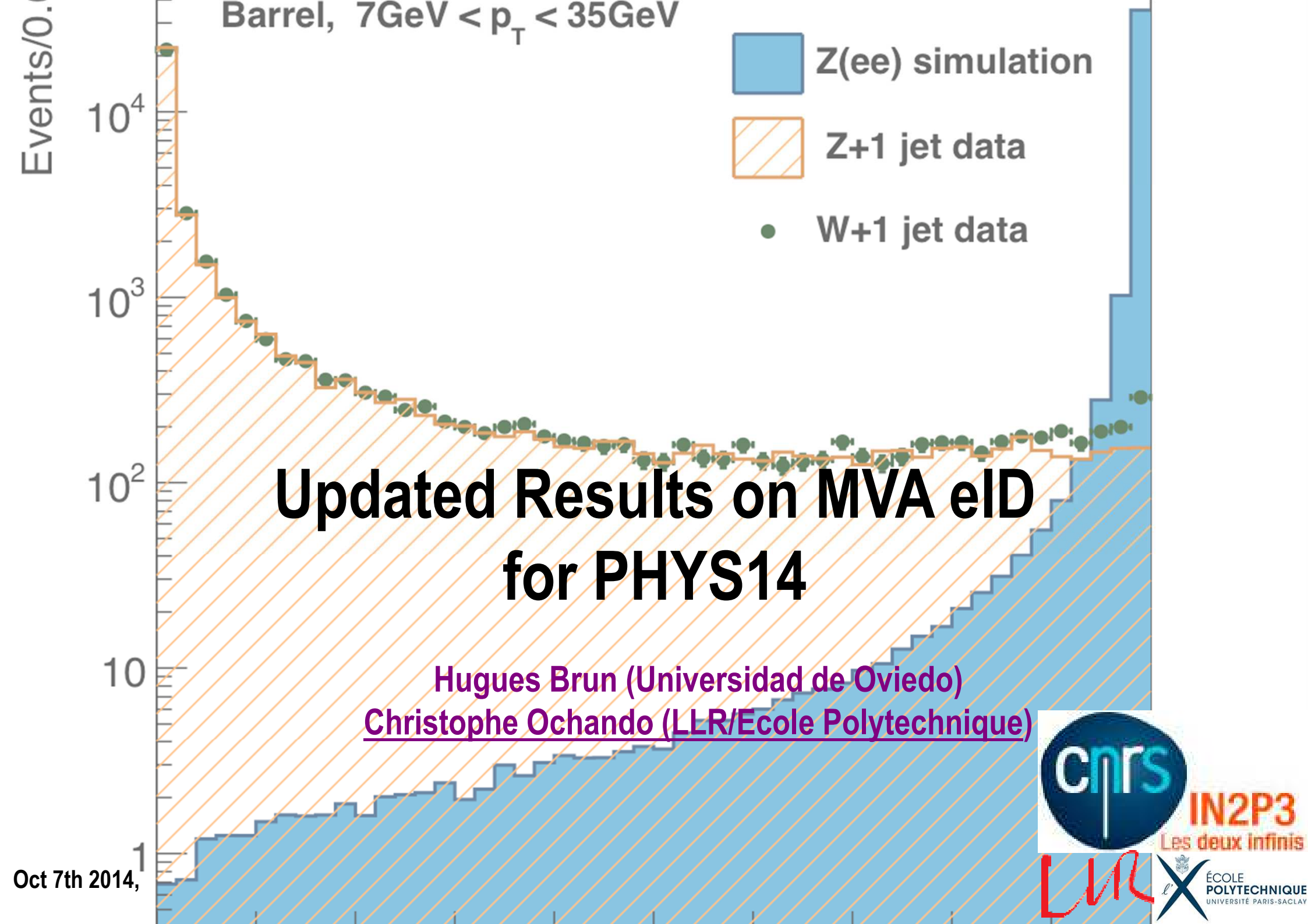


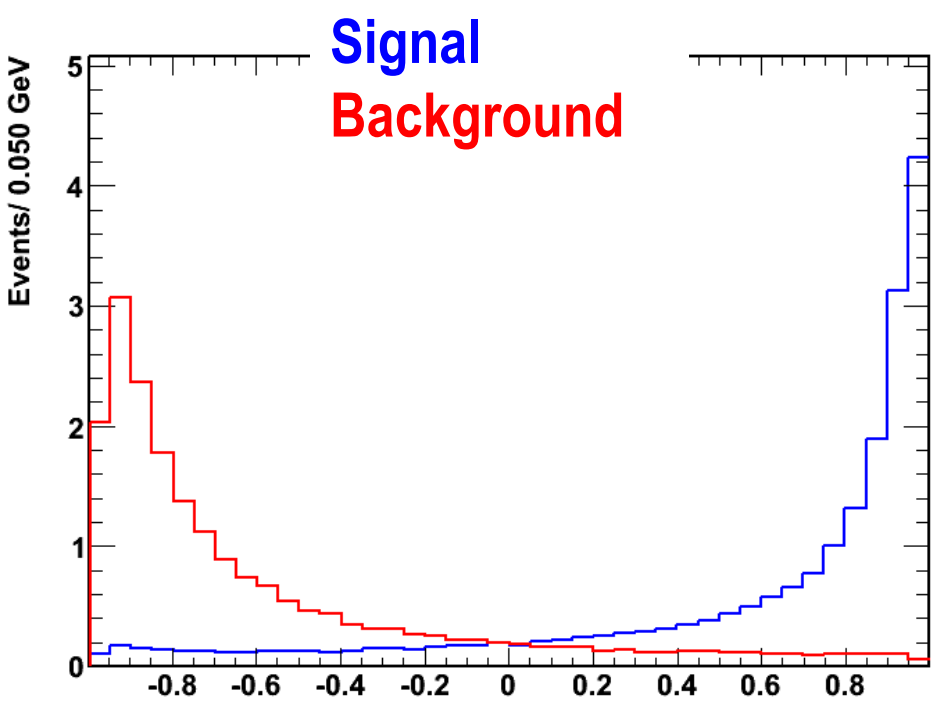

# Updated Results on MVA eID for PHYS14

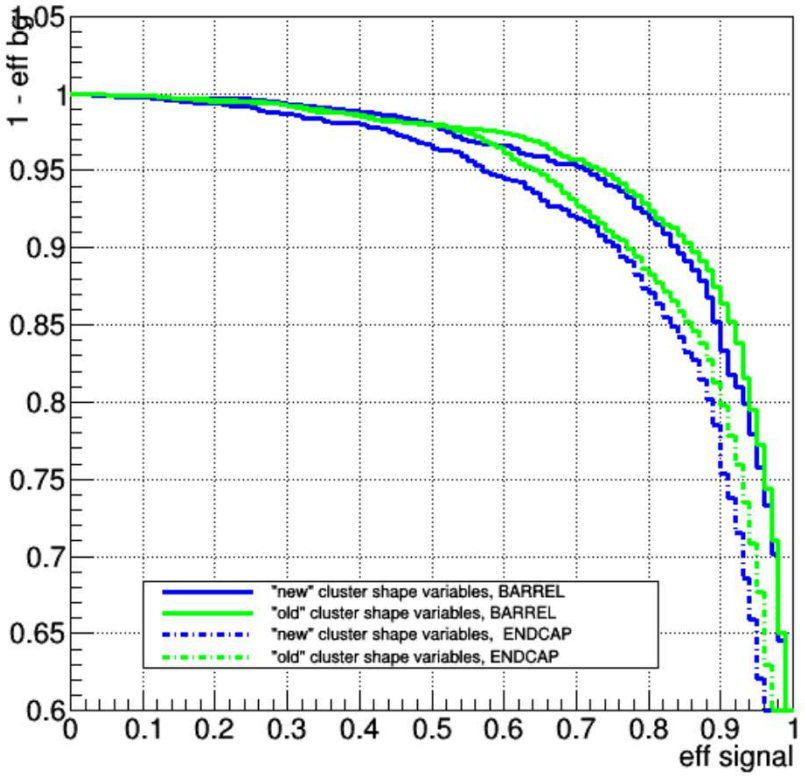
Hugues Brun (Universidad de Oviedo)
Christophe Ochando (LLR/Ecole Polytechnique)

# Reminder

Two versions of the MVA eID were trained for the CSA 14 exercise:

- Triggering version: optimized for electrons which have fired e/g triggers
- Non-triggering version: optimized for electrons which have NOT fired e/g triggers (very important for multi-leptons analysis)




➢ **Today:** mostly about update for PHYS14 non-triggering version

# Samples (Non-triggering MVA)

## ➢ gg→H→ZZ→4e, 2e2mu: used as signal

/GluGluToHToZZTo4L_M-125_13TeV-powheg-pythia6/Phys14DR-PU20bx25_tsg_PHYS14_25_V1-v1/AODSIM

## ➢ Z+jets: used for fakes

/DYJetsToLL_M-50_13TeV-madgraph-pythia8/Phys14DR-PU20bx25_PHYS14_25_V1-v1/AODSIM

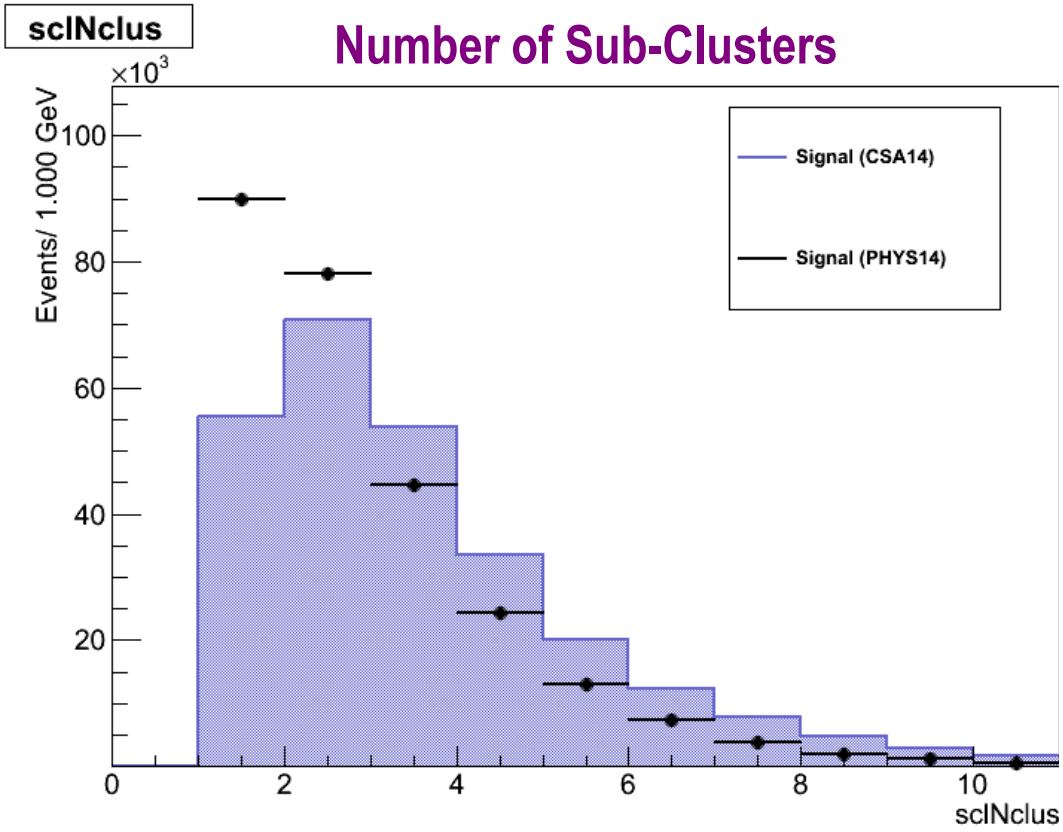
- Training done in 6 categories:
  - 5<pT<10, pT>10 GeV
  - Inner (<0.8) and Outer (>0.8) Barrel + Endcaps.

