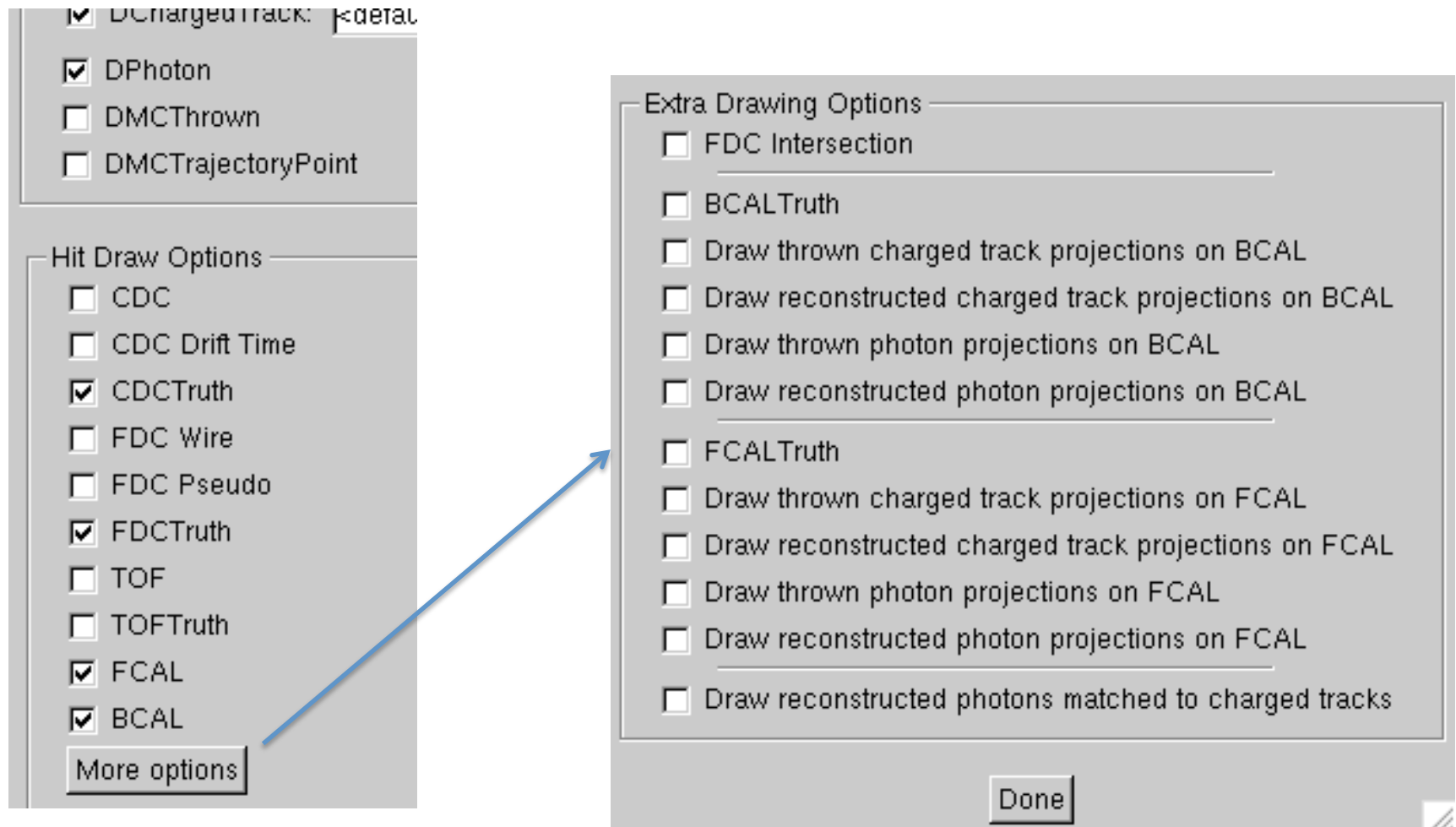
hdview2 FCAL Elements
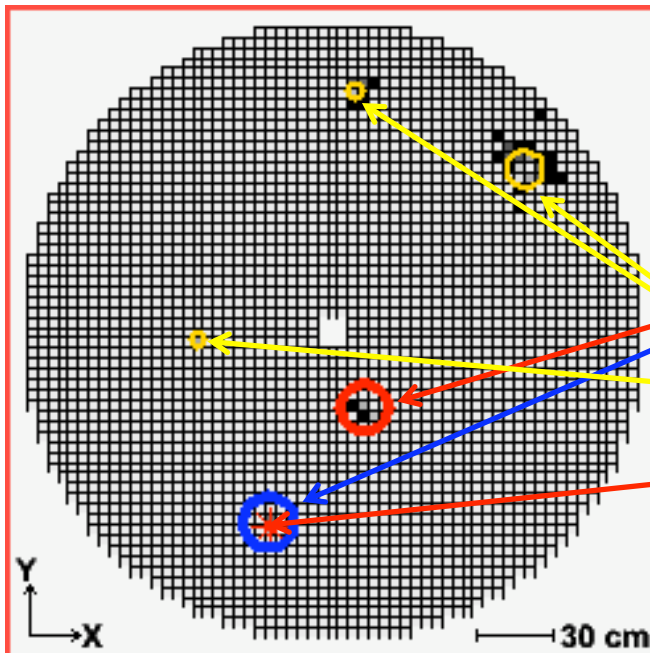
FCALTruth

