Electron, H->4e efficiency from AOD and LAr cell scrambling

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Two new elements in this talk:

- Efficiency studies using a single tool configurable from jobOptions
  - Rome electron efficiencies vs calorimeter and tracking isolation variables.
  - Rome Higgs efficiencies
- Making the simulation more realistic even before DC3
  - Cell miscalibration during a ESD to AOD transition
  - Studies on electrons with miscalibrated cells

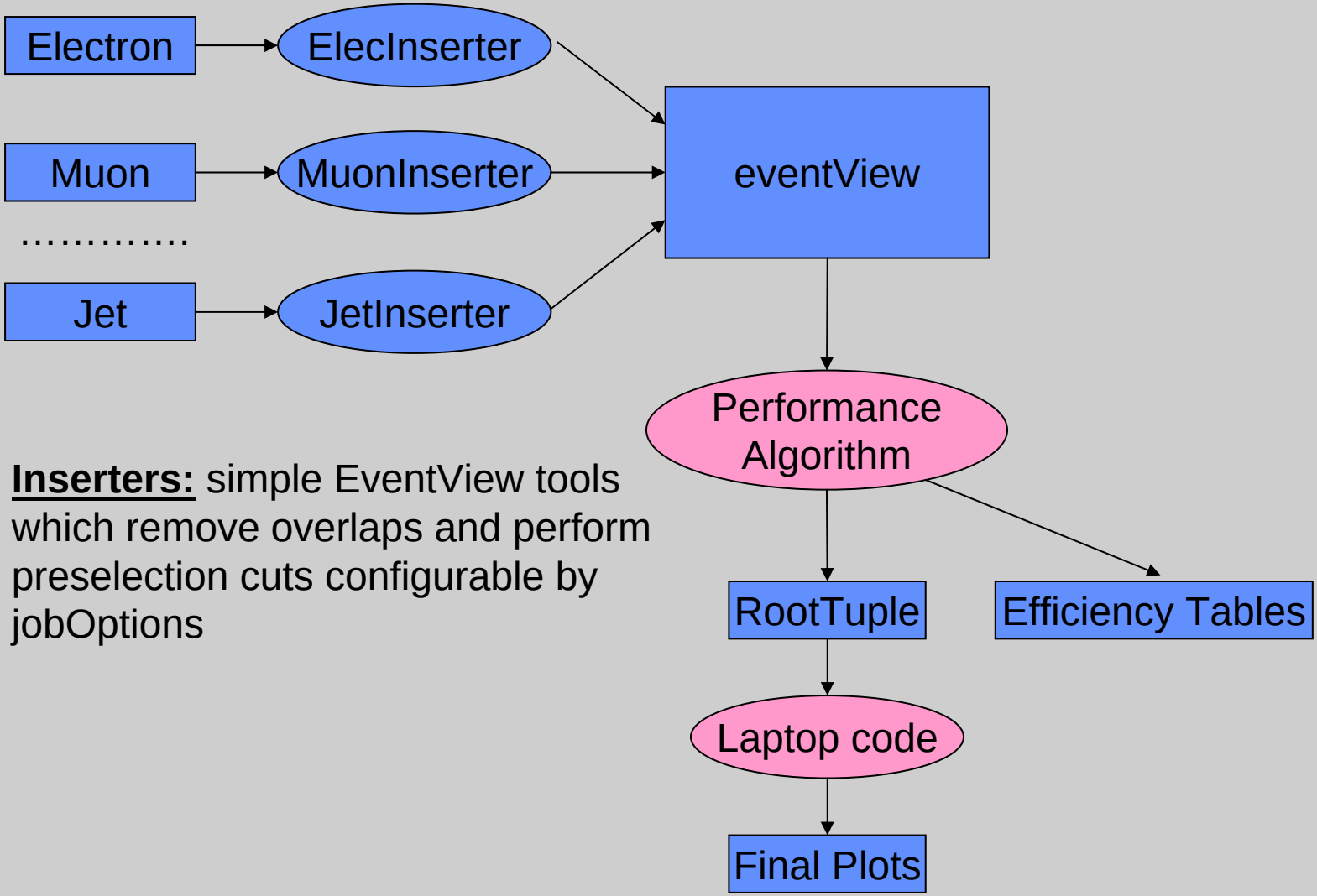
Samples Used:

- Single Electrons
  - Rome.004021, 004022, 004027 with pile-up (thanks to M.Wielers)
- Z bosons
  - Rome.004201.recov10.lumi01.ZeeJimmy (SM, results not shown)
- Higgs
  - Rome.003045.recov10.H1_130_4l (no pile-up)
  - Rome.004321.recov10.AcerMC_Zbb_4l
- Runs performed locally at Sheffield using ESDs and AODs.
  - Both 10.0.1 and 10.0.4 reconstructed AODs were used.

Documentation

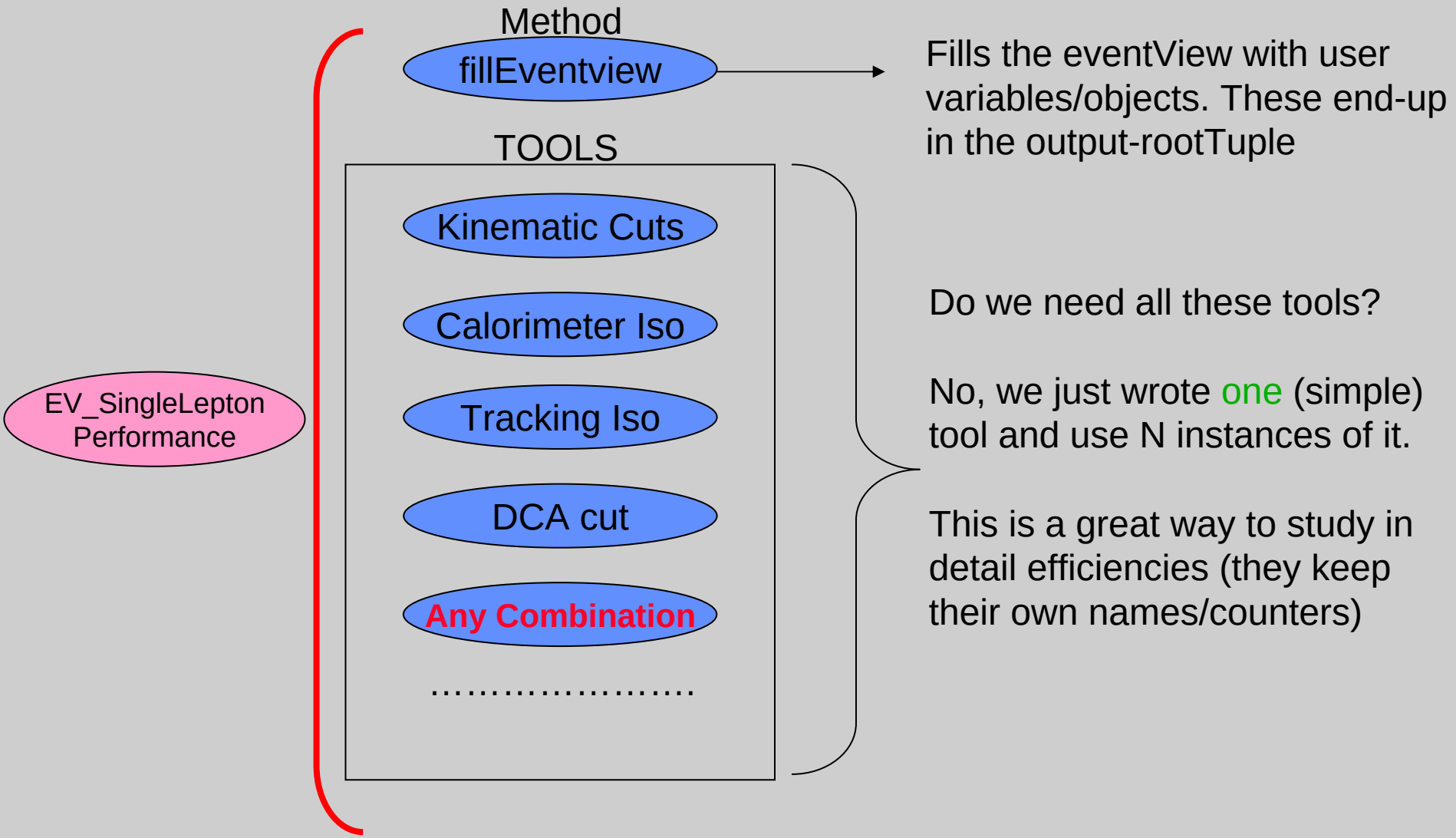
- EventView (Sep/05 Software Week) K.Cranmer, Amir Farbin: http://agenda.cern.ch/fullAgenda.php?ida=a045109
- EventView twiki documentation: https://uimon.cern.ch/twiki/bin/view/Atlas/EventView
- Egamma twiki documentation: https://uimon.cern.ch/twiki/bin/view/Atlas/ElectronGamma

