Improving $b_1 \pi$ full event reconstruction

March 9, 2010 David Lawrence

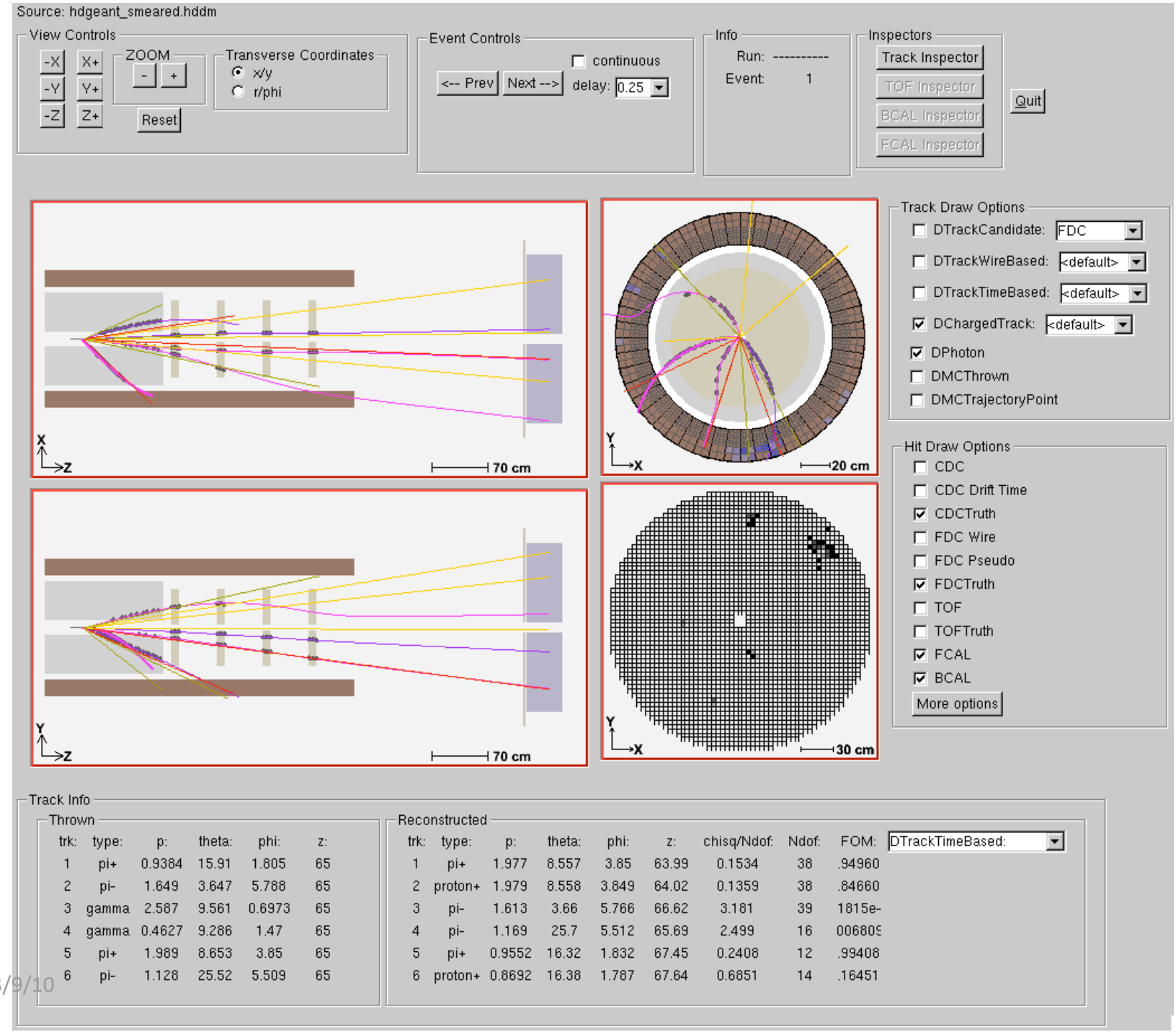
In a nutshell:

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

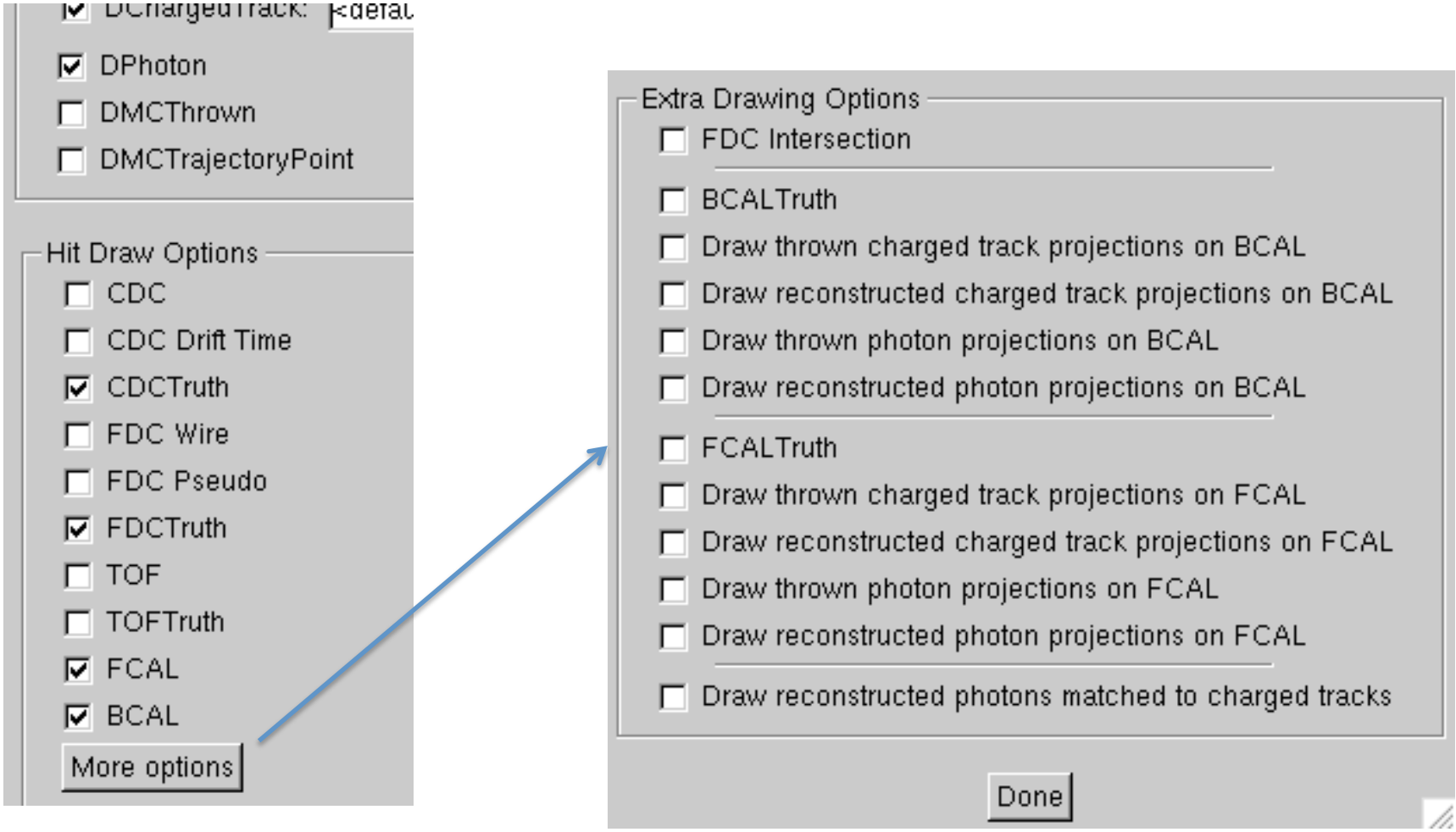
◆ Merging of multiple DFCALCluster objects when creating DFCALPhoton objects