Draw thrown charged track projections on FCAL

☑ Draw reconstructed charged track projections on FCAL

Draw thrown photon projections on FCAL

☑ Draw reconstructed photon projections on FCAL

☑ Draw reconstructed photons matched to charged tracks
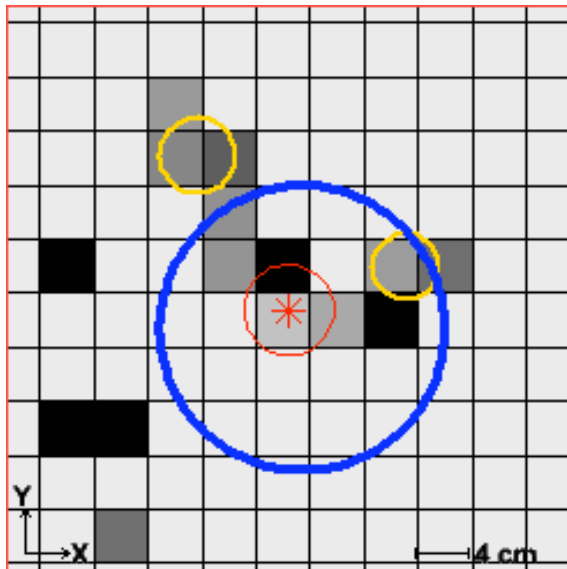
DFCALPhoton merging

FCAL/cluster_merging

Minimum separation between 2 clusters for
# them NOT to be merged
MIN_CLUSTER_SEPARATION15.0 # centimeters

3 "photons" reconstructed.
1 flagged as matching a
charged track

Photons merged, but now
centroid out of range for
matching with charged track
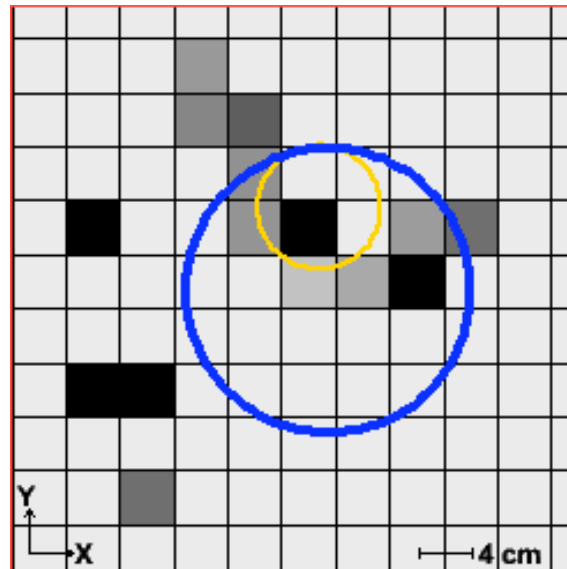
Single photon properly
flagged for matching track
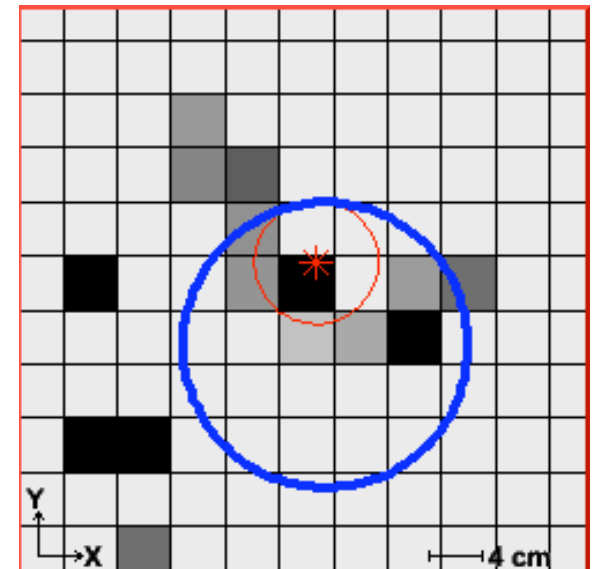
release-2010-02-11