Structure (simplified)



Inserters: simple EventView tools which remove overlaps and perform preselection cuts configurable by jobOptions

EV_SingleLeptonPerformance algorithm and its tools



Fills the eventView with user variables/objects. These end-up in the output-rootTuple

Do we need all these tools?

No, we just wrote one (simple) tool and use N instances of it.

This is a great way to study in detail efficiencies (they keep their own names/counters)

Structure of Performance tool

```
#
# Top Algorithm (I call it "ePerf")
#
theApp.TopAlg += ["EV_SingleLeptonPerformance/ePerf"]
ePerf=Algorithm("ePerf")
ePerf.doHto4l         = False
ePerf.doSingleElec = True
ePerf.OutputLevel   = FATAL
#
# The performance tool
#
ePerf.PerformanceTool[
                    "EV_SingleLeptonPerformanceTool/egammaOnly",
                    "EV_SingleLeptonPerformanceTool/egCaloIsEM",
                    "EV_SingleLeptonPerformanceTool/egTrackIsEM",
                    "EV_SingleLeptonPerformanceTool/egTrackIso",
                    "EV_SingleLeptonPerformanceTool/egCaloTrkIsEM",
                    "EV_SingleLeptonPerformanceTool/egammaFull",
                    ]
```

Notice: there are 6 tools defined however all 6 are re-incarnations of the same “Performance Tool” (in this case the tool is actually an eventViewBaseTool)

Multiple tool definition

```
toolSvc = Service( "ToolSvc" )

toolSvc.egammaOnly.cutName            = "egammaOnly"
toolSvc.egammaOnly.outputLevel        = FATAL

toolSvc.egCaloIsEM.cutName            = "egCaloIsEM"
toolSvc.egCaloIsEM.useCaloIsEM        = True
toolSvc.egCaloIsEM.outputLevel        = FATAL

toolSvc.egTrackIsEM.cutName           = "egTrackIsEM"
toolSvc.egTrackIsEM.useTrkQualIsEM    = True
toolSvc.egTrackIsEM.outputLevel       = FATAL

toolSvc.egTrackIso.cutName            = "egTrackIso"
toolSvc.egTrackIso.useIsolation       = True
toolSvc.egTrackIso.outputLevel        = FATAL

toolSvc.egCaloTrkIsEM.cutName         = "egCaloTrkIsEM"
toolSvc.egCaloTrkIsEM.useCaloIsEM     = True
toolSvc.egCaloTrkIsEM.useTrkQualIsEM  = True
toolSvc.egCaloTrkIsEM.outputLevel     = FATAL

toolSvc.egammaFull.cutName            = "egammaFull"
toolSvc.egammaFull.useCaloIsEM        = True
toolSvc.egammaFull.useTrkQualIsEM     = True
toolSvc.egammaFull.useIsolation       = True
toolSvc.egammaFull.outputLevel        = FATAL
```

Calorimeter Isolation

Track quality cuts

Track cone isolation

Calo Isolation+Track quality

All cuts combined

Single electrons pt=15GeV (pile-up: 10^{33})

	etamin	etamax	Total	Passed	Efficiency
egammaOnly	0.00	0.40	1468	1406	0.9578
egammaOnly	0.40	0.80	1529	1457	0.9529
egammaOnly	0.80	1.20	1514	1433	0.9465
egammaOnly	1.20	1.60	1495	1368	0.9151
egammaOnly	1.60	2.00	1609	1450	0.9012
egammaOnly	2.00	2.40	1494	1346	0.9009
egCaloIsEM	0.00	0.40	1468	1328	0.9046
egCaloIsEM	0.40	0.80	1529	1330	0.8698
egCaloIsEM	0.80	1.20	1514	1341	0.8857
egCaloIsEM	1.20	1.60	1495	1034	0.6916
egCaloIsEM	1.60	2.00	1609	1366	0.8490
egCaloIsEM	2.00	2.40	1494	1220	0.8166
egTrackIsEM	0.00	0.40	1468	1291	0.8794
egTrackIsEM	0.40	0.80	1529	1362	0.8908
egTrackIsEM	0.80	1.20	1514	1349	0.8910
egTrackIsEM	1.20	1.60	1495	1256	0.8401
egTrackIsEM	1.60	2.00	1609	1251	0.7775
egTrackIsEM	2.00	2.40	1494	1187	0.7945
egTrackIso	0.00	0.40	1468	1404	0.9564
egTrackIso	0.40	0.80	1529	1454	0.9509
egTrackIso	0.80	1.20	1514	1426	0.9419
egTrackIso	1.20	1.60	1495	1348	0.9017
egTrackIso	1.60	2.00	1609	1391	0.8645
egTrackIso	2.00	2.40	1494	1206	0.8072

Somewhat better than DC1:

	etamin	etamax	Total	Passed	Efficiency
egCaloTrkIsEM	0.00	0.40	1468	1224	0.8338
egCaloTrkIsEM	0.40	0.80	1529	1245	0.8143
egCaloTrkIsEM	0.80	1.20	1514	1262	0.8336
egCaloTrkIsEM	1.20	1.60	1495	956	0.6395
egCaloTrkIsEM	1.60	2.00	1609	1190	0.7396
egCaloTrkIsEM	2.00	2.40	1494	1084	0.7256

egammaFull	**0.00**	**0.40**	**1468**	**1224**	**0.8338**
egammaFull	**0.40**	**0.80**	**1529**	**1245**	**0.8143**
egammaFull	**0.80**	**1.20**	**1514**	**1262**	**0.8336**
egammaFull	**1.20**	**1.60**	**1495**	**947**	**0.6334**
egammaFull	**1.60**	**2.00**	**1609**	**1168**	**0.7259**
egammaFull	**2.00**	**2.40**	**1494**	**1017**	**0.6807**

