

Gamma jet D2PDs

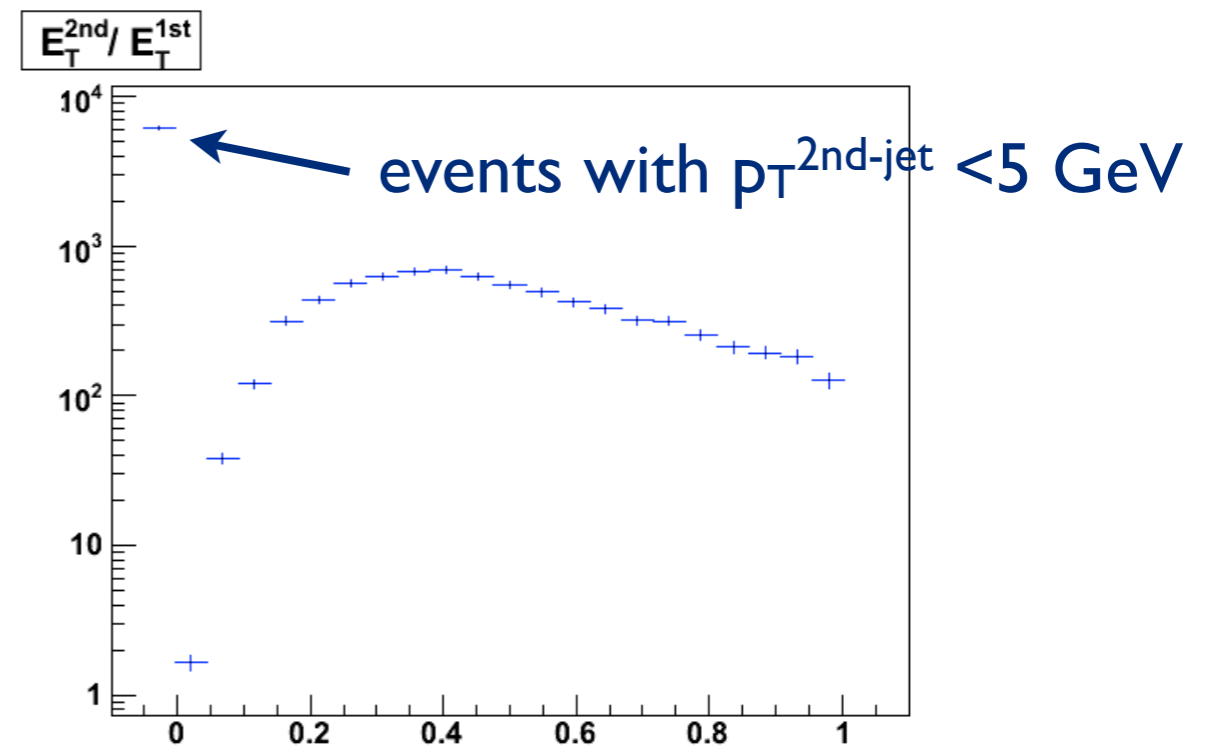
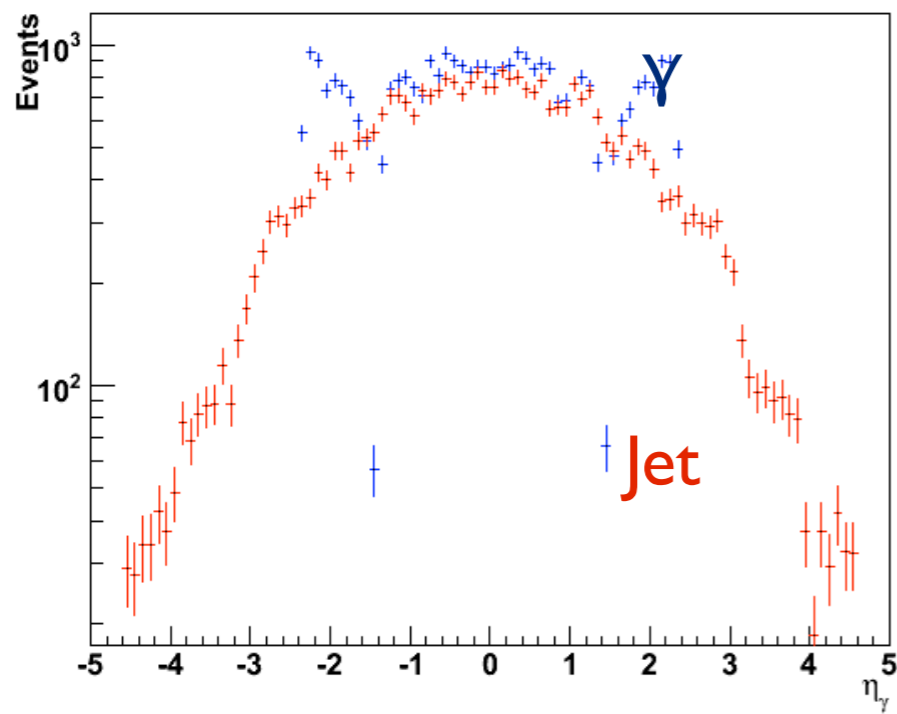
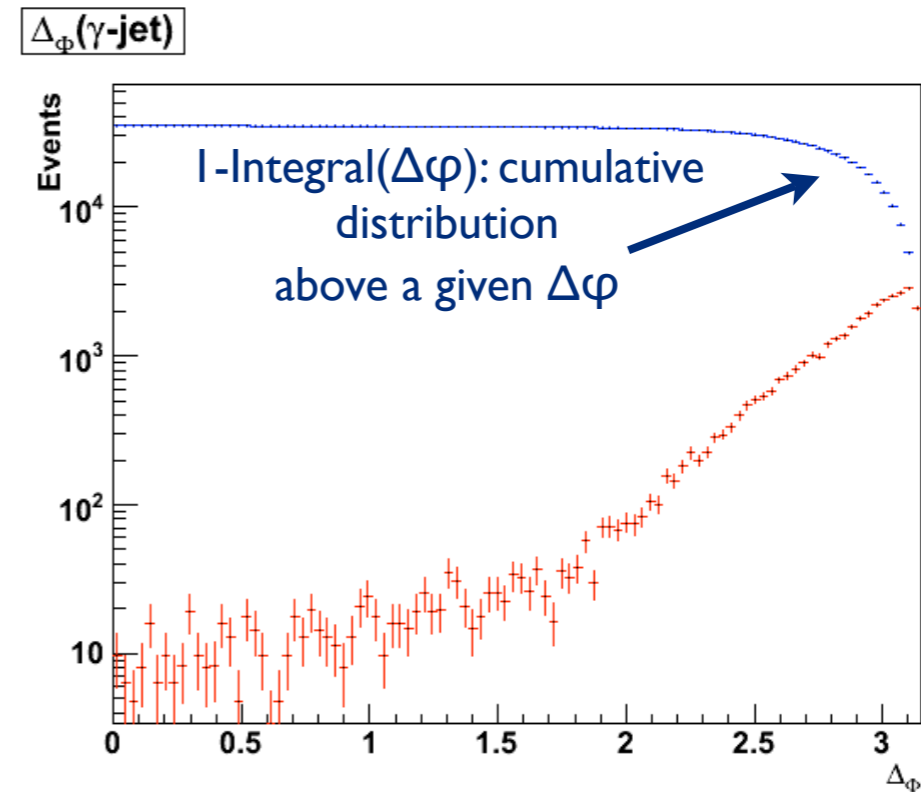
