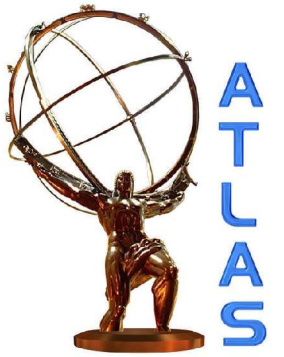


Update on Trigger Efficiency from data studies.

Matthew Tamsett RHUL

RHUL SUSY 08/10/08

Introduction

• We have previously seen that Et, eta and etcone20 don't fully explain electron trigger efficiencies.

• We have also seen that these differences can be explained by the Pt of truth jets within 0.6

•The same results cannot be reproduced using Reconstructed Jets or All Reconstructed objects.

•But we know the difference is due to energy coming from nearby truth jets.

• Maybe etcone20 isn't big enough

• So i've reproduced nTuples with different Etcone sizes, then reproduced Z->ee estimators with these to see if they fully explain electron trigger efficiencies

Efficiency Estimator based on Et, Eta and Isolation

Hypothesis;

$$\text{Efficiency} = \text{Integration(Et,Eta,Iso)}[\ \text{Dist(Et,Eta,Iso)} \ \text{conv}\ \text{Eff(Et, Eta, Iso)}]\text{dEt dEta dIso}$$

We parameterise using only a matrix of Et, eta and isolation.

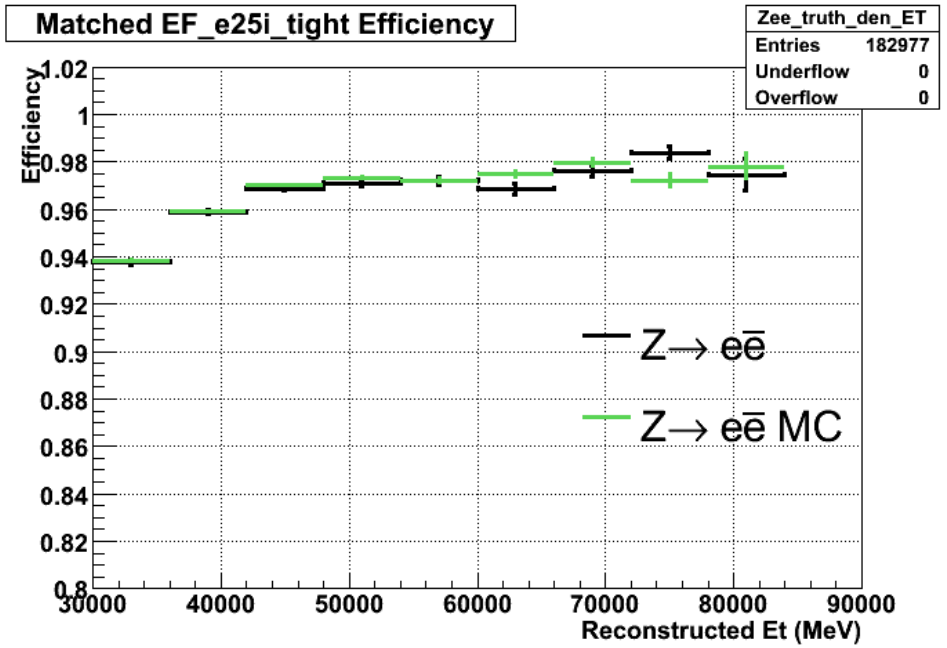
Isolation will be represented by Etcones of varying sizes.