Program text output

Single electrons pt=25GeV (pile-up: 10^{33})

	etamin	etamax	Total	Passed	Efficiency
egammaOnly	0.00	0.40	1435	1329	0.9261
egammaOnly	0.40	0.80	1490	1398	0.9383
egammaOnly	0.80	1.20	1468	1394	0.9496
egammaOnly	1.20	1.60	1425	1322	0.9277
egammaOnly	1.60	2.00	1543	1390	0.9008
egammaOnly	2.00	2.40	1430	1282	0.8965
egCaloIsEM	0.00	0.40	1435	1268	0.8836
egCaloIsEM	0.40	0.80	1490	1333	0.8946
egCaloIsEM	0.80	1.20	1468	1336	0.9101
egCaloIsEM	1.20	1.60	1425	1078	0.7565
egCaloIsEM	1.60	2.00	1543	1318	0.8542
egCaloIsEM	2.00	2.40	1430	1090	0.7622
egTrackIsEM	0.00	0.40	1435	1209	0.8425
egTrackIsEM	0.40	0.80	1490	1307	0.8772
egTrackIsEM	0.80	1.20	1468	1299	0.8849
egTrackIsEM	1.20	1.60	1425	1230	0.8632
egTrackIsEM	1.60	2.00	1543	1217	0.7887
egTrackIsEM	2.00	2.40	1430	1145	0.8007
egTrackIso	0.00	0.40	1435	1325	0.9233
egTrackIso	0.40	0.80	1490	1393	0.9349
egTrackIso	0.80	1.20	1468	1380	0.9401
egTrackIso	1.20	1.60	1425	1276	0.8954
egTrackIso	1.60	2.00	1543	1308	0.8477
egTrackIso	2.00	2.40	1430	1126	0.7874

Consistent with DC1:

	etamin	etamax	Total	Passed	Efficiency
egCaloTrkIsEM	**0.00**	**0.40**	**1435**	**1159**	**0.8077**
egCaloTrkIsEM	**0.40**	**0.80**	**1490**	**1249**	**0.8383**
egCaloTrkIsEM	**0.80**	**1.20**	**1468**	**1248**	**0.8501**
egCaloTrkIsEM	**1.20**	**1.60**	**1425**	**1002**	**0.7032**
egCaloTrkIsEM	**1.60**	**2.00**	**1543**	**1158**	**0.7505**
egCaloTrkIsEM	**2.00**	**2.40**	**1430**	**982**	**0.6867**
egammaFull	**0.00**	**0.40**	**1435**	**1157**	**0.8063**
egammaFull	**0.40**	**0.80**	**1490**	**1246**	**0.8362**
egammaFull	**0.80**	**1.20**	**1468**	**1242**	**0.8460**
egammaFull	**1.20**	**1.60**	**1425**	**987**	**0.6926**
egammaFull	**1.60**	**2.00**	**1543**	**1118**	**0.7246**
egammaFull	**2.00**	**2.40**	**1430**	**896**	**0.6266**

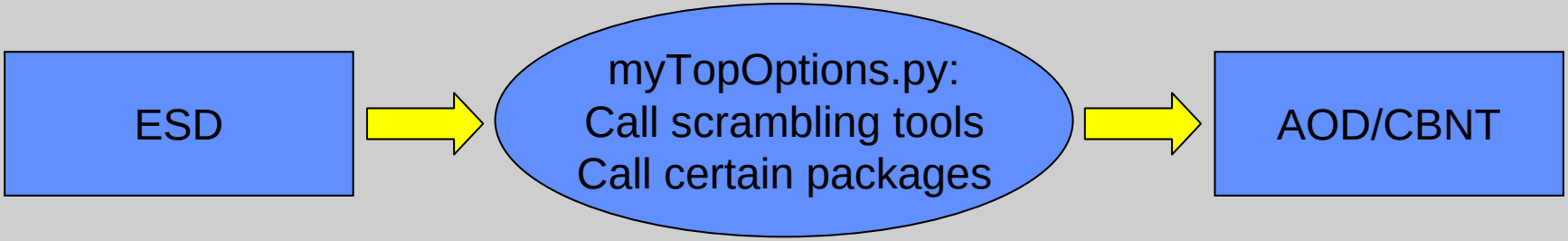
For pt=60GeV and DC1 please look at the extra slides

Electrons from Higgs(130GeV) to 4leptons (no pile-up)

	etamin	etamax	Total	Passed	Efficiency
egammaOnly	0.00	0.40	2119	2097	0.9896
egammaOnly	0.40	0.80	1950	1903	0.9759
egammaOnly	0.80	1.20	1846	1735	0.9399
egammaOnly	1.20	1.60	1616	1454	0.8998
egammaOnly	1.60	2.00	1308	1185	0.9060
egammaOnly	2.00	2.40	1086	1001	0.9217
egCaloIsEM	0.00	0.40	2119	1904	0.8985
egCaloIsEM	0.40	0.80	1950	1716	0.8800
egCaloIsEM	0.80	1.20	1846	1607	0.8705
egCaloIsEM	1.20	1.60	1616	1095	0.6776
egCaloIsEM	1.60	2.00	1308	1087	0.8310
egCaloIsEM	2.00	2.40	1086	848	0.7808
egTrackIsEM	0.00	0.40	2119	1948	0.9193
egTrackIsEM	0.40	0.80	1950	1776	0.9108
egTrackIsEM	0.80	1.20	1846	1631	0.8835
egTrackIsEM	1.20	1.60	1616	1324	0.8193
egTrackIsEM	1.60	2.00	1308	1053	0.8050
egTrackIsEM	2.00	2.40	1086	917	0.8444
egTrackIso	0.00	0.40	2119	2064	0.9740
egTrackIso	0.40	0.80	1950	1834	0.9405
egTrackIso	0.80	1.20	1846	1668	0.9036
egTrackIso	1.20	1.60	1616	1378	0.8527
egTrackIso	1.60	2.00	1308	1079	0.8249
egTrackIso	2.00	2.40	1086	852	0.7845

	etamin	etamax	Total	Passed	Efficiency
egCaloTrkIsEM	0.00	0.40	2119	1774	0.8372
egCaloTrkIsEM	0.40	0.80	1950	1614	0.8277
egCaloTrkIsEM	0.80	1.20	1846	1518	0.8223
egCaloTrkIsEM	1.20	1.60	1616	1009	0.6244
egCaloTrkIsEM	1.60	2.00	1308	970	0.7416
egCaloTrkIsEM	2.00	2.40	1086	778	0.7164
egammaFull	**0.00**	**0.40**	**2119**	**1751**	**0.8263**
egammaFull	**0.40**	**0.80**	**1950**	**1573**	**0.8067**
egammaFull	**0.80**	**1.20**	**1846**	**1477**	**0.8001**
egammaFull	**1.20**	**1.60**	**1616**	**980**	**0.6064**
egammaFull	**1.60**	**2.00**	**1308**	**914**	**0.6988**
egammaFull	**2.00**	**2.40**	**1086**	**696**	**0.6409**

Including systematic effects on AOD/cbnt (scrambling is a misnomer)



An example: Cross talk in the Strips Cells of the LAr calorimeter

-Affects isEM performance (shower cuts using strips)
-Combined Test Beam: strip shower variables significantly altered due to ctalk
-Induce cross-talk in the cells before clustering
-Run ESD to AOD(or cbnt)
    -Call clustering
    -Call egamma