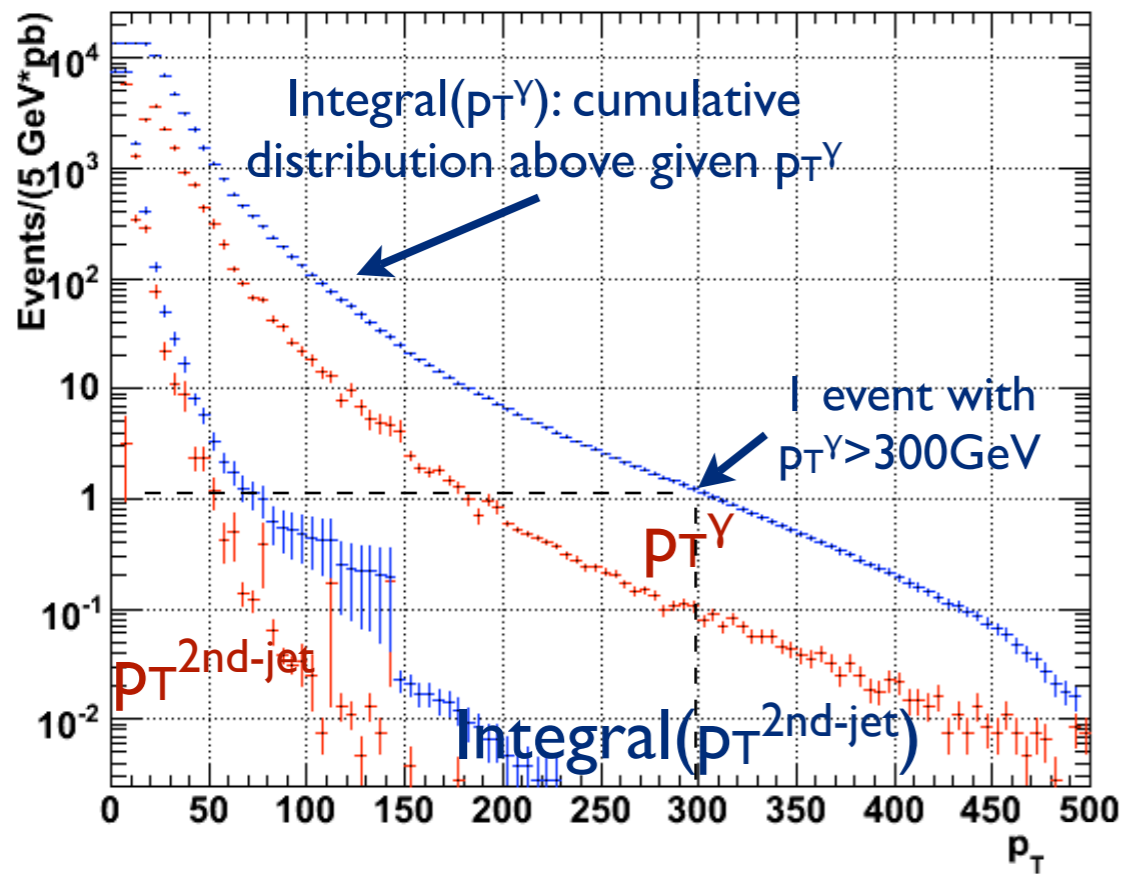
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introduction