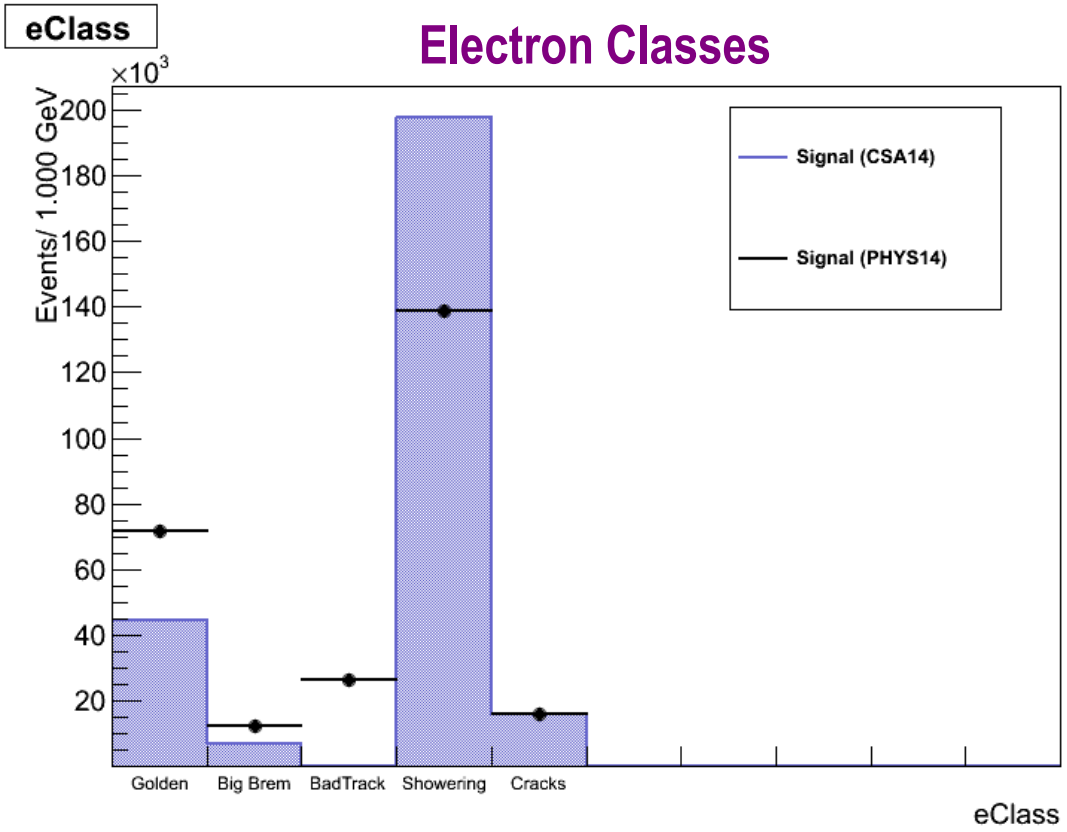
- Same set of variables as for the Run I MVA.
  - But we know better performances can be achieved with more/different categories and variables
  - See: https://indico.cern.ch/event/298249/contribution/3/material/slides/0.pdf
  - Distributions for signal & background can be found in:
    http://llr.in2p3.fr/~ochando/EID7XX/phys14SvsB/EB1pT10/
    http://llr.in2p3.fr/~ochando/EID7XX/phys14SvsB/EB1pT510/
    http://llr.in2p3.fr/~ochando/EID7XX/phys14SvsB/EB2pT10/
    http://llr.in2p3.fr/~ochando/EID7XX/phys14SvsB/EB2pT510/
    http://llr.in2p3.fr/~ochando/EID7XX/phys14SvsB/EEpT10/
    http://llr.in2p3.fr/~ochando/EID7XX/phys14SvsB/EEpT510/

# CSA14 vs PHYS14

- There has been quite some changes in the reconstruction between CSA14 (70X) and PHYS14 (72X), especially in the ECAL (1)

- **They have a significant impact on the supercluster topology:**




(1) See: https://indico.cern.ch/event/339614/contribution/5/material/slides/0.pdf