Implementation of a 'scrambling' Algo + tool

In LArCalorimeter/LArClusterRec/share/LArCluster_jobOptions.py:

```
theApp.Dlls      += [  "CaloRec", "LArClusterRec"  ]
theApp.TopAlg += [
"CaloCellScrambler",
"CaloTowerAlgorithm/TowerMaker",
"LArClusterMaker/LArSWClusterMaker"
]
#--------------------------------------------------------------
# Algorithms Private Options
#--------------------------------------------------------------
#Scrambler:
scrambler = Algorithm("CaloCellScrambler")
scrambler.CaloCellsOutputName="AllCalo_scrambled"
#scrambler.CaloCellsOutputName="AllCalo"
scrambler.OutputLevel=ERROR
scrambler.CaloCellMakerToolNames=["CaloCellScramblerTool"]
scrambler.CaloCellMakerToolNames+=["CaloCellContainerFinalizerTool"]
scrambler.CaloCellScramblerTool.CaloCellsInputName="AllCalo"
scrambler.CaloCellScramblerTool.OutputLevel=ERROR
```

Elec pt=25 default

	etamin	etamax	Total	Passed	Efficiency
egammaOnly	0.00	0.40	1398	1295	0.9263
egammaOnly	0.40	0.80	1444	1353	0.9370
egammaOnly	0.80	1.20	1430	1357	0.9490
egammaOnly	1.20	1.60	1377	1283	0.9317
egammaOnly	1.60	2.00	1496	1347	0.9004
egammaOnly	2.00	2.40	1405	1260	0.8968
egCaloIsEM	0.00	0.40	1398	1236	0.8841
egCaloIsEM	0.40	0.80	1444	1295	0.8968
egCaloIsEM	0.80	1.20	1430	1304	0.9119
egCaloIsEM	1.20	1.60	1377	1045	0.7589
egCaloIsEM	1.60	2.00	1496	1278	0.8543
egCaloIsEM	2.00	2.40	1405	1073	0.7637
egTrackIsEM	0.00	0.40	1398	1182	0.8455
egTrackIsEM	0.40	0.80	1444	1263	0.8747
egTrackIsEM	0.80	1.20	1430	1265	0.8846
egTrackIsEM	1.20	1.60	1377	1194	0.8671
egTrackIsEM	1.60	2.00	1496	1181	0.7894
egTrackIsEM	2.00	2.40	1405	1126	0.8014
egTrackIso	0.00	0.40	1398	1291	0.9235
egTrackIso	0.40	0.80	1444	1348	0.9335
egTrackIso	0.80	1.20	1430	1343	0.9392
egTrackIso	1.20	1.60	1377	1239	0.8998
egTrackIso	1.60	2.00	1496	1267	0.8469
egTrackIso	2.00	2.40	1405	1109	0.7893

1% cell miscalibration

	etamin	etamax	Total	Passed	Efficiency
egammaOnly	0.00	0.40	1398	1295	0.9263
egammaOnly	0.40	0.80	1444	1353	0.9370
egammaOnly	0.80	1.20	1430	1357	0.9490
egammaOnly	1.20	1.60	1377	1283	0.9317
egammaOnly	1.60	2.00	1496	1347	0.9004
egammaOnly	2.00	2.40	1405	1260	0.8968
egCaloIsEM	0.00	0.40	1398	1236	0.8841
egCaloIsEM	0.40	0.80	1444	1294	0.8961
egCaloIsEM	0.80	1.20	1430	1304	0.9119
egCaloIsEM	1.20	1.60	1377	1046	0.7596
egCaloIsEM	1.60	2.00	1496	1277	0.8536
egCaloIsEM	2.00	2.40	1405	1072	0.7630
egTrackIsEM	0.00	0.40	1398	1182	0.8455
egTrackIsEM	0.40	0.80	1444	1263	0.8747
egTrackIsEM	0.80	1.20	1430	1265	0.8846
egTrackIsEM	1.20	1.60	1377	1194	0.8671
egTrackIsEM	1.60	2.00	1496	1181	0.7894
egTrackIsEM	2.00	2.40	1405	1126	0.8014
egTrackIso	0.00	0.40	1398	1291	0.9235
egTrackIso	0.40	0.80	1444	1348	0.9335
egTrackIso	0.80	1.20	1430	1343	0.9392
egTrackIso	1.20	1.60	1377	1239	0.8998
egTrackIso	1.60	2.00	1496	1267	0.8469
egTrackIso	2.00	2.40	1405	1109	0.7893

Electron pt=25 default

	etamin	etamax	Total	Passed	Efficiency
egammaOnly	0.00	0.40	1398	1295	0.9263
egammaOnly	0.40	0.80	1444	1353	0.9370
egammaOnly	0.80	1.20	1430	1357	0.9490
egammaOnly	1.20	1.60	1377	1283	0.9317
egammaOnly	1.60	2.00	1496	1347	0.9004
egammaOnly	2.00	2.40	1405	1260	0.8968
egCaloIsEM	0.00	0.40	1398	1236	0.8841
egCaloIsEM	0.40	0.80	1444	1295	0.8968
egCaloIsEM	0.80	1.20	1430	1304	0.9119
egCaloIsEM	1.20	1.60	1377	1045	0.7589
egCaloIsEM	1.60	2.00	1496	1278	0.8543
egCaloIsEM	2.00	2.40	1405	1073	0.7637
egTrackIsEM	0.00	0.40	1398	1182	0.8455
egTrackIsEM	0.40	0.80	1444	1263	0.8747
egTrackIsEM	0.80	1.20	1430	1265	0.8846
egTrackIsEM	1.20	1.60	1377	1194	0.8671
egTrackIsEM	1.60	2.00	1496	1181	0.7894
egTrackIsEM	2.00	2.40	1405	1126	0.8014
egTrackIso	0.00	0.40	1398	1291	0.9235
egTrackIso	0.40	0.80	1444	1348	0.9335
egTrackIso	0.80	1.20	1430	1343	0.9392
egTrackIso	1.20	1.60	1377	1239	0.8998
egTrackIso	1.60	2.00	1496	1267	0.8469
egTrackIso	2.00	2.40	1405	1109	0.7893

10% strips energy sharing

	etamin	etamax	Total	Passed	Efficiency
egammaOnly	0.00	0.40	1398	1295	0.9263
egammaOnly	0.40	0.80	1444	1353	0.9370
egammaOnly	0.80	1.20	1430	1357	0.9490
egammaOnly	1.20	1.60	1377	1282	0.9310
egammaOnly	1.60	2.00	1496	1346	0.8997
egammaOnly	2.00	2.40	1405	1261	0.8975
egCaloIsEM	0.00	0.40	1398	1233	0.8820
egCaloIsEM	0.40	0.80	1444	1287	0.8913
egCaloIsEM	0.80	1.20	1430	1296	0.9063
egCaloIsEM	1.20	1.60	1377	1043	0.7574
egCaloIsEM	1.60	2.00	1496	1276	0.8529
egCaloIsEM	2.00	2.40	1405	1074	0.7644
egTrackIsEM	0.00	0.40	1398	1182	0.8455
egTrackIsEM	0.40	0.80	1444	1263	0.8747
egTrackIsEM	0.80	1.20	1430	1265	0.8846
egTrackIsEM	1.20	1.60	1377	1193	0.8664
egTrackIsEM	1.60	2.00	1496	1180	0.7888
egTrackIsEM	2.00	2.40	1405	1126	0.8014
egTrackIso	0.00	0.40	1398	1291	0.9235
egTrackIso	0.40	0.80	1444	1348	0.9335
egTrackIso	0.80	1.20	1430	1343	0.9392
egTrackIso	1.20	1.60	1377	1238	0.8991
egTrackIso	1.60	2.00	1496	1266	0.8463
egTrackIso	2.00	2.40	1405	1110	0.7900