DBCALPhoton merging

BCAL/cluster_merging

Minimum separation between 2 clusters for them NOT to be merged
MIN_CLUSTER_SEPARATION_XY15.0 # centimeters
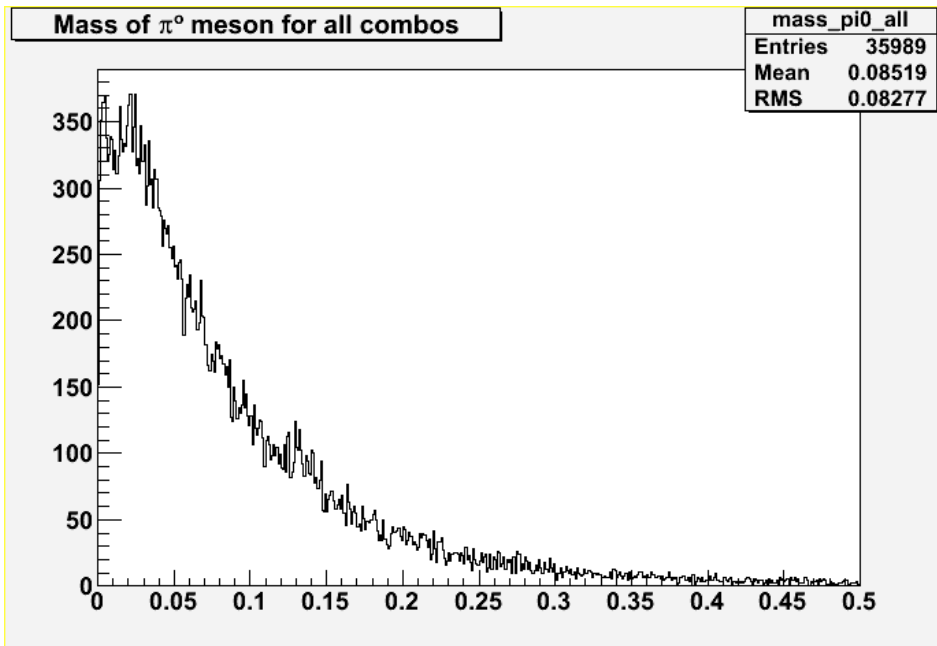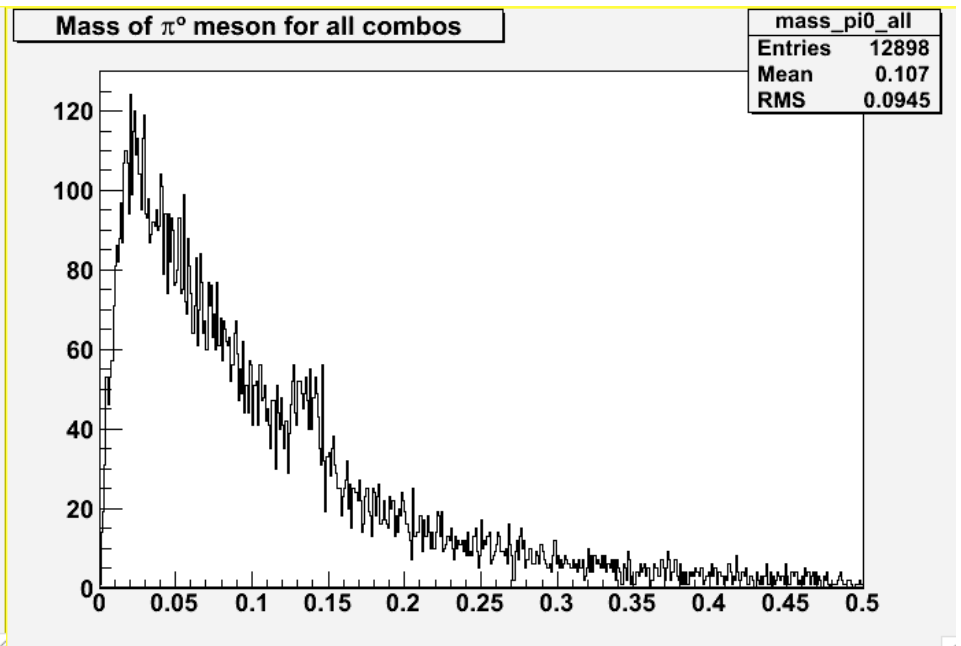MIN_CLUSTER_SEPARATION_Z30.0 # centimeters
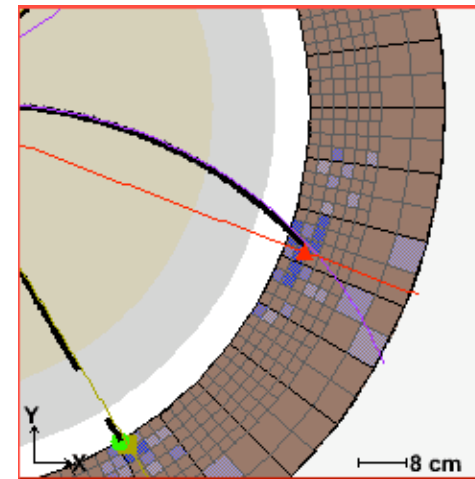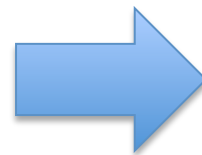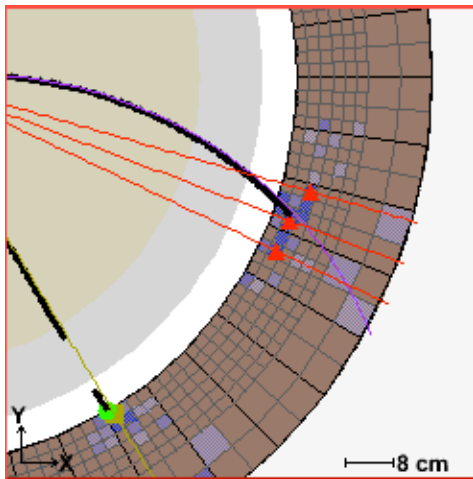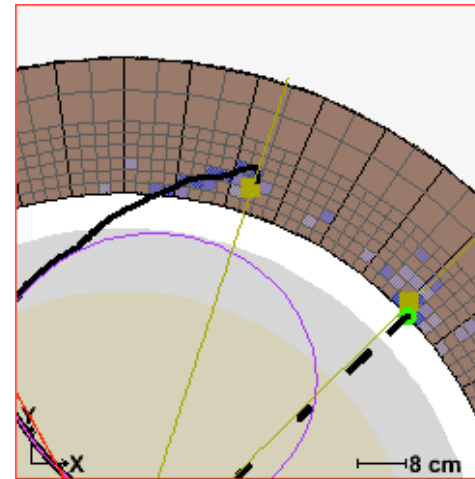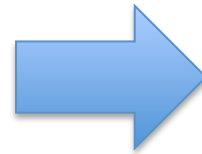