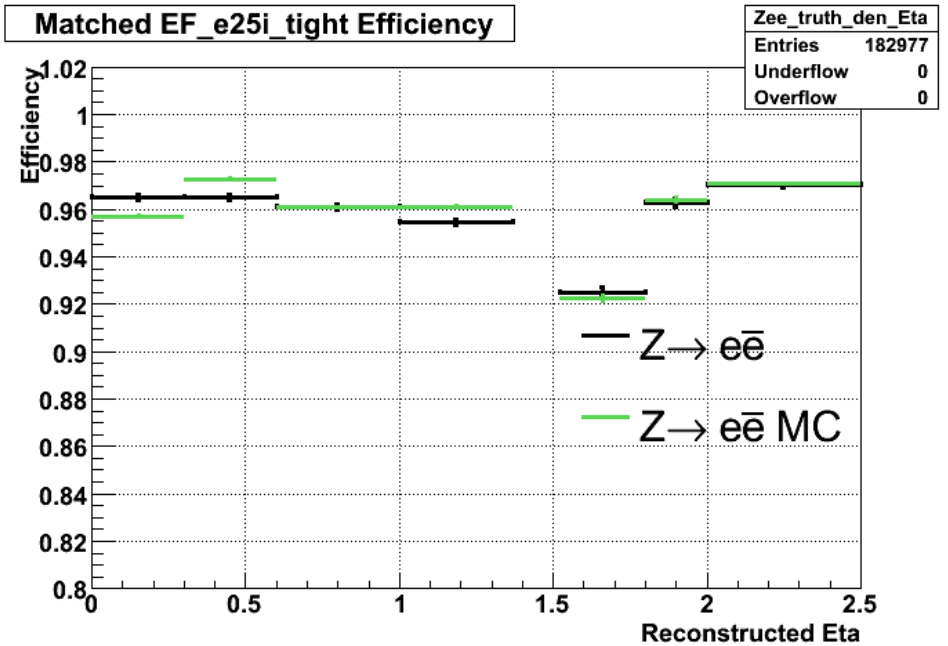
I will construct this matrix of estimators from half the **Zee** sample as this how we'd extract this information with data.

This matrix is then used to estimate the trigger efficiency for any given electron(Et, Eta, Iso) and the results are compared against full sim.

If the matrix is correctly parameterising efficiencies then estimator results will agree with Monte Carlo for all samples.