◆ Merging of multiple DBCALShower objects when creating DBCALPhoton objects

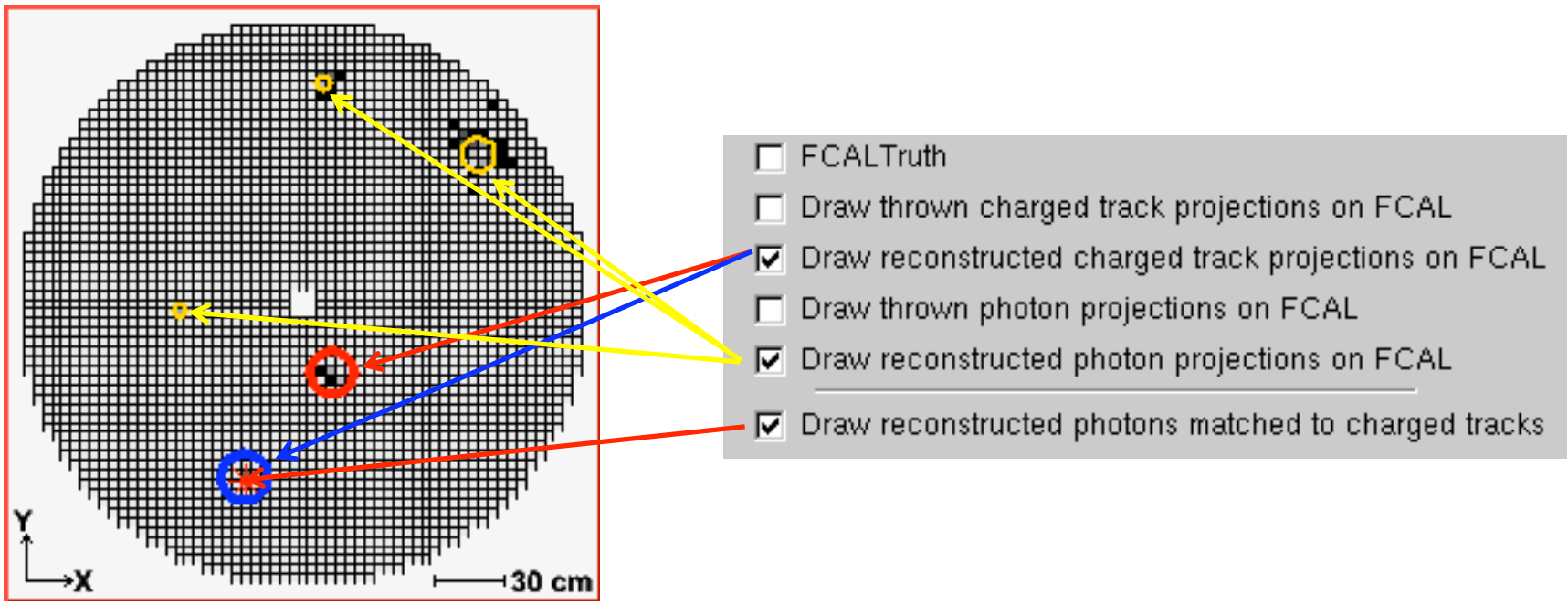
◆ Improved matching of reconstructed photons to charged tracks


Source: hdgeant_smeared.hddm
View Controls
-X
X+
-Y
Y+
-Z
Z+
ZOOM
-
+
Reset
Transverse Coordinates
x/y
r/phi
Event Controls
continuous
<-- Prev
Next -->
delay: 0.25
Info
Run: ----------
Event: 1
Inspectors
Track Inspector
TOF Inspector
BCAL Inspector
FCAL Inspector
Quit
X
Z
70 cm
Y
X
20 cm
Y
Z
70 cm
Y
X
30 cm
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
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
trk: type: p: theta: phi: z: chisq/Ndof: Ndof: FOM: DTrackTimeBased:
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