# CSA14 vs PHYS14

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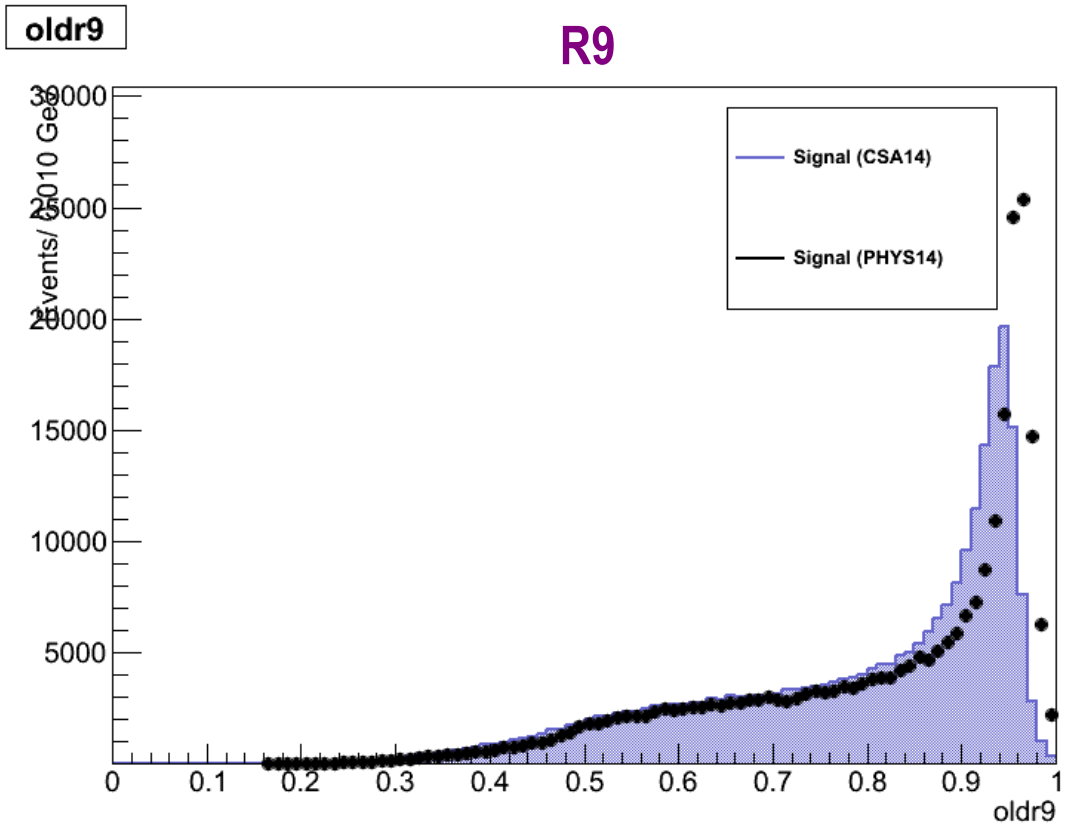
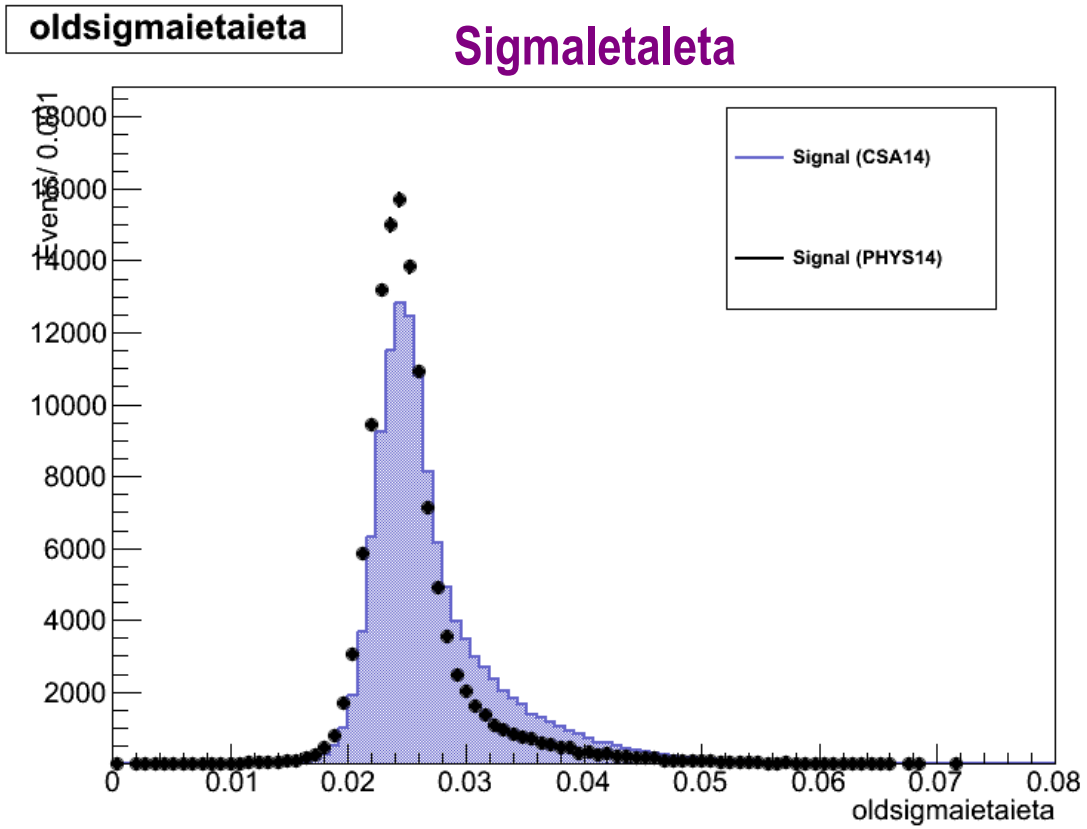
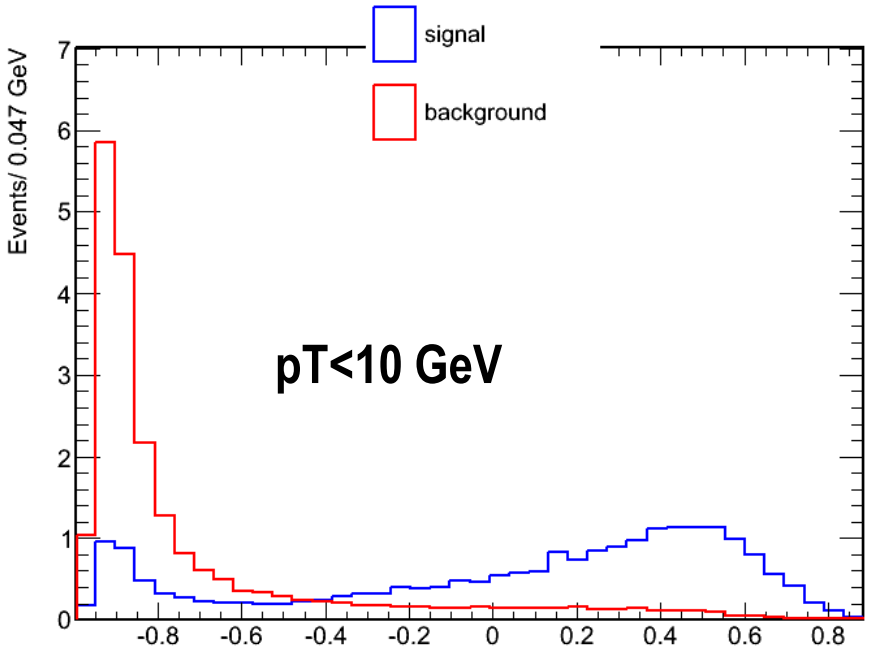
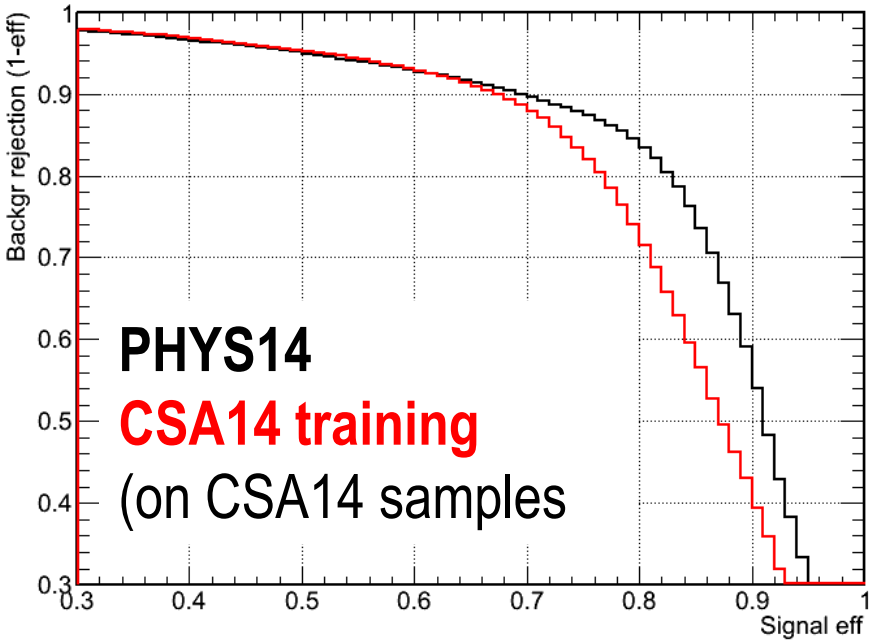