- study the impact of different skimming strategy for the photon-jet performance D2PDs on the photon-jet balance procedure
- I started from the non-skimmed D2PD samples, I applied on the skimming selection before calculating the photon-jet balancing. I then checked for possible biases or important loss in statistical power.
- The relevant variable that could be used to to select events other than trigger requirements are: p_T^{jet} , p_T^γ , $p_T^{2\text{nd jet}}$, $\Delta\varphi_{\gamma\text{-jet}}$; their distribution together with the integral above threshold is shown in the next slide

Event Sample

- group08.PerfJets.mc08.10800x.PythiaPhotonJetX.recon.DPD_NOSKIM.e344_s456_r545_DPDMaker000157_p1 (X=1,4)



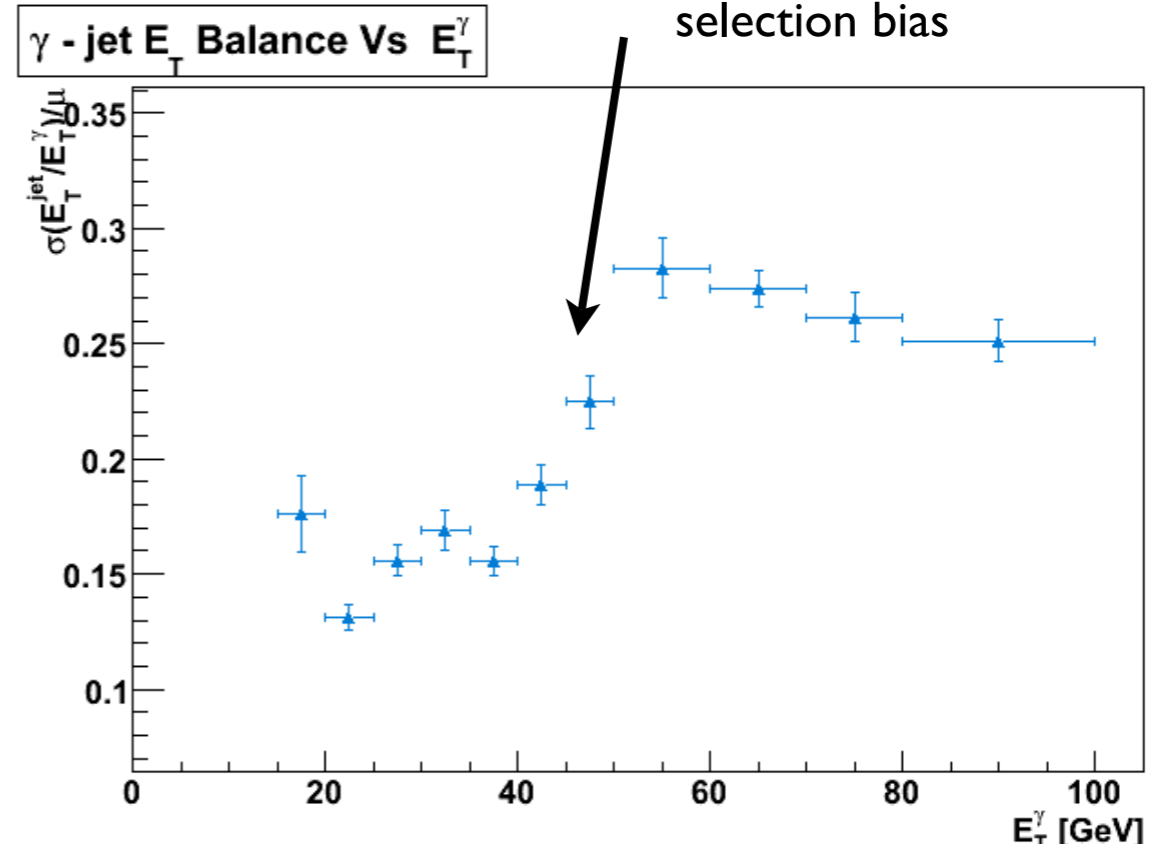