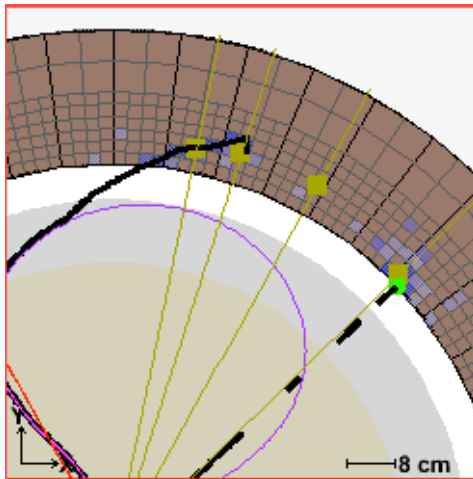
Effect of latest changes
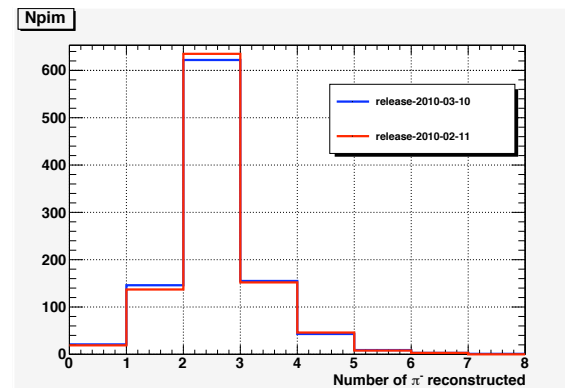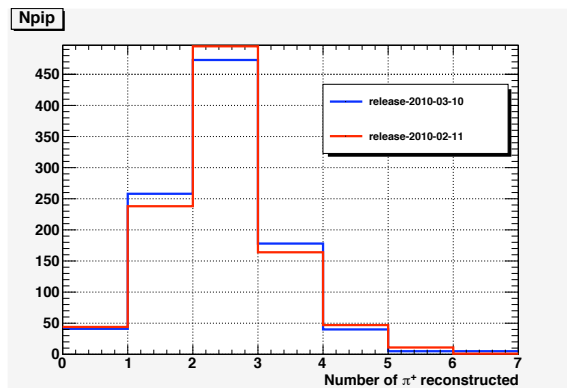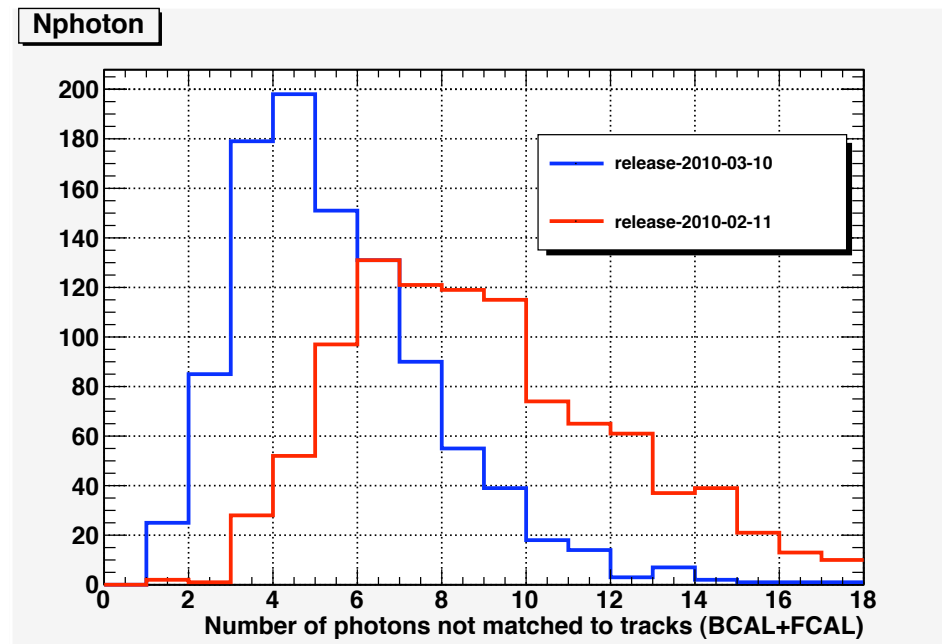
2-photon invariant mass
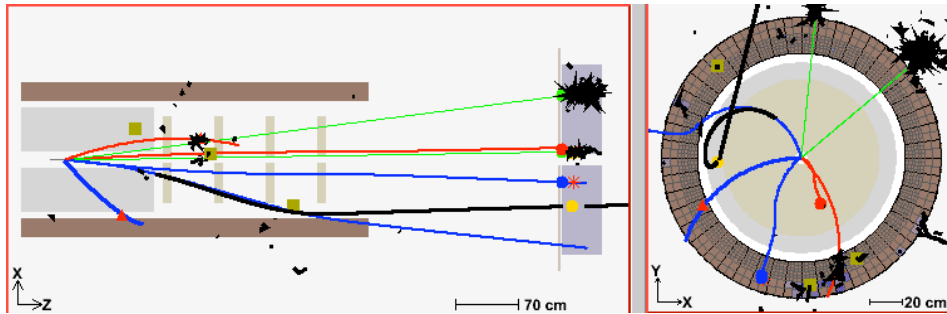