<1% effect

Electron pt=25 default

	etamin	etamax	Total	Passed	Efficiency
egammaOnly	0.00	0.40	1398	1295	0.9263
egammaOnly	0.40	0.80	1444	1353	0.9370
egammaOnly	0.80	1.20	1430	1357	0.9490
egammaOnly	1.20	1.60	1377	1283	0.9317
egammaOnly	1.60	2.00	1496	1347	0.9004
egammaOnly	2.00	2.40	1405	1260	0.8968
egCaloIsEM	0.00	0.40	1398	1236	0.8841
egCaloIsEM	0.40	0.80	1444	1295	0.8968
egCaloIsEM	0.80	1.20	1430	1304	0.9119
egCaloIsEM	1.20	1.60	1377	1045	0.7589
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egCaloIsEM	2.00	2.40	1405	1073	0.7637
egTrackIsEM	0.00	0.40	1398	1182	0.8455
egTrackIsEM	0.40	0.80	1444	1263	0.8747
egTrackIsEM	0.80	1.20	1430	1265	0.8846
egTrackIsEM	1.20	1.60	1377	1194	0.8671
egTrackIsEM	1.60	2.00	1496	1181	0.7894
egTrackIsEM	2.00	2.40	1405	1126	0.8014
egTrackIso	0.00	0.40	1398	1291	0.9235
egTrackIso	0.40	0.80	1444	1348	0.9335
egTrackIso	0.80	1.20	1430	1343	0.9392
egTrackIso	1.20	1.60	1377	1239	0.8998
egTrackIso	1.60	2.00	1496	1267	0.8469
egTrackIso	2.00	2.40	1405	1109	0.7893

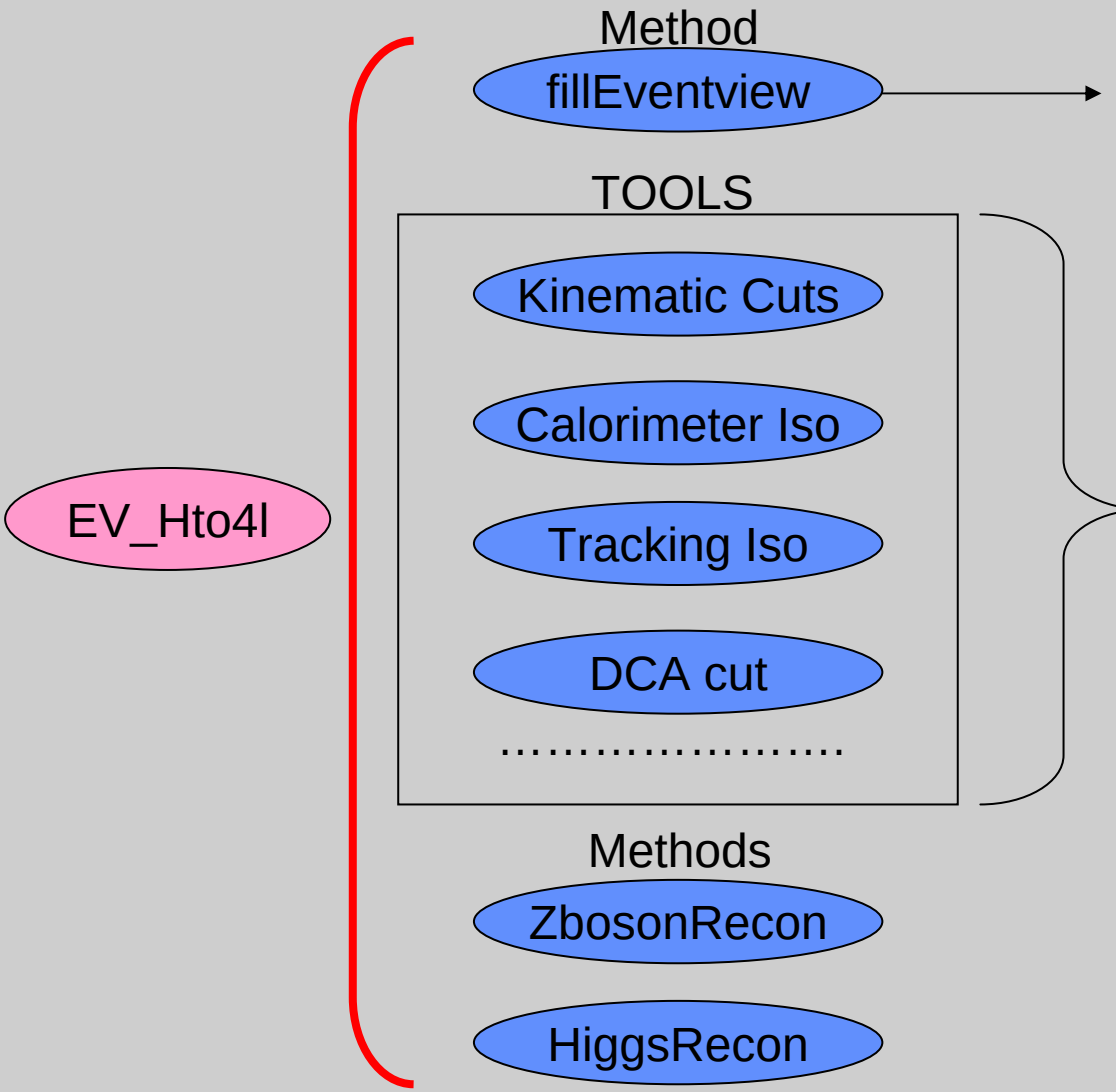
30% strips energy sharing

	etamin	etamax	Total	Passed	Efficiency
egammaOnly	0.00	0.40	1398	1295	0.9263
egammaOnly	0.40	0.80	1444	1352	0.9363
egammaOnly	0.80	1.20	1430	1357	0.9490
egammaOnly	1.20	1.60	1377	1282	0.9310
egammaOnly	1.60	2.00	1496	1346	0.8997
egammaOnly	2.00	2.40	1405	1261	0.8975
egCaloIsEM	0.00	0.40	1398	1216	0.8698
egCaloIsEM	0.40	0.80	1444	1263	0.8747
egCaloIsEM	0.80	1.20	1430	1285	0.8986
egCaloIsEM	1.20	1.60	1377	1033	0.7502
egCaloIsEM	1.60	2.00	1496	1276	0.8529
egCaloIsEM	2.00	2.40	1405	1074	0.7644
egTrackIsEM	0.00	0.40	1398	1182	0.8455
egTrackIsEM	0.40	0.80	1444	1262	0.8740
egTrackIsEM	0.80	1.20	1430	1265	0.8846
egTrackIsEM	1.20	1.60	1377	1194	0.8671
egTrackIsEM	1.60	2.00	1496	1180	0.7888
egTrackIsEM	2.00	2.40	1405	1126	0.8014
egTrackIso	0.00	0.40	1398	1291	0.9235
egTrackIso	0.40	0.80	1444	1347	0.9328
egTrackIso	0.80	1.20	1430	1343	0.9392
egTrackIso	1.20	1.60	1377	1238	0.8991
egTrackIso	1.60	2.00	1496	1266	0.8463
egTrackIso	2.00	2.40	1405	1110	0.7900

-2% effect

EV_Hto4l algorithm and its tools

Collaboration with
Max Planck Inst. (N.Benekos)
Saclay (R. Nicolaidou)



Fills the eventView with user variables/objects. These end-up in the output-rootTuple

Do we need all these tools?