DFCALPhoton merging

FCAL/cluster_merging

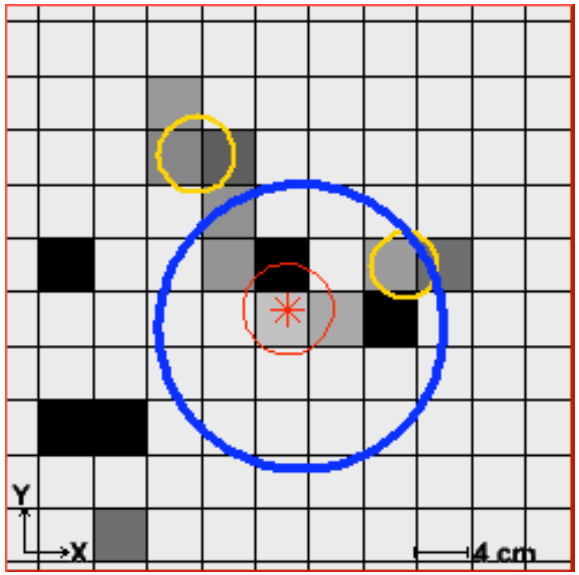
```
# Minimum separation between 2 clusters for
# them NOT to be merged
MIN_CLUSTER_SEPARATION15.0  # centimeters
```

PID/photon_track_matching

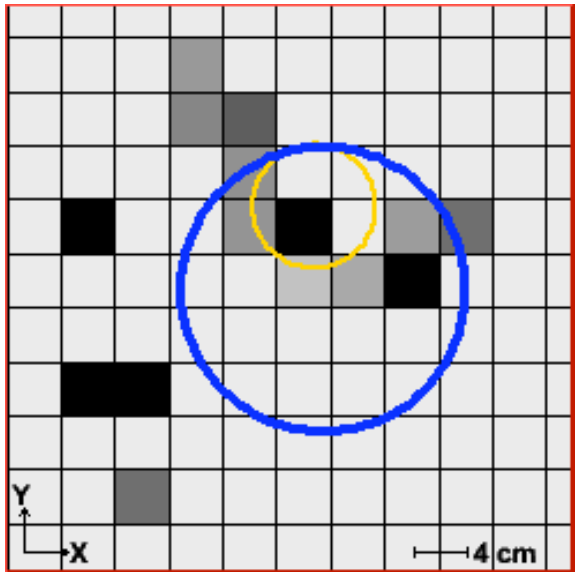
```
# BCAL is matched in both phi and z on BCAL surface
DELTA_PHI_BCAL0.15# radians
DELTA_Z_BCAL15.0# cm
MEAN_PHI_BCAL0.0# radians
MEAN_Z_BCAL0.0# cm

# FCAL is matched in distance on FCAL surface
DELTA_R_FCAL18.0# cm
MEAN_R_FCAL0.0# cm
```

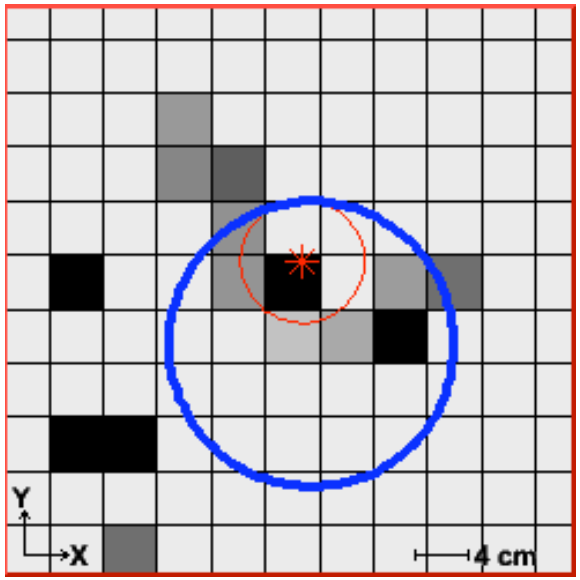
3 “photons” reconstructed.
1 flagged as matching a charged track