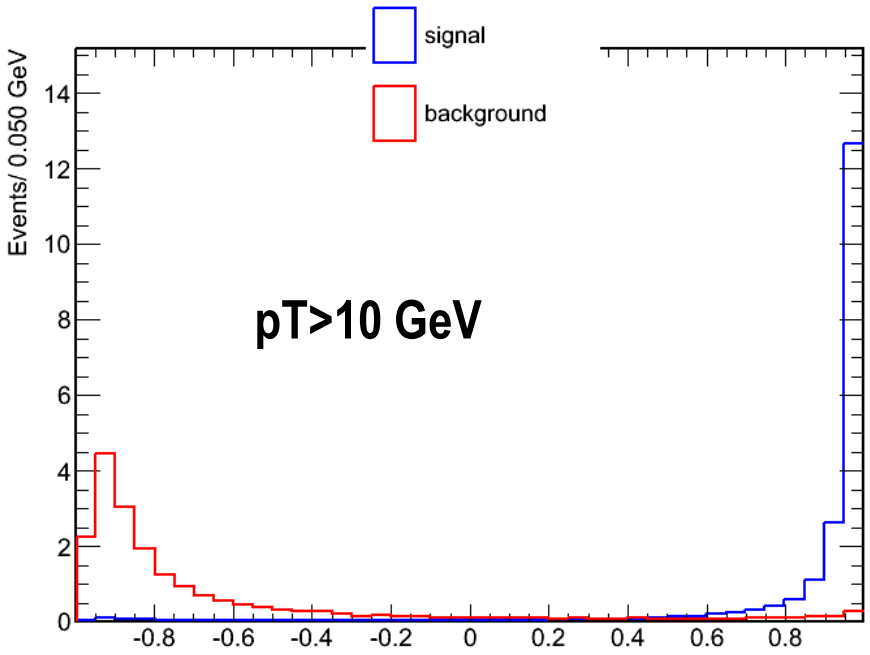



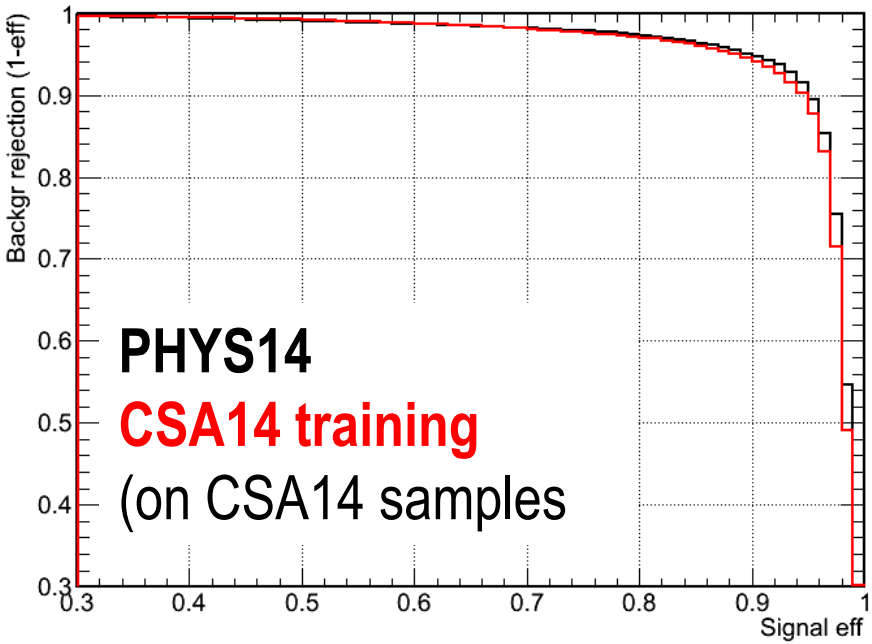

- One has now to see whether these modifications (new ECAL reco kills low ET clusters?) are reasonable from every point of views (resolution, background rejection, ...)
- At least, it motivates a re-training of the MVA…