Estimator Validation on Z->ee





Efficiency vs Et

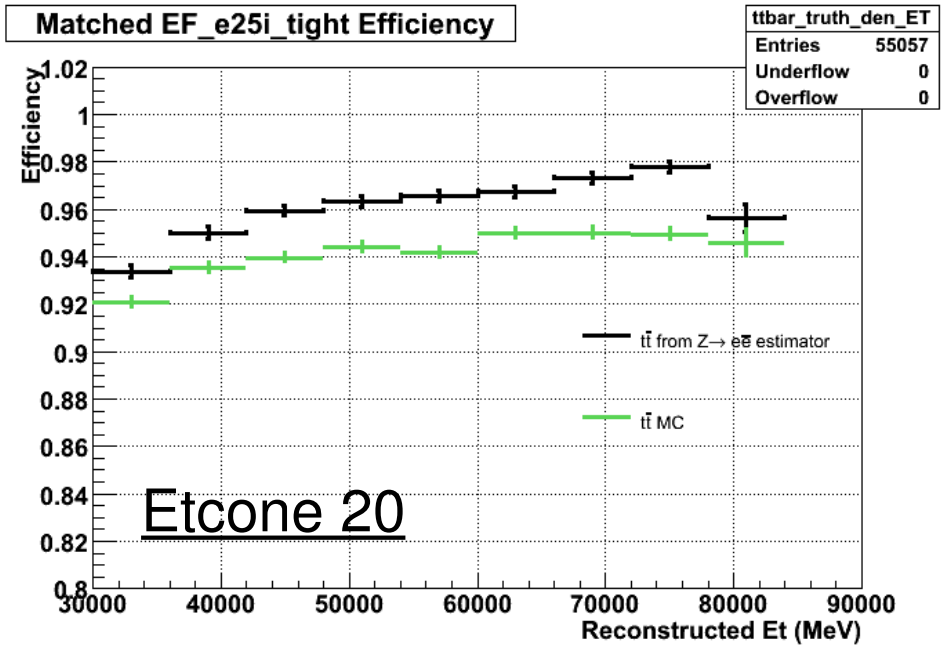
Efficiency vs Eta

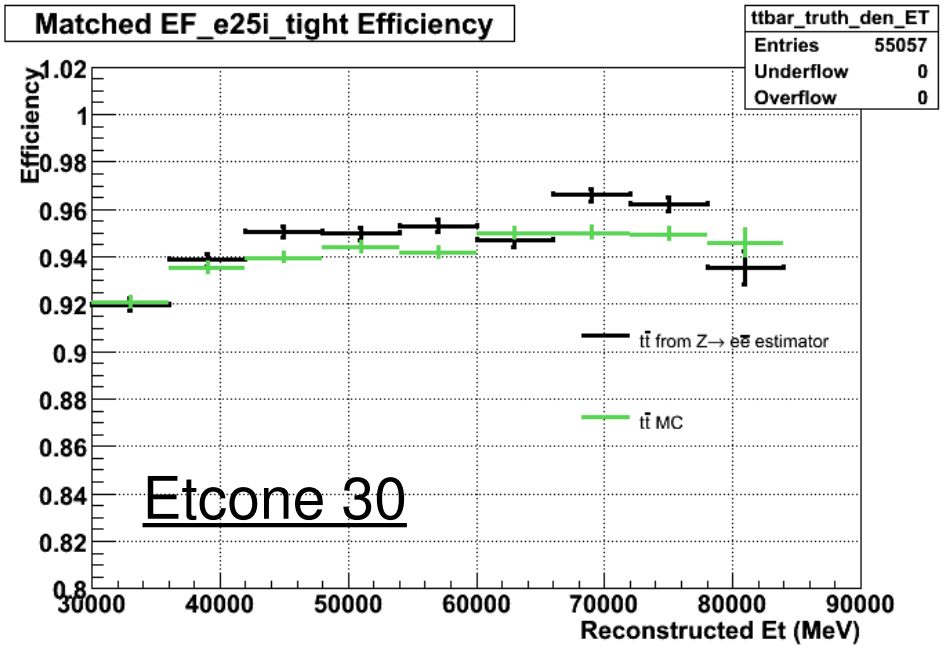
Estimators constructed on half the Z->ee are tested on the other half, and validated against full sim Monte Carlo (MC) results.

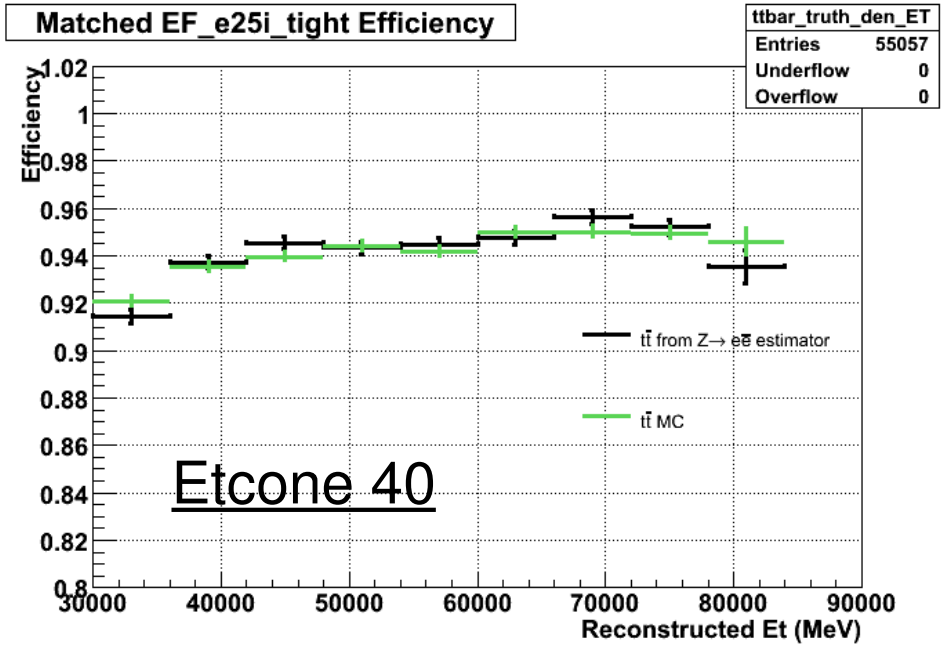
Error bars do not include errors on estimators. Estimators are random variables so have errors.

