

$f(e \rightarrow \gamma)$ - Fakerate Analysis

- used sample:

/Zee/Spring10-START3X_V26_S09-v1/GEN-SIM-RECO

Contains 2461575 events

with 191502 selected events

- used collections:

<reco::PhotonCollection>	photons;
<reco::GsfElectronCollection>	gsfElectrons;
<reco::SuperClusterCollection>	correctedHybridSuperClusters;
<reco::CaloJetCollection>	ak5CaloJets;
JetCorrectionService = 'L2L3JetCorrectorAK5Calo';	

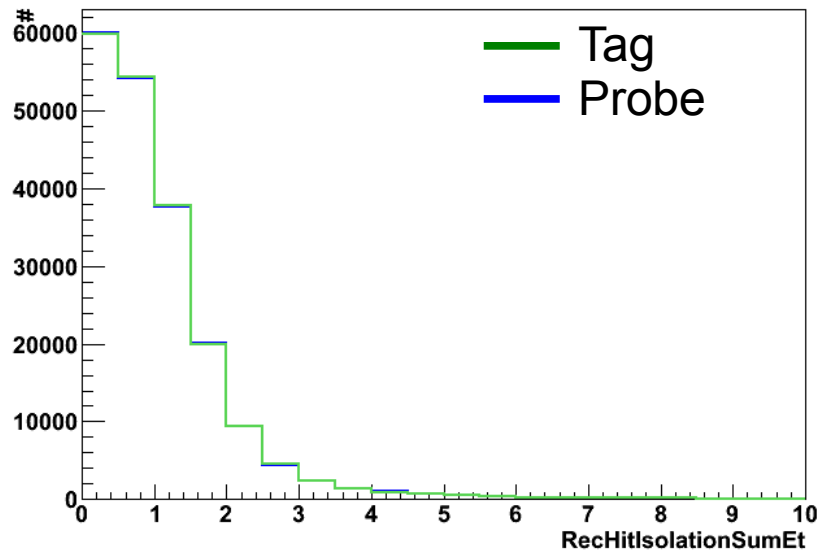
Z->ee Eventselection

- 2 EM-SuperCluster with:
 - $|\eta| < 1.479$ (EB) (conditional on Sc-Collection)
 - $\text{SumMass} = M_Z \pm 10 \text{ GeV}$
 - SC-Isolation: $\text{RecHitEcalSumEtDR04} < 5 \text{ GeV}$
 - SC-Tag has ElectronMatch*
- 2461575 events total
191502 events selected (7.78%)

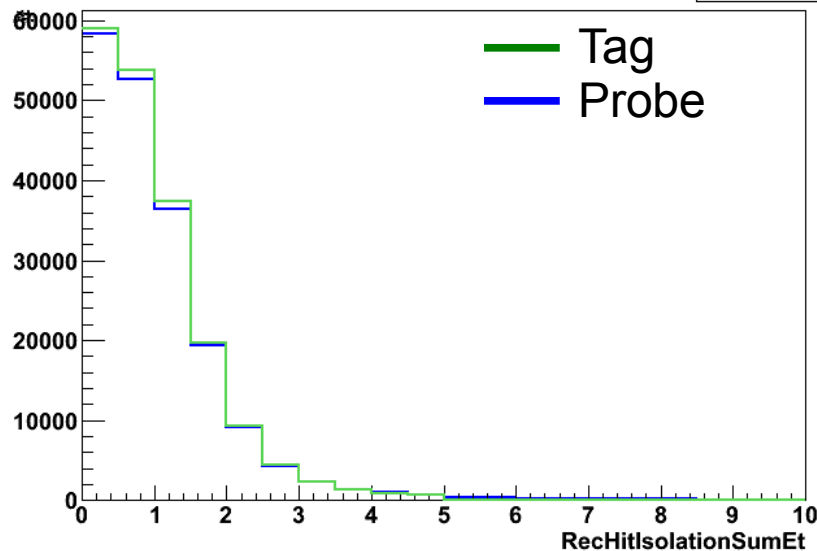
*Matching: $\text{deltaR}(\text{Sc}, e/\gamma) < 0.2$