# Results: Inner Barrel (<0.8)

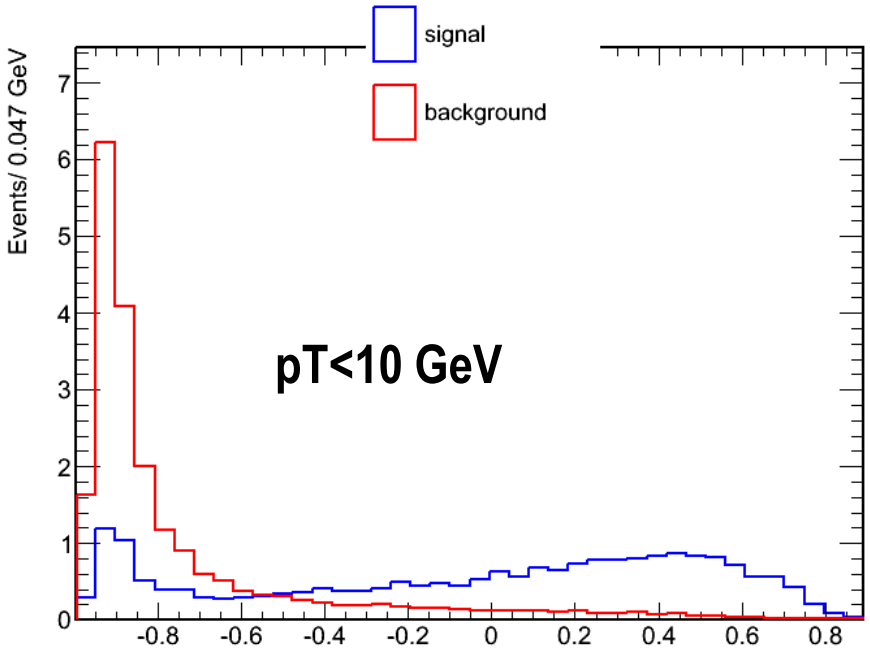


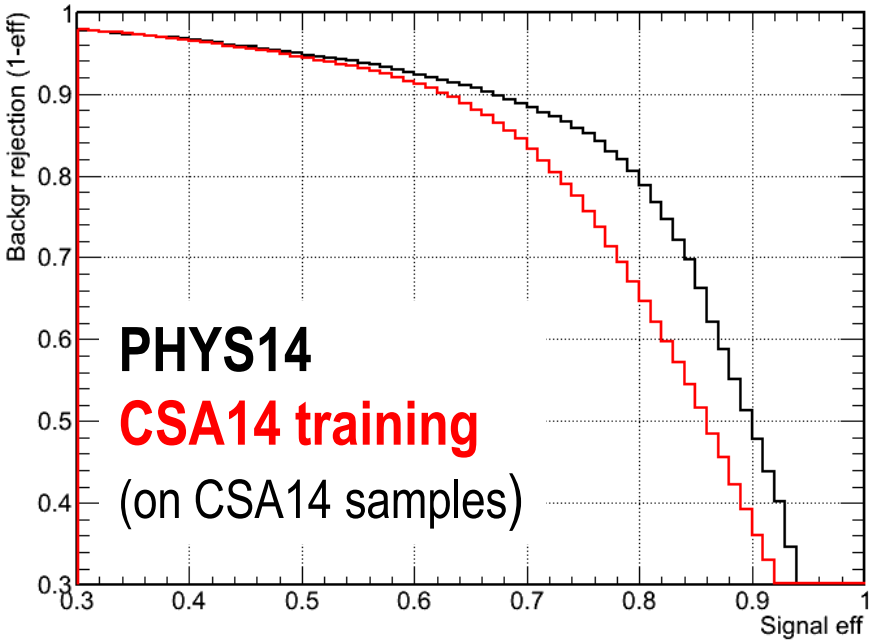



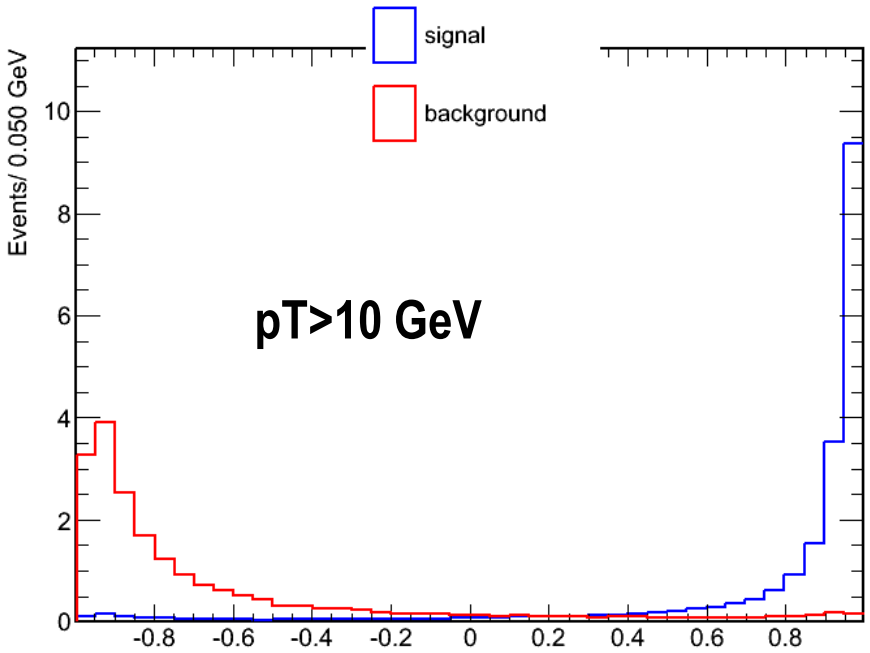



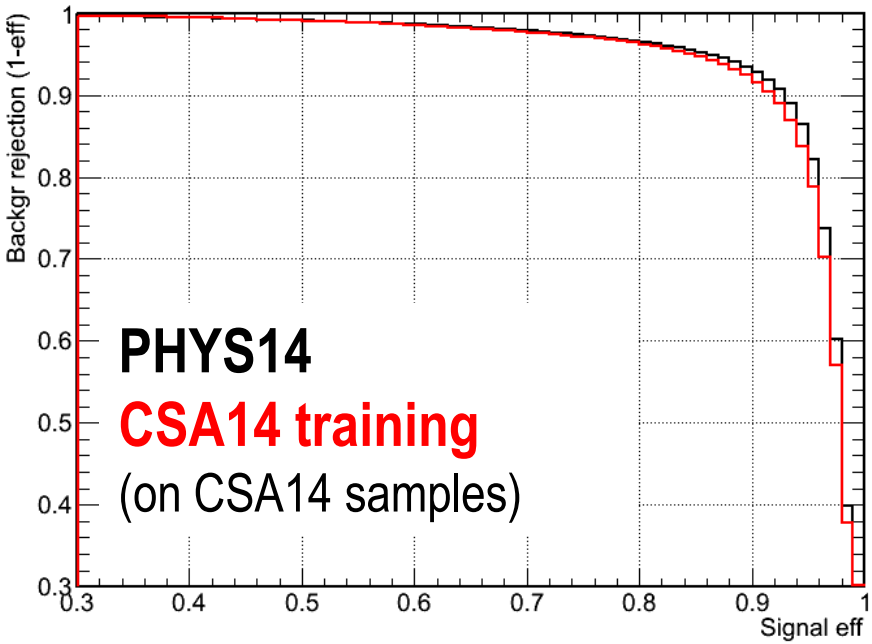



# Results: Outer Barrel (>0.8)

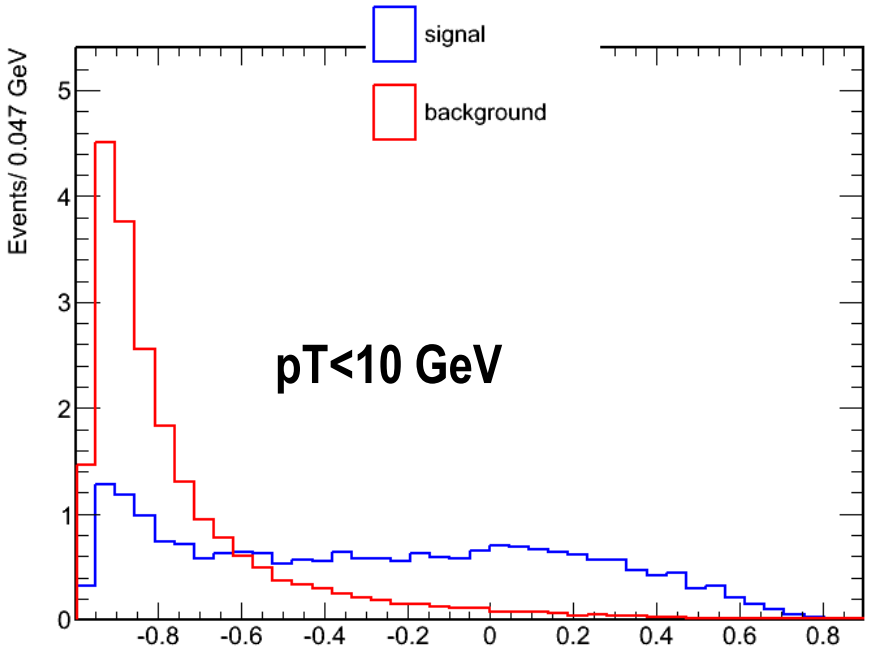


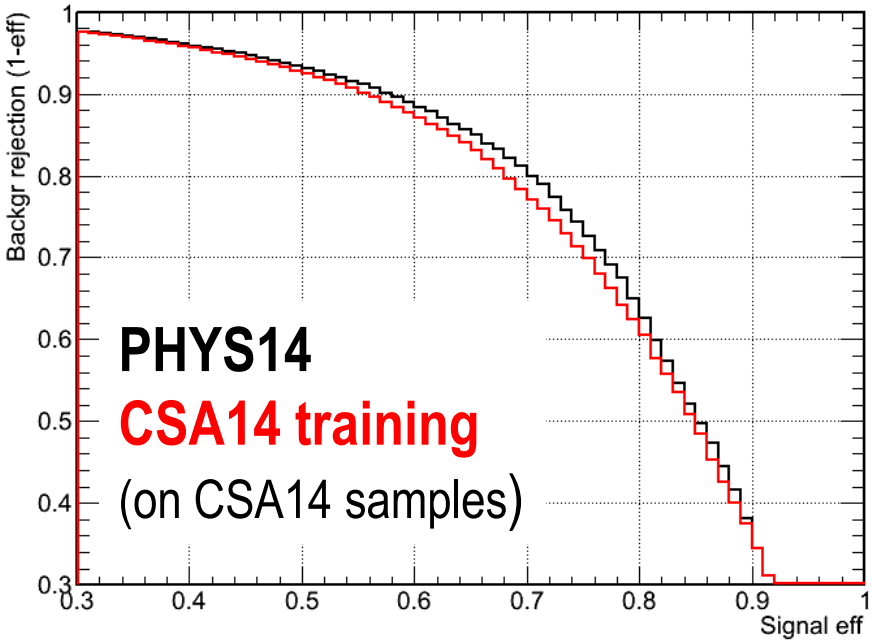



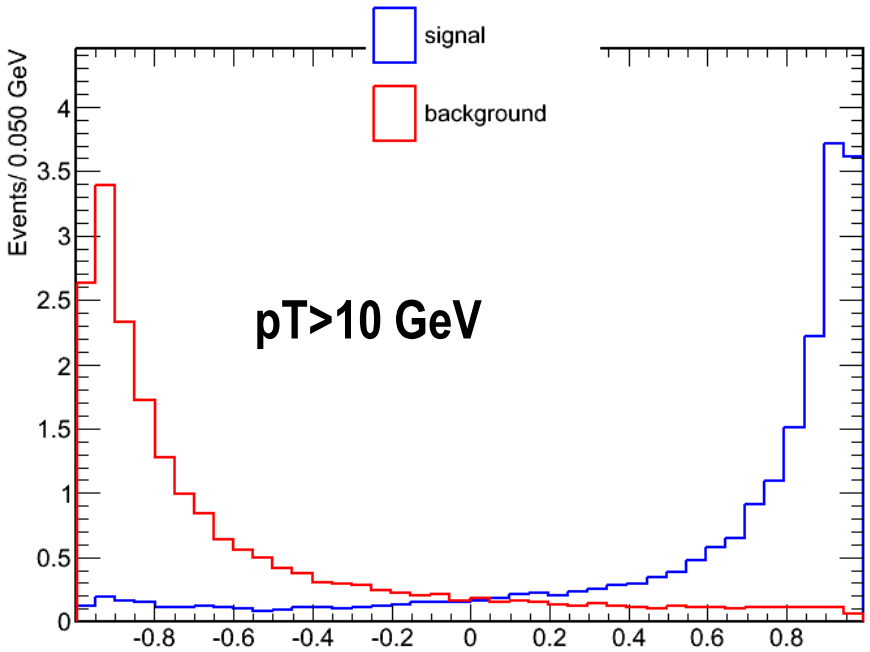



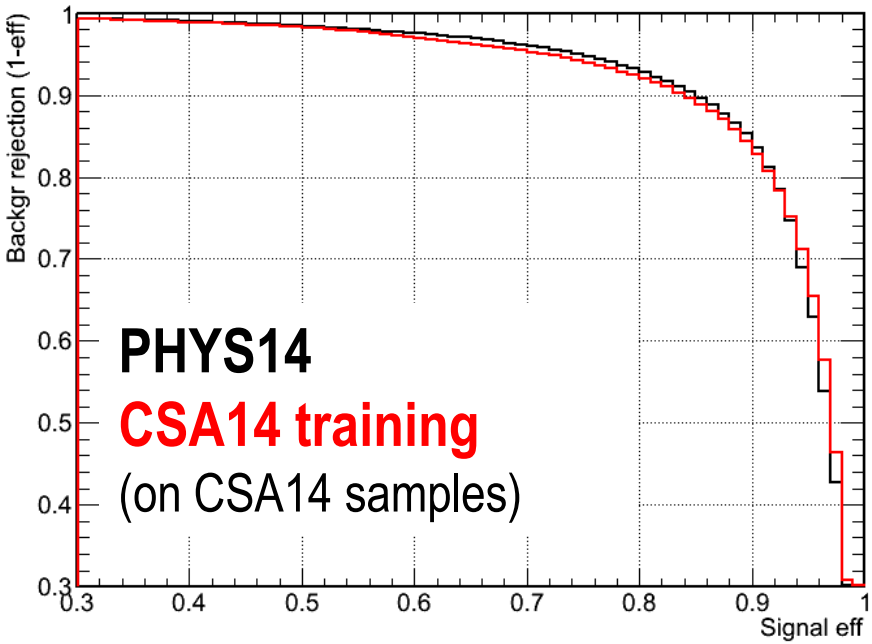



# Results: Endcaps

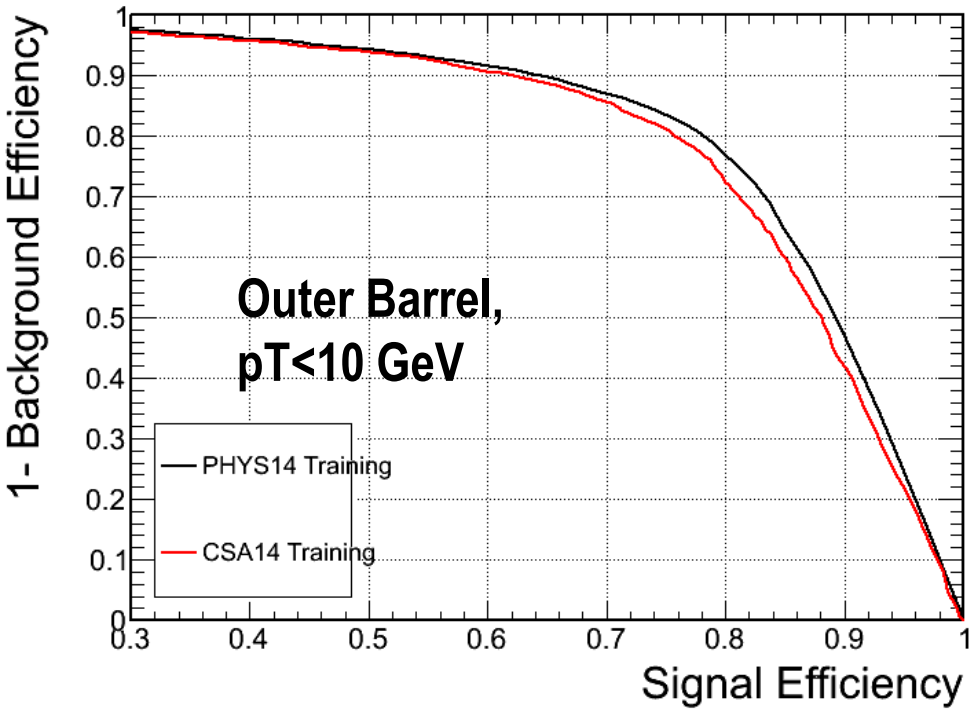


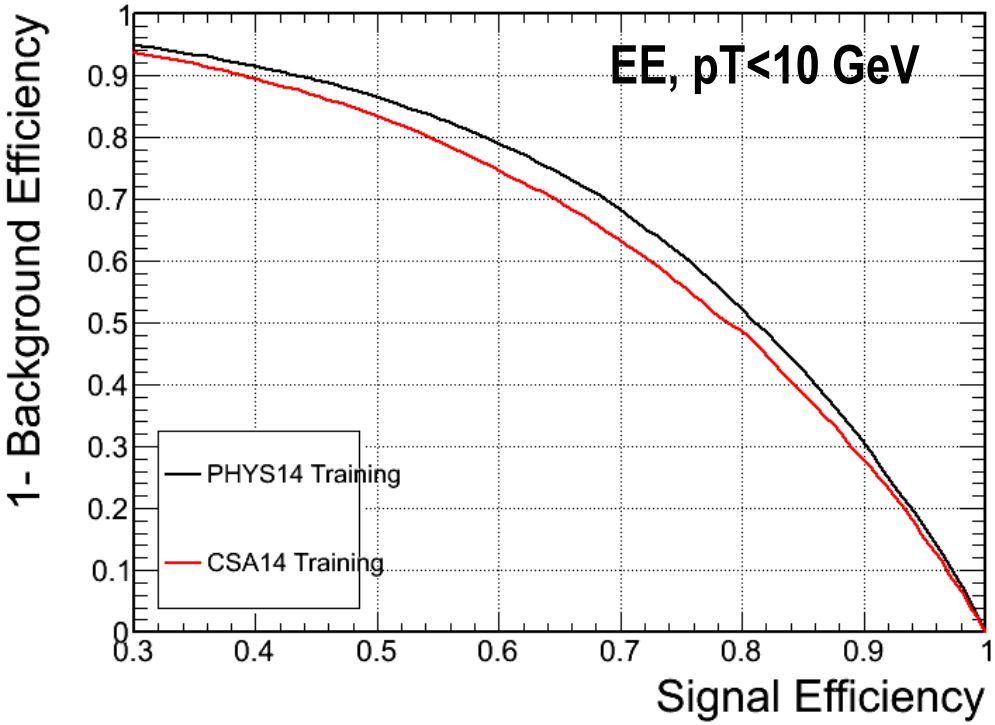



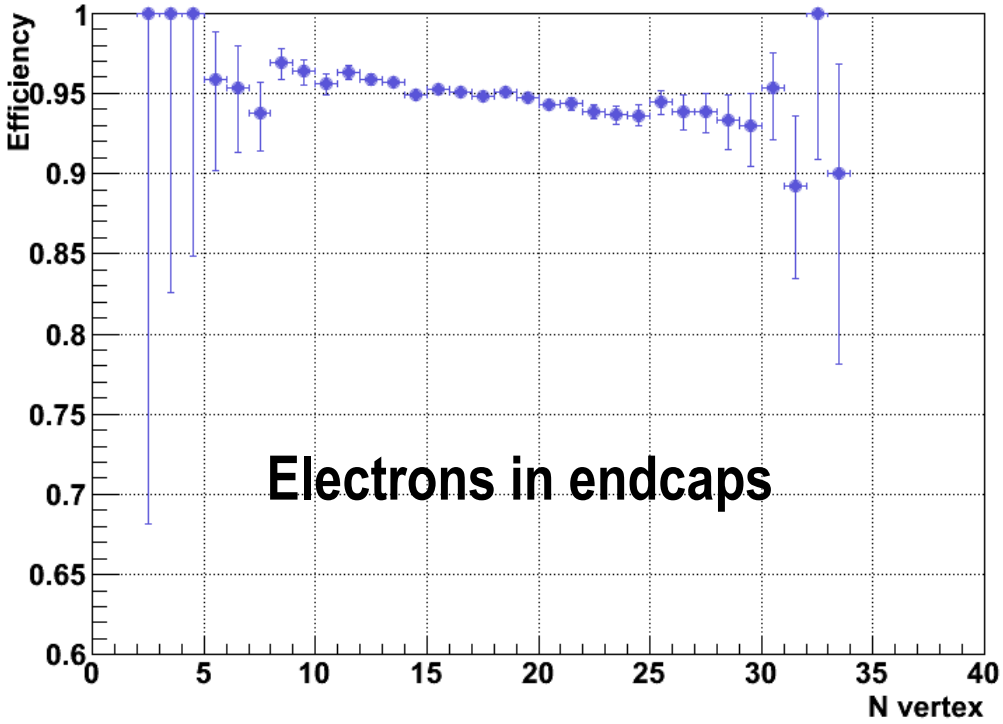