All2 photon combinations
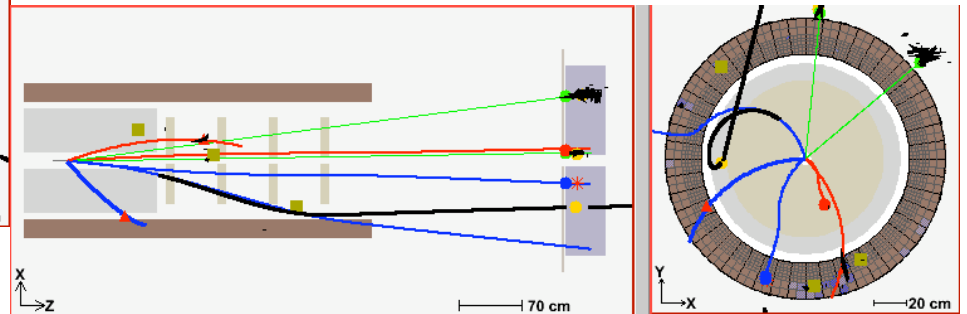
Release-2010-02-11   Release-2010-03-10
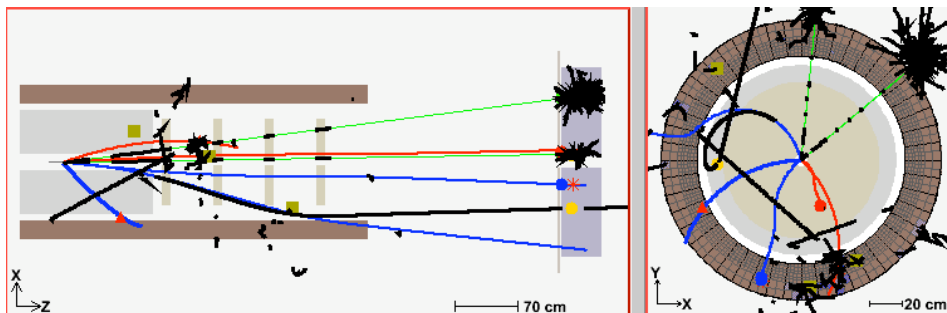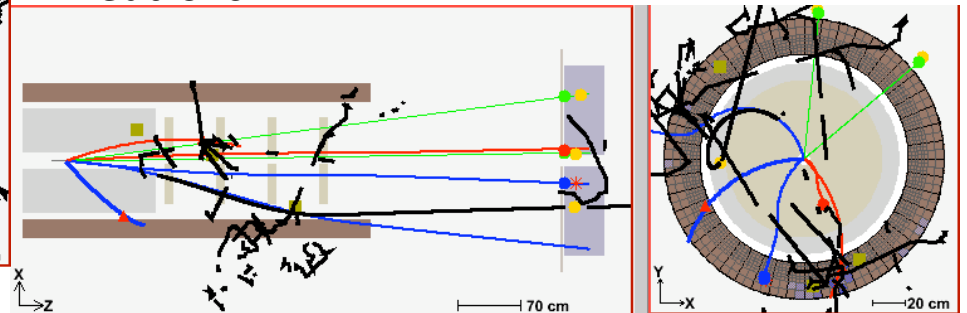
Trajectory points by particle type