Isolation Variables

Before ElectronMatch&Cut: Entries 197630



After ElectronMatch&Cut: Entries 191502

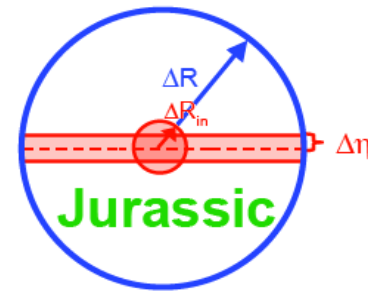


Tag&Probe Supercluster:

- Sc – Isolation Variable:

IsolationSumEt with
modified PhotonIsolationCalculator

Parameters:

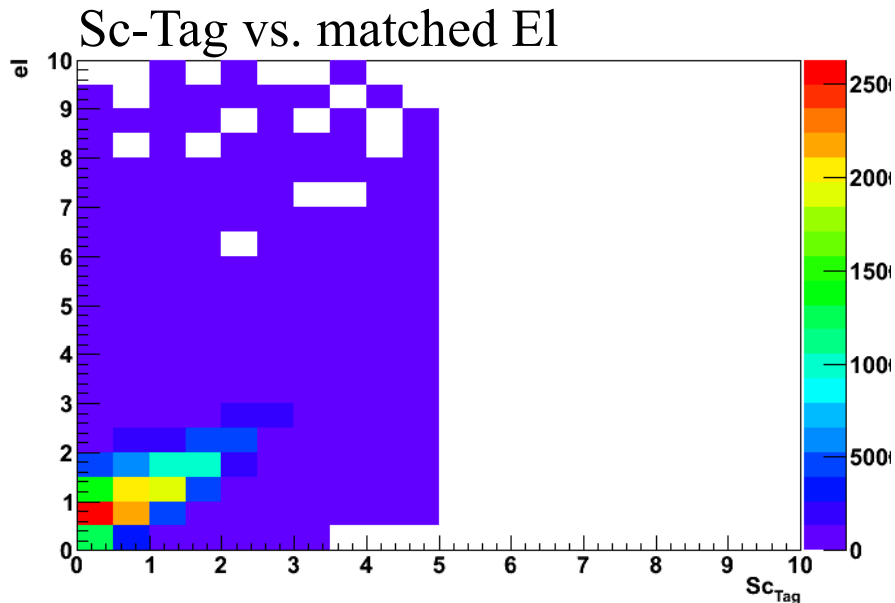


- $\Delta R = 0.4$
- $\Delta R_{in} = 0.06$
- $\Delta\eta = 0.04$
- $eMin = 0.08$
- $etMin = 0.08$

Tag Supercluster:

- Electron Matching
- Isolation Cut: $Iso_Tag < 5 \text{ GeV}$

Isolation Variables

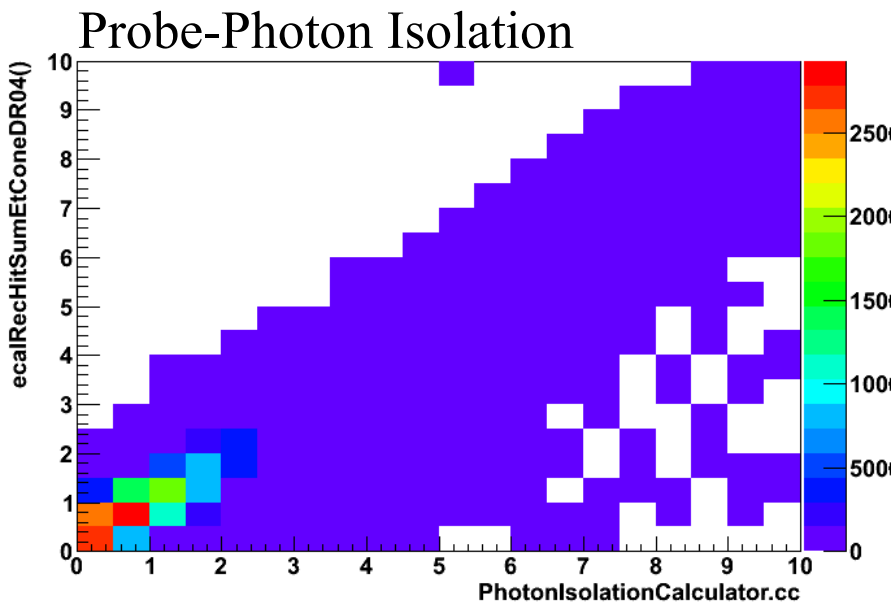


Tag Supercluster:

- RecHitIsolationSumEt
(PhotonIsolationCalculator.cc s.a.)

matched GSF-Electron:

- El – Isolation Variables:
 $\text{dr04EcalRecHitSumEt}()$ *

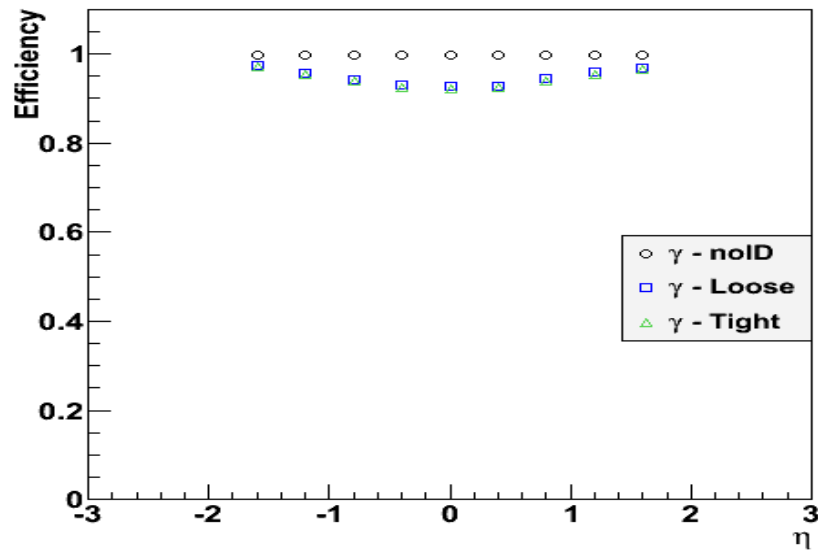


Testing PhotonIsolationCalculator:

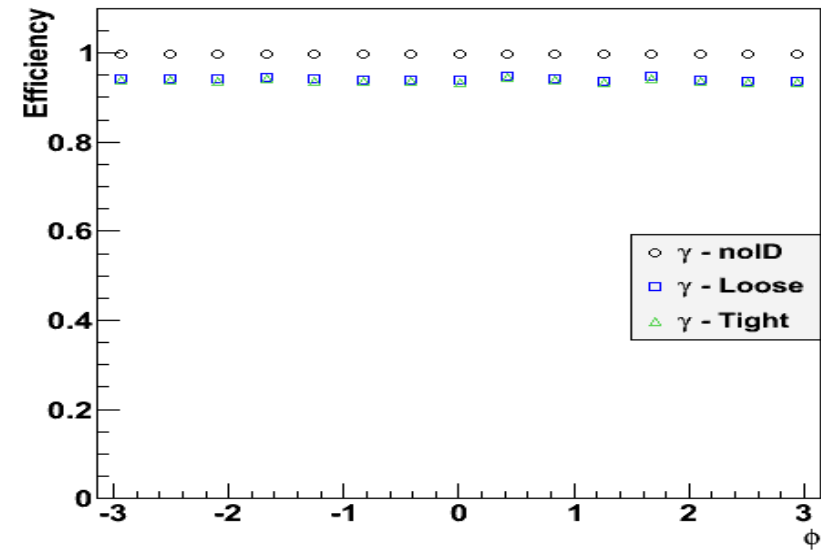
- shown is IsolationSumET calculated with different Methods:
 - PhotonIsolationCalculator.cc
 - $\text{ecalRecHitSumEtConeDR04}()$ *