Estimators agree well with Monte Carlo.

ttbar efficiency vs Et for varying Etcone sizes





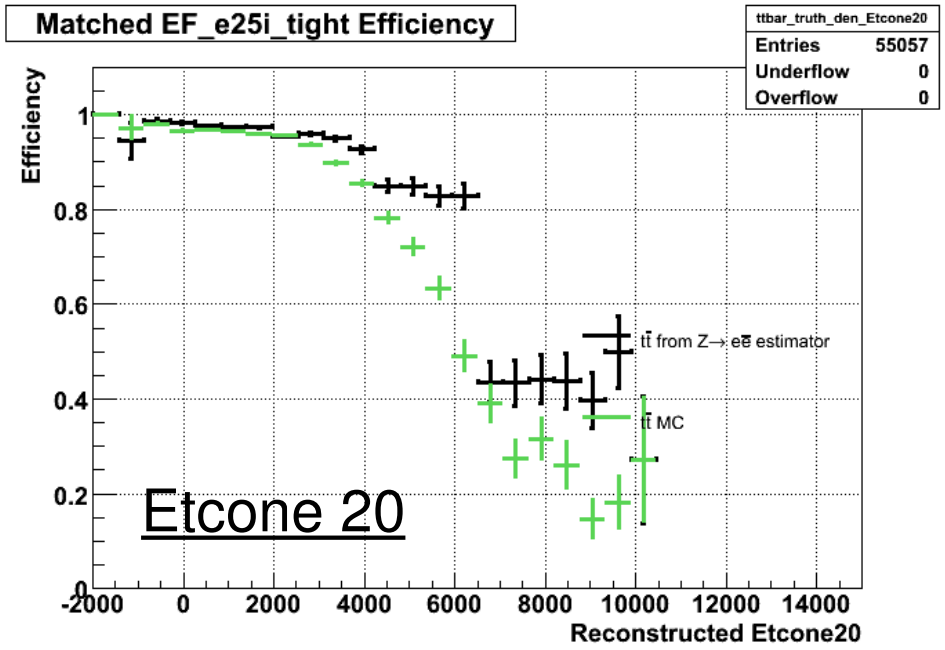


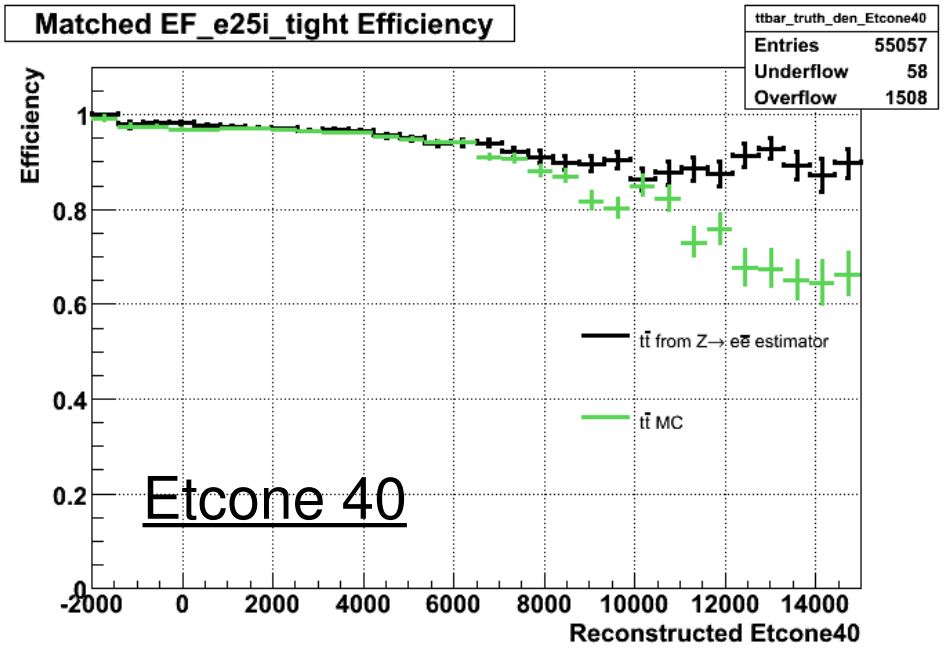
Etcone 20 is not sufficiently big.

Etcone40 appears to successfully parameterise electron trigger efficiencies!!!!!!