Photons merged, but now centroid out of range for matching with charged track



Single photon properly flagged for matching track



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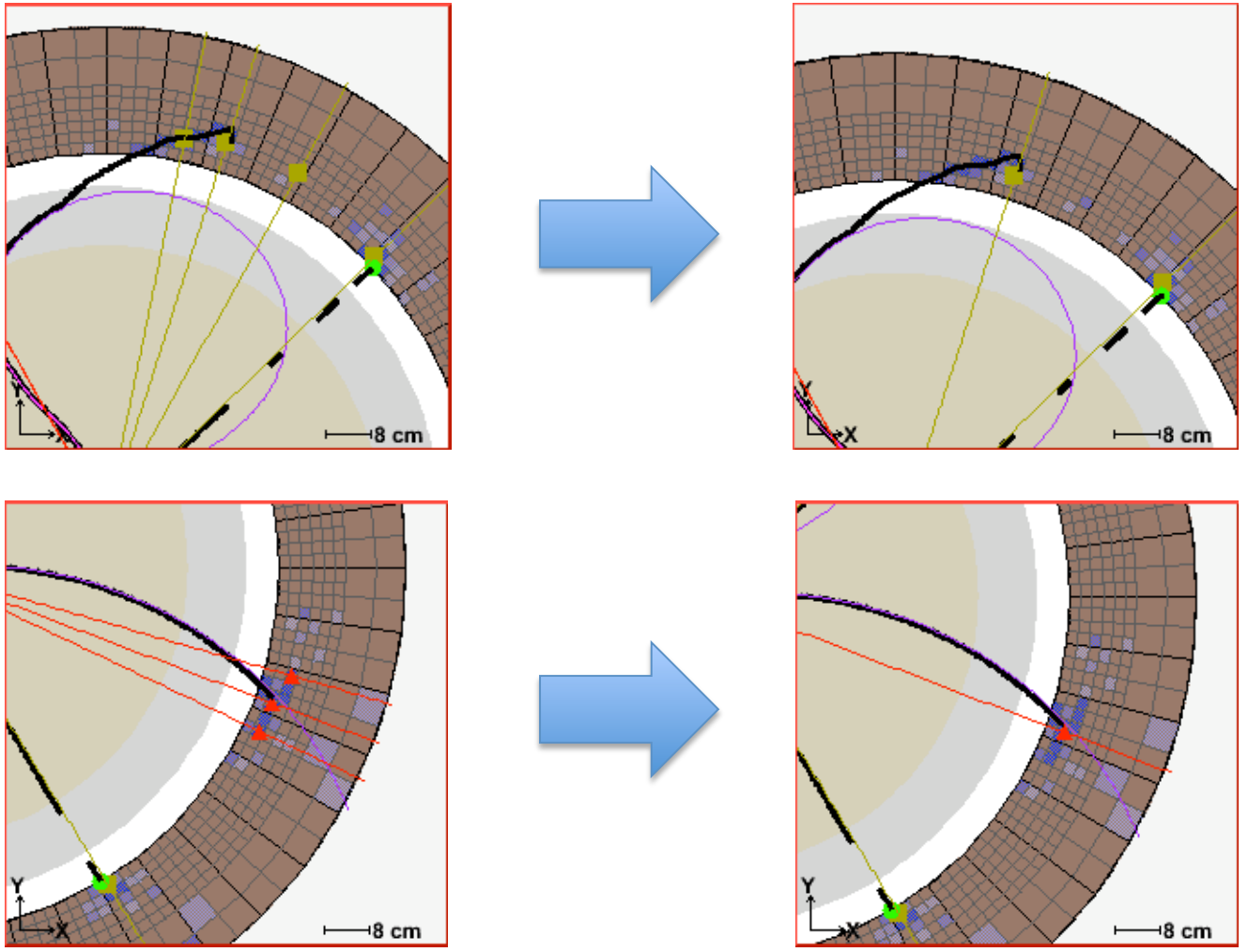
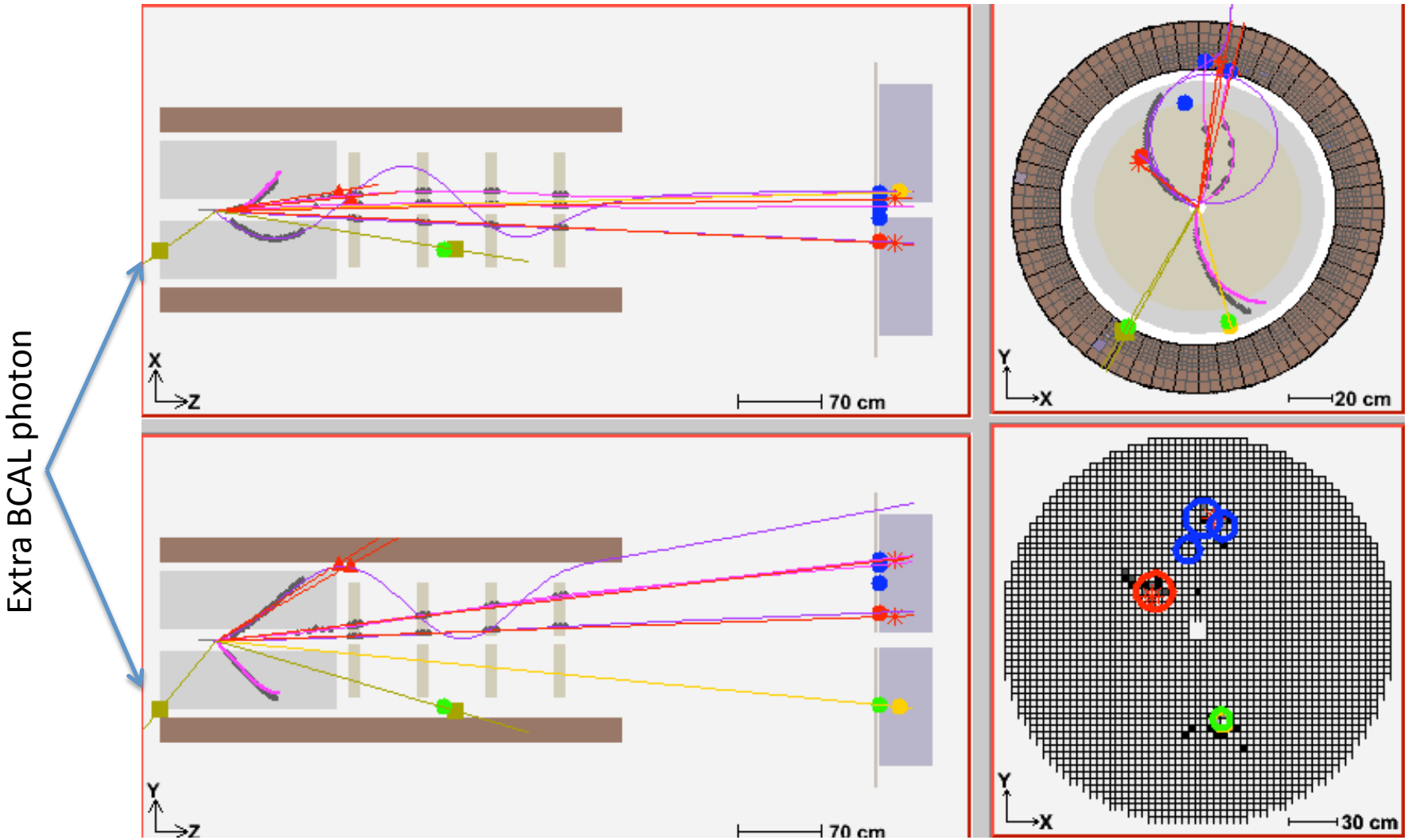
DBCALPhoton merging

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
```



Almost perfect …