ScProbe: Photon-matching-Efficiency

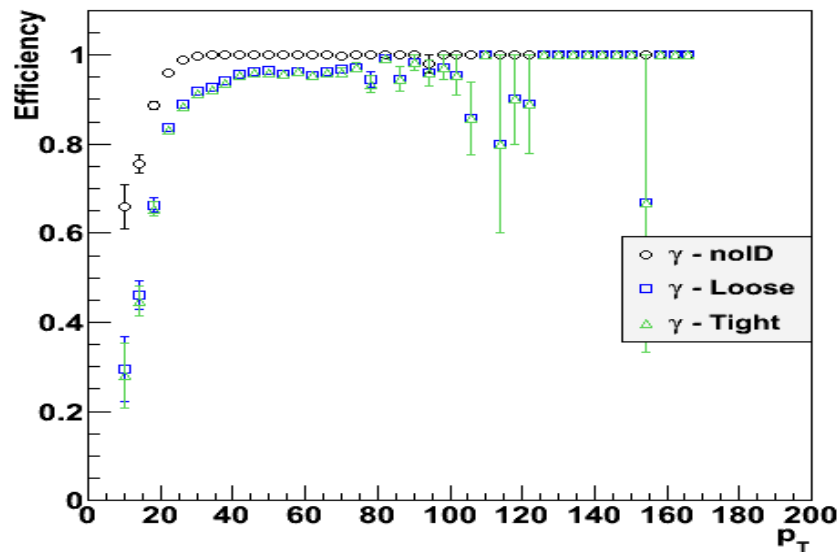
in Eta:



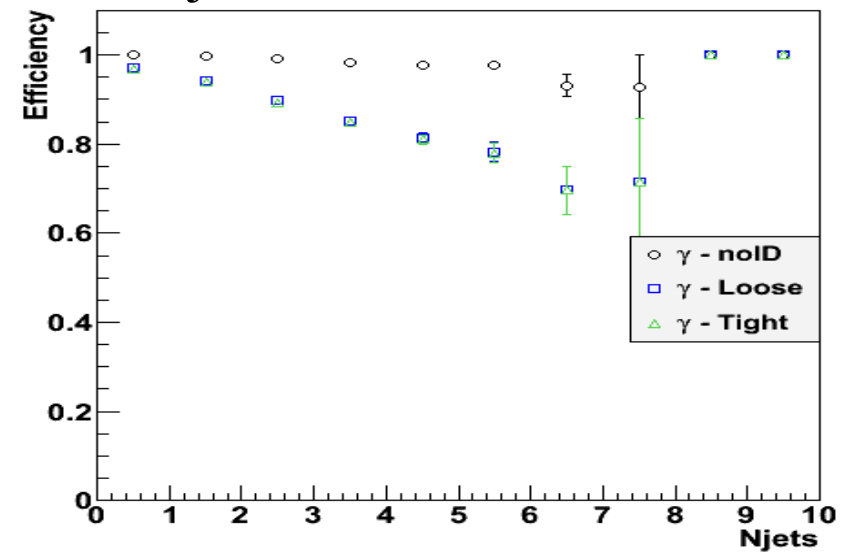
in Phi:



in Pt:



in Njets:



*Matching: $\Delta R(\text{Sc}, e/\gamma) < 0.2$

ScProbe: Photon-matching-Efficiency

- Reconstruction of Photons:
(Assumption that Electron and Photons are constructed similar, except for the pixelseed veto)

#Events: 191502

No – ID : 190870 / 99.67%

Loose : 180240 / 94.12%

Tight : 179487 / 93.73%

- Fake-Rate $f(e - \gamma)$:
(PixelSeed-Veto for Photons)

#Events: 191502

No – ID : 2950 / 1.54%

Loose : 1855 / 0.97%

Tight : 1795 / 0.94%