:D

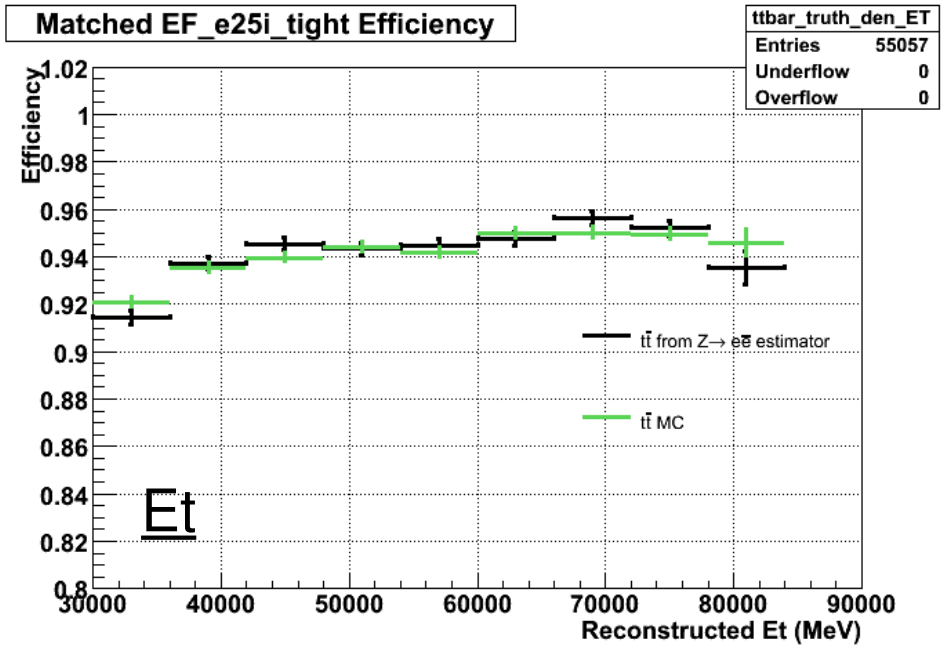
Efficiency using etcone20 estimators

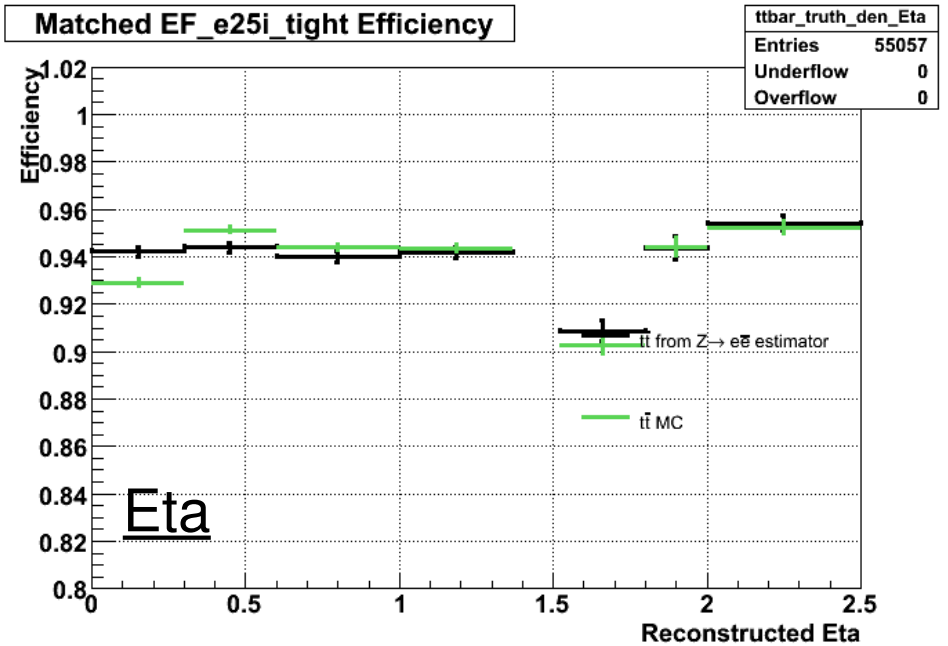


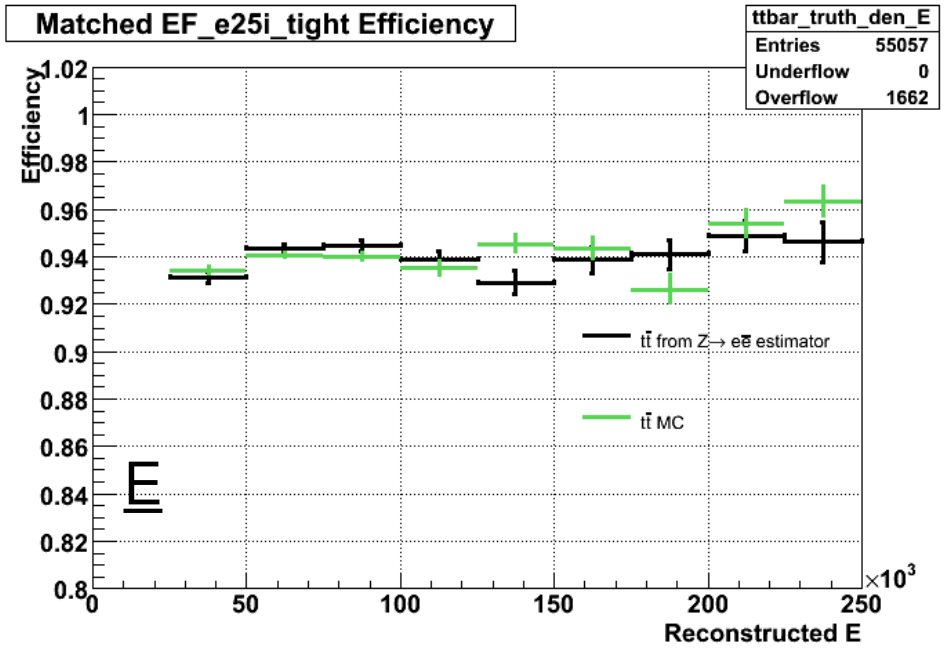