No, we just wrote one (simple) tool and use N instances of it.

This is a great way to study in detail efficiencies (tools keep their own names/counters)

H->4e efficiencies

	Total	Passed	Efficiency	TotalEff
fourEMLArClusters	8076	734	0.0909	0.0909
fourTrkMatchClusters	734	734	1.0000	0.0909
fourTrkQualClusters	734	531	0.7234	0.0658
threeIsoEMLArClusters	531	435	0.8192	0.0539
fourIsoEMLArClusters	435	266	0.6115	0.0329
fourIsolatedTracks	266	250	0.9398	0.0310
fourLowImpParamTrks	250	223	0.8920	0.0276
ZeeReconstruction	223	223	1.0000	0.0276
HtoZZ4eReconstruction	223	165	0.7399	0.0204
Total				0.0204

Default Analysis (TDR-like)

Removed →

	Total	Passed	Efficiency	TotalEff
fourEMLArClusters	8076	734	0.0909	0.0909
fourTrkMatchClusters	734	734	1.0000	0.0909
fourTrkQualClusters	734	531	0.7234	0.0658
threeIsoEMLArClusters	531	435	0.8192	0.0539
fourIsolatedTracks	435	435	1.0000	0.0539
fourLowImpParamTrks	435	384	0.8828	0.0475
ZeeReconstruction	384	381	0.9922	0.0472
HtoZZ4eReconstruction	381	281	0.7375	0.0348
Total				0.0348

Example that can be refined:
3iso+1non-iso-Clusters
-Must be checked against Zjj background

<u>The point of the example is:</u>
It is now very easy to study any cut flow without writing a single line of src code.

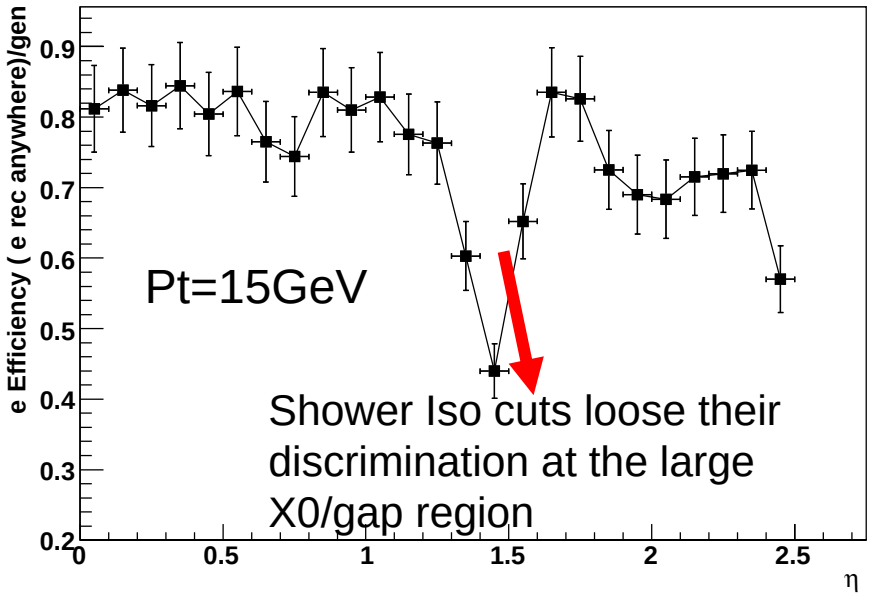
Summary

- Simple Analysis tools (eventView tools here) fully configurable from jobOptions were presented.
  - The modularity of the approach eases performance studies, cut optimization and allows users to cleanly cross-check results.
  - We have explored only a small part of the available possibilities.
- We presented simple 'scrambling' tools that can induce miscalibrations during ESD->AOD:
  - Fast, many iterations possible, provides 1-1 test at AOD/cbnt level.
- Performance Checks with Rome samples:
  - We find agreement in efficiencies with official egamma validation
  - We miscalibrated the LAr cells by 1-3%: no impact on std e-ID
  - We induced strip cross-talk which impacts egISEM (preliminary)