# Comparison: PHYS14 vs CSA14 (on PHYS14 samples)

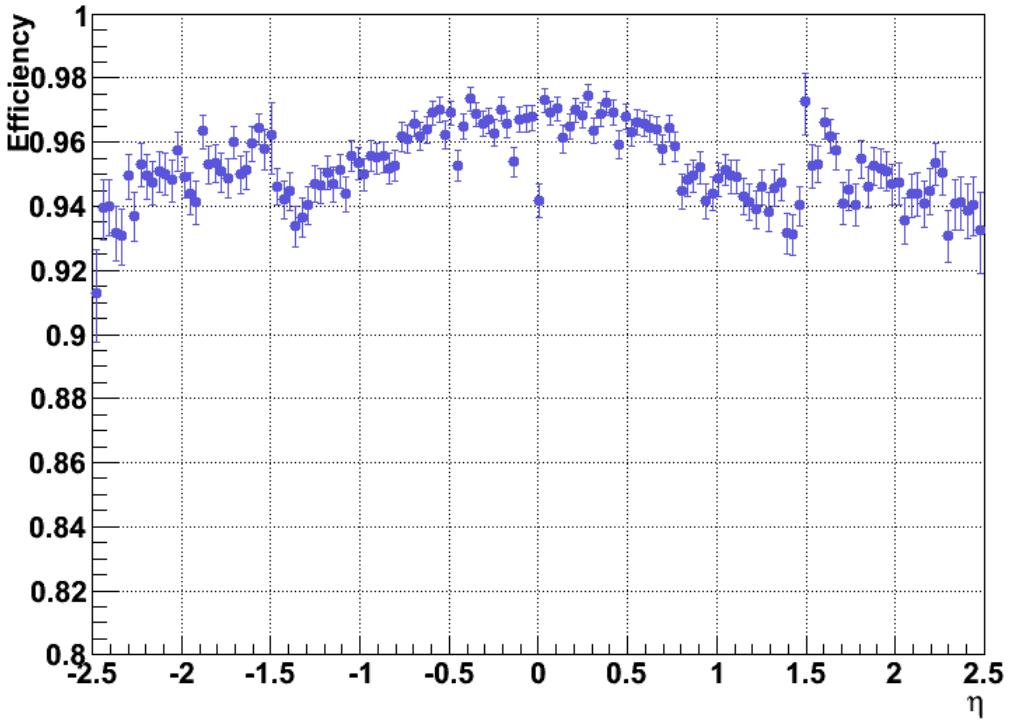



- In ones applies CSA14 training on PHYS14 samples, non-optimal performances obtained (although non dramatic…)

# Performances




Efficiency of electron ID for a loose Working Point (~95% efficiency)

- Slight dependency with PU
- Efficiency could be flatter in eta.
  - Further training should probably inject knowledge of event PU (Nvtx, rho,…) and electron precise location (eta, cracks, …)

# Non-triggering MVA eiD: Status & Plans

Here the training of the MVA is performed only for electron passing trigger

The training is actually performed on the top of a loose preselection just tighter that the trigger (as the trigger may evolve during the data taking)

In PHYS14, the HLT is close to the one that will be used in 2015: need to retune the triggering selection (CSA14 was still with the 2012 one)

- Timescale: (1 to 2 weeks)
  - test of the new triggering selection ongoing
  - then need to retrain the MVA (should be fast as already done for CSA14)
- MC samples:
  - prompt electron from DYJets (+ cross check using electron from TTbar)
  - fakes from QCDEMenriched (+ cross check using jets from DYJets)

# Summary/Plans

- **Non-triggering electrons:**
  - First reasonable training of MVA electron ID available
  - Significant changes in supercluster topology seen going from 70X to 72X (seems to improve the background rejection)
  - **This version will be committed soon**
  - Next tuning will include more information: PU, eta-dependancy, more variables/categories

- **Triggering electrons:**
  - Re-tuning of trigger-like cuts on-going
  - First results are expected in 1-2 weeks.

# BACK UP SLIDES