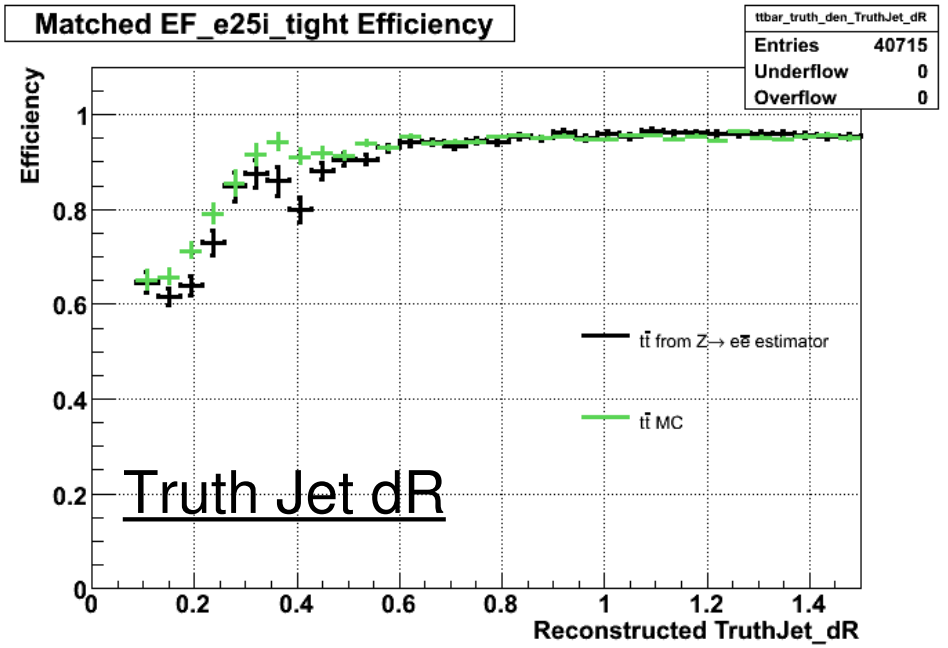
Etcone 20 does not appear to be parameterizing well in situations where we have large Et in a cone larger than Etcone 40.