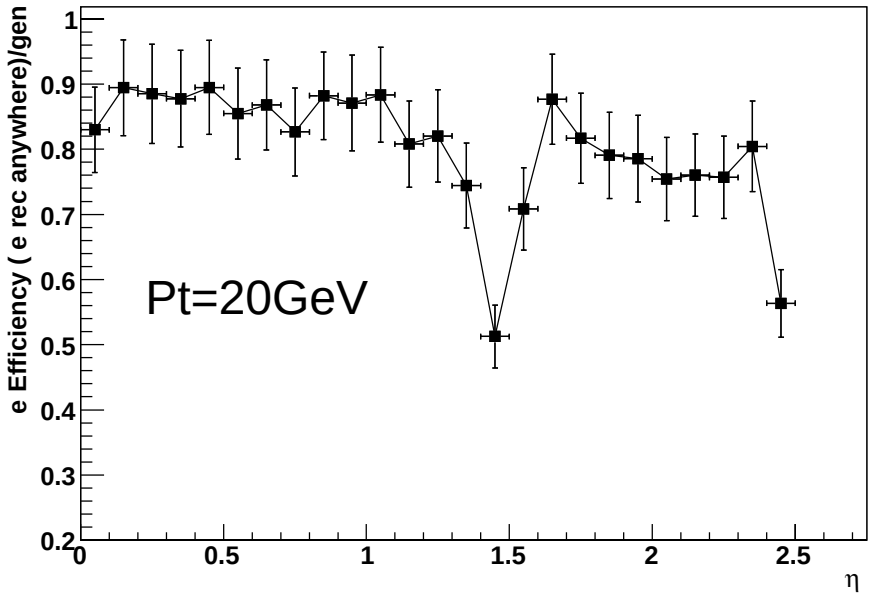
Extra slides

DC1 Efficiency: isolated track-matched clusters

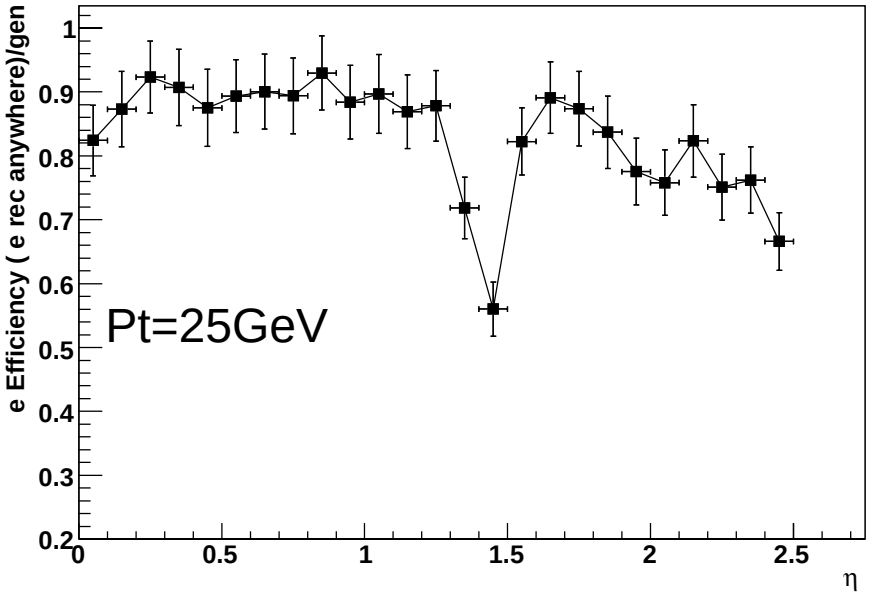
Standard Electron Reconstruction



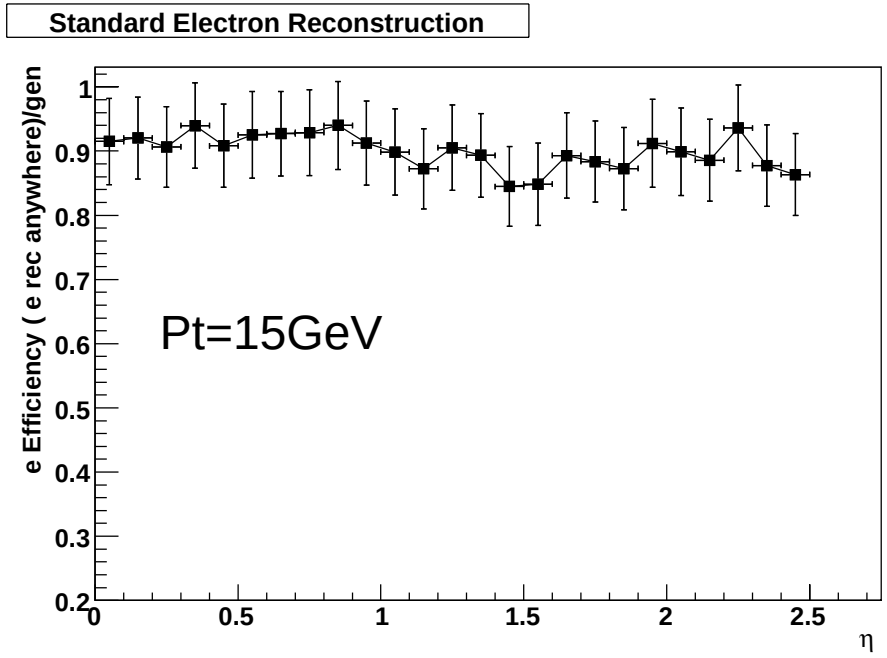
Standard Electron Reconstruction

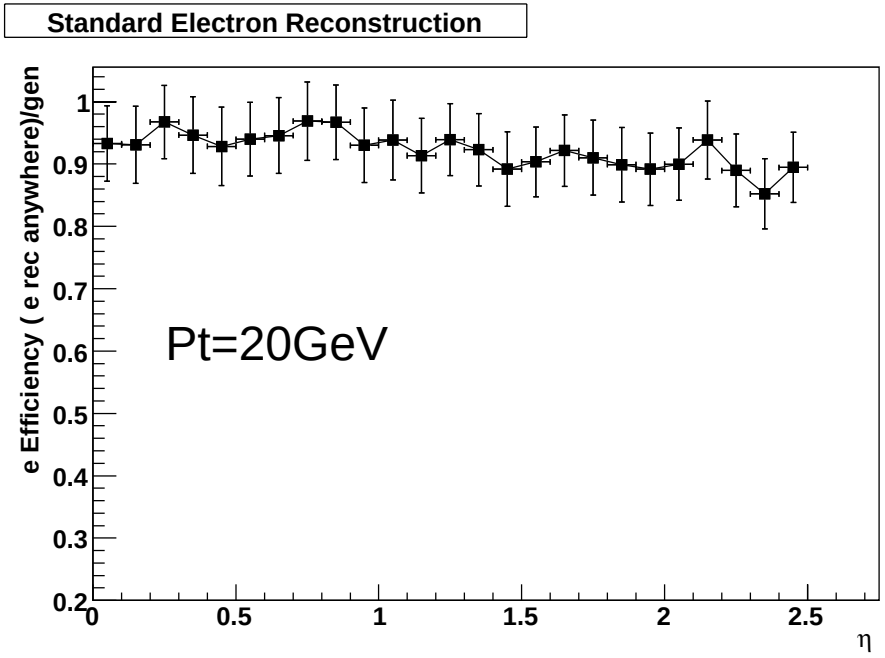


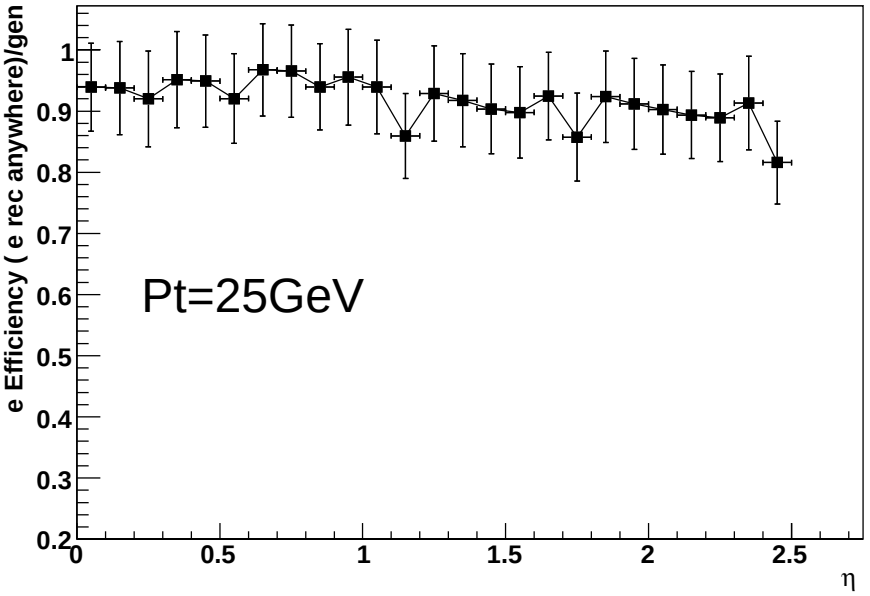
FEE noise and Pile-up included



e Efficiency vs eta (DC1) track-matched clusters







FEE noise and
Pile-up included

Electron pt=25 from ESD->AOD no scrambling

	etamin	etamax	Total	Passed	Efficiency
egammaOnly	0.00	0.40	1398	1295	0.9263
egammaOnly	0.40	0.80	1444	1353	0.9370
egammaOnly	0.80	1.20	1430	1357	0.9490
egammaOnly	1.20	1.60	1377	1283	0.9317
egammaOnly	1.60	2.00	1496	1347	0.9004
egammaOnly	2.00	2.40	1405	1260	0.8968
egCaloIsEM	0.00	0.40	1398	1236	0.8841
egCaloIsEM	0.40	0.80	1444	1295	0.8968
egCaloIsEM	0.80	1.20	1430	1304	0.9119
egCaloIsEM	1.20	1.60	1377	1045	0.7589
egCaloIsEM	1.60	2.00	1496	1278	0.8543
egCaloIsEM	2.00	2.40	1405	1073	0.7637
egTrackIsEM	0.00	0.40	1398	1182	0.8455
egTrackIsEM	0.40	0.80	1444	1263	0.8747
egTrackIsEM	0.80	1.20	1430	1265	0.8846
egTrackIsEM	1.20	1.60	1377	1194	0.8671
egTrackIsEM	1.60	2.00	1496	1181	0.7894
egTrackIsEM	2.00	2.40	1405	1126	0.8014
egTrackIso	0.00	0.40	1398	1291	0.9235
egTrackIso	0.40	0.80	1444	1348	0.9335
egTrackIso	0.80	1.20	1430	1343	0.9392
egTrackIso	1.20	1.60	1377	1239	0.8998
egTrackIso	1.60	2.00	1496	1267	0.8469
egTrackIso	2.00	2.40	1405	1109	0.7893