Electrons

Positrons

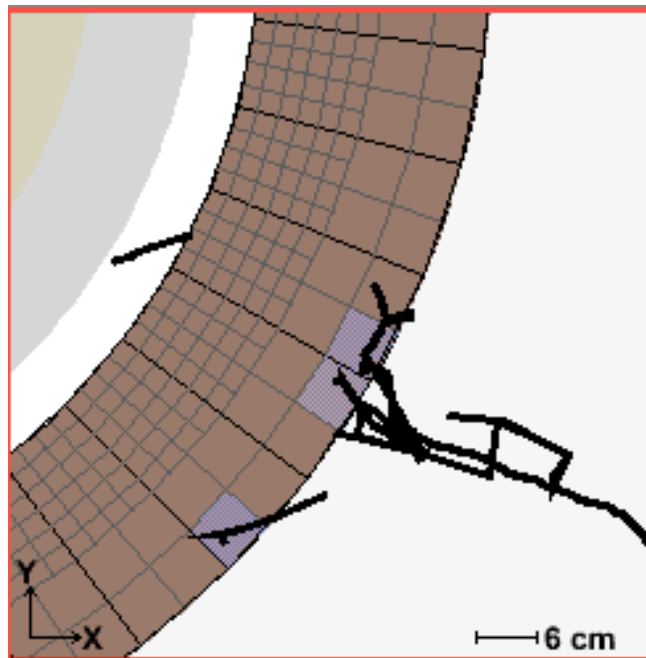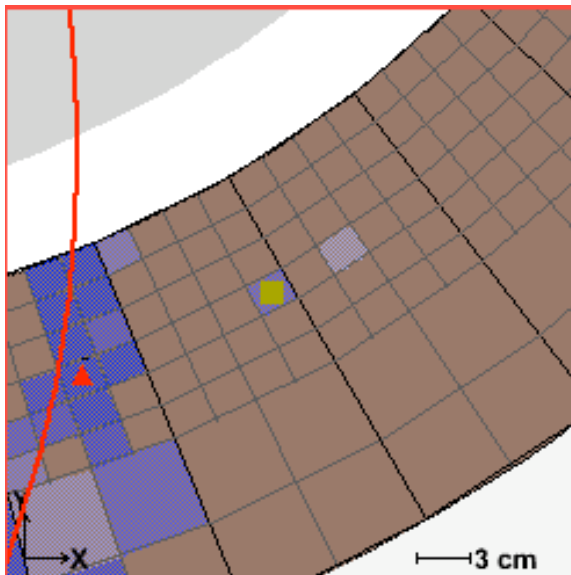Photons

Neutrons

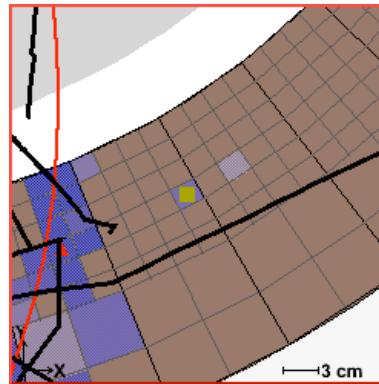# BCAL sees some backscatter from magnet

Only photons and electrons drawn (but no other particles contributing in this instance)

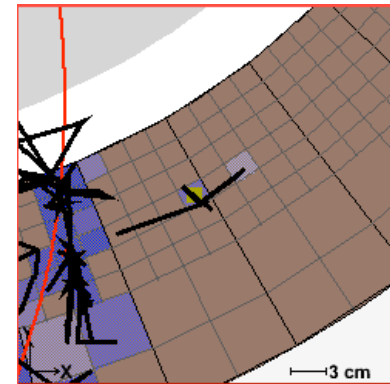# "Islands" of energy deposition in BCAL
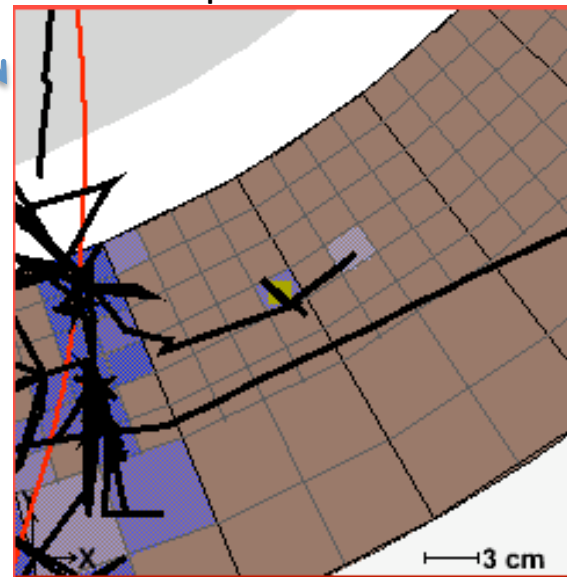
2 islands, disconnected from shower

neutron tracks

photon tracks

neutron+photon tracks

Almost perfect …

Extra BCAL photon

70 cm

20 cm

70 cm

30 cm

3/9/10

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