ttbar efficiency plots for etcone40

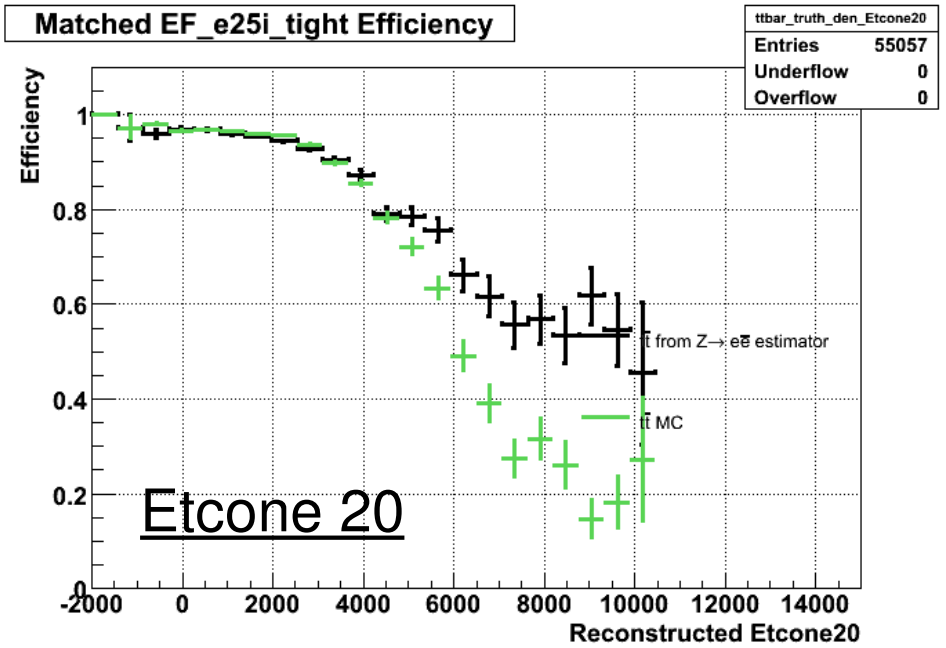


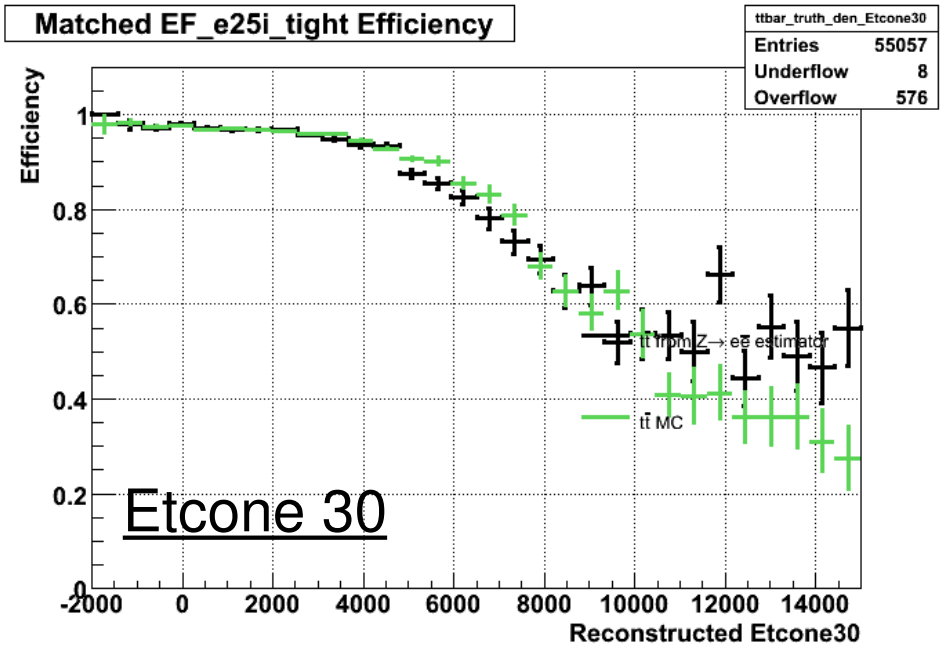


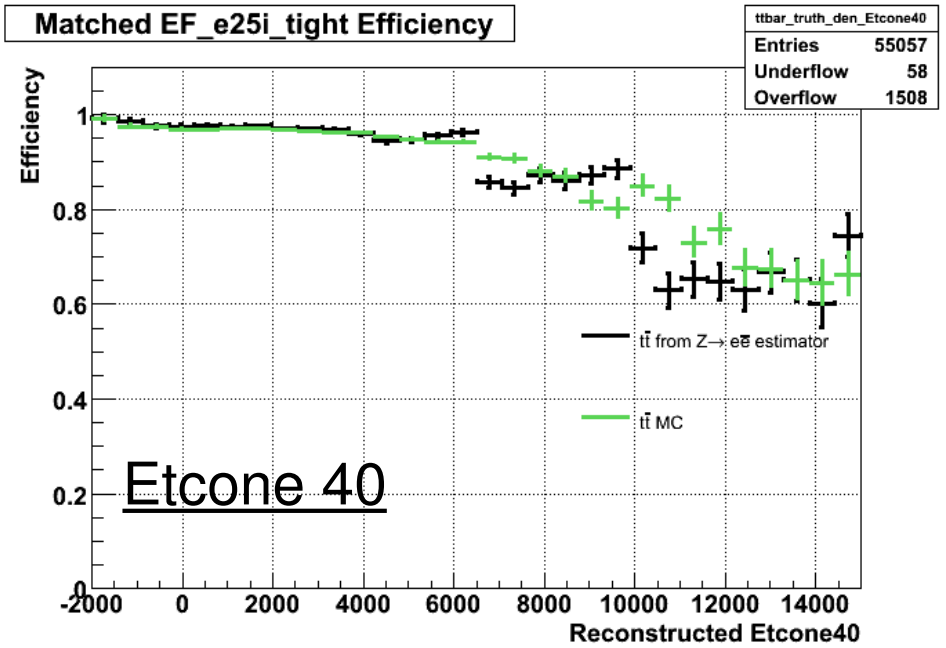


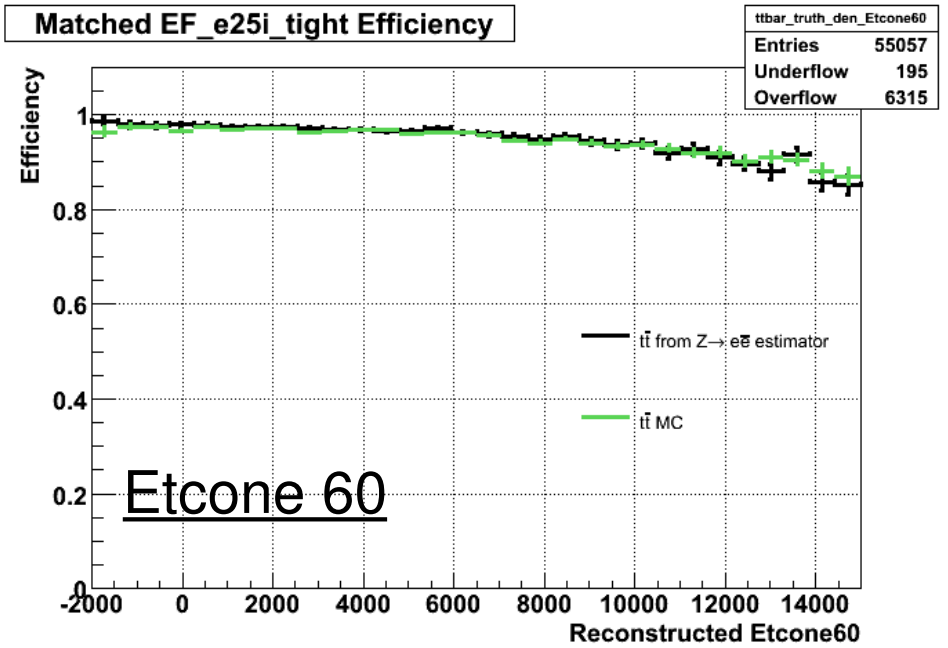


ttbar efficiency plots for etcone40









Conclusions and Further Work

Confirm that this is working in the way i think it is.
- lots of checks need to be made.

A straight forward check to to compare the 3D efficiency curves to see if they agree between samples.