	etamin	etamax	Total	Passed	Efficiency
egCaloTrkIsEM	0.00	0.40	1398	1132	0.8097
egCaloTrkIsEM	0.40	0.80	1444	1212	0.8393
egCaloTrkIsEM	0.80	1.20	1430	1219	0.8524
egCaloTrkIsEM	1.20	1.60	1377	971	0.7052
egCaloTrkIsEM	1.60	2.00	1496	1124	0.7513
egCaloTrkIsEM	2.00	2.40	1405	967	0.6883
egammaFull	**0.00**	**0.40**	**1398**	**1130**	**0.8083**
egammaFull	**0.40**	**0.80**	**1444**	**1209**	**0.8373**
egammaFull	**0.80**	**1.20**	**1430**	**1213**	**0.8483**
egammaFull	**1.20**	**1.60**	**1377**	**956**	**0.6943**
egammaFull	**1.60**	**2.00**	**1496**	**1084**	**0.7246**
egammaFull	**2.00**	**2.40**	**1405**	**883**	**0.6285**

Single electrons pt=60GeV (pile-up: 10^{33})

	etamin	etamax	Total	Passed	Efficiency
egammaOnly	0.00	0.40	1528	1478	0.9673
egammaOnly	0.40	0.80	1583	1555	0.9823
egammaOnly	0.80	1.20	1562	1519	0.9725
egammaOnly	1.20	1.60	1515	1437	0.9485
egammaOnly	1.60	2.00	1635	1513	0.9254
egammaOnly	2.00	2.40	1527	1408	0.9221
egCaloIsEM	0.00	0.40	1528	1432	0.9372
egCaloIsEM	0.40	0.80	1583	1539	0.9722
egCaloIsEM	0.80	1.20	1562	1506	0.9641
egCaloIsEM	1.20	1.60	1515	1260	0.8317
egCaloIsEM	1.60	2.00	1635	1482	0.9064
egCaloIsEM	2.00	2.40	1527	1324	0.8671
egTrackIsEM	0.00	0.40	1528	1395	0.9130
egTrackIsEM	0.40	0.80	1583	1473	0.9305
egTrackIsEM	0.80	1.20	1562	1455	0.9315
egTrackIsEM	1.20	1.60	1515	1381	0.9116
egTrackIsEM	1.60	2.00	1635	1449	0.8862
egTrackIsEM	2.00	2.40	1527	1346	0.8815
egTrackIso	0.00	0.40	1528	1472	0.9634
egTrackIso	0.40	0.80	1583	1542	0.9741
egTrackIso	0.80	1.20	1562	1504	0.9629
egTrackIso	1.20	1.60	1515	1375	0.9076
egTrackIso	1.60	2.00	1635	1361	0.8324
egTrackIso	2.00	2.40	1527	1205	0.7891

	etamin	etamax	Total	Passed	Efficiency
egCaloTrkIsEM	0.00	0.40	1528	1356	0.8874
egCaloTrkIsEM	0.40	0.80	1583	1457	0.9204
egCaloTrkIsEM	0.80	1.20	1562	1443	0.9238
egCaloTrkIsEM	1.20	1.60	1515	1212	0.8000
egCaloTrkIsEM	1.60	2.00	1635	1419	0.8679
egCaloTrkIsEM	2.00	2.40	1527	1270	0.8317
egammaFull	**0.00**	**0.40**	**1528**	**1352**	**0.8848**
egammaFull	**0.40**	**0.80**	**1583**	**1448**	**0.9147**
egammaFull	**0.80**	**1.20**	**1562**	**1431**	**0.9161**
egammaFull	**1.20**	**1.60**	**1515**	**1174**	**0.7749**
egammaFull	**1.60**	**2.00**	**1635**	**1304**	**0.7976**
egammaFull	**2.00**	**2.40**	**1527**	**1115**	**0.7302**

Electron pt=25 with 1% cell miscalibration

	etamin	etamax	Total	Passed	Efficiency
egammaOnly	0.00	0.40	1398	1295	0.9263
egammaOnly	0.40	0.80	1444	1353	0.9370
egammaOnly	0.80	1.20	1430	1357	0.9490
egammaOnly	1.20	1.60	1377	1283	0.9317
egammaOnly	1.60	2.00	1496	1347	0.9004
egammaOnly	2.00	2.40	1405	1260	0.8968
egCaloIsEM	0.00	0.40	1398	1236	0.8841
egCaloIsEM	0.40	0.80	1444	1294	0.8961
egCaloIsEM	0.80	1.20	1430	1304	0.9119
egCaloIsEM	1.20	1.60	1377	1046	0.7596
egCaloIsEM	1.60	2.00	1496	1277	0.8536
egCaloIsEM	2.00	2.40	1405	1072	0.7630
egTrackIsEM	0.00	0.40	1398	1182	0.8455
egTrackIsEM	0.40	0.80	1444	1263	0.8747
egTrackIsEM	0.80	1.20	1430	1265	0.8846
egTrackIsEM	1.20	1.60	1377	1194	0.8671
egTrackIsEM	1.60	2.00	1496	1181	0.7894
egTrackIsEM	2.00	2.40	1405	1126	0.8014
egTrackIso	0.00	0.40	1398	1291	0.9235
egTrackIso	0.40	0.80	1444	1348	0.9335
egTrackIso	0.80	1.20	1430	1343	0.9392
egTrackIso	1.20	1.60	1377	1239	0.8998
egTrackIso	1.60	2.00	1496	1267	0.8469
egTrackIso	2.00	2.40	1405	1109	0.7893
egCaloTrkIsEM	0.00	0.40	1398	1132	0.8097
egCaloTrkIsEM	0.40	0.80	1444	1211	0.8386
egCaloTrkIsEM	0.80	1.20	1430	1219	0.8524
egCaloTrkIsEM	1.20	1.60	1377	972	0.7059
egCaloTrkIsEM	1.60	2.00	1496	1123	0.7507
egCaloTrkIsEM	2.00	2.40	1405	967	0.6883
egammaFull	**0.00**	**0.40**	**1398**	**1130**	**0.8083**
egammaFull	**0.40**	**0.80**	**1444**	**1208**	**0.8366**
egammaFull	**0.80**	**1.20**	**1430**	**1213**	**0.8483**
egammaFull	**1.20**	**1.60**	**1377**	**957**	**0.6950**
egammaFull	**1.60**	**2.00**	**1496**	**1083**	**0.7239**
egammaFull	**2.00**	**2.40**	**1405**	**883**	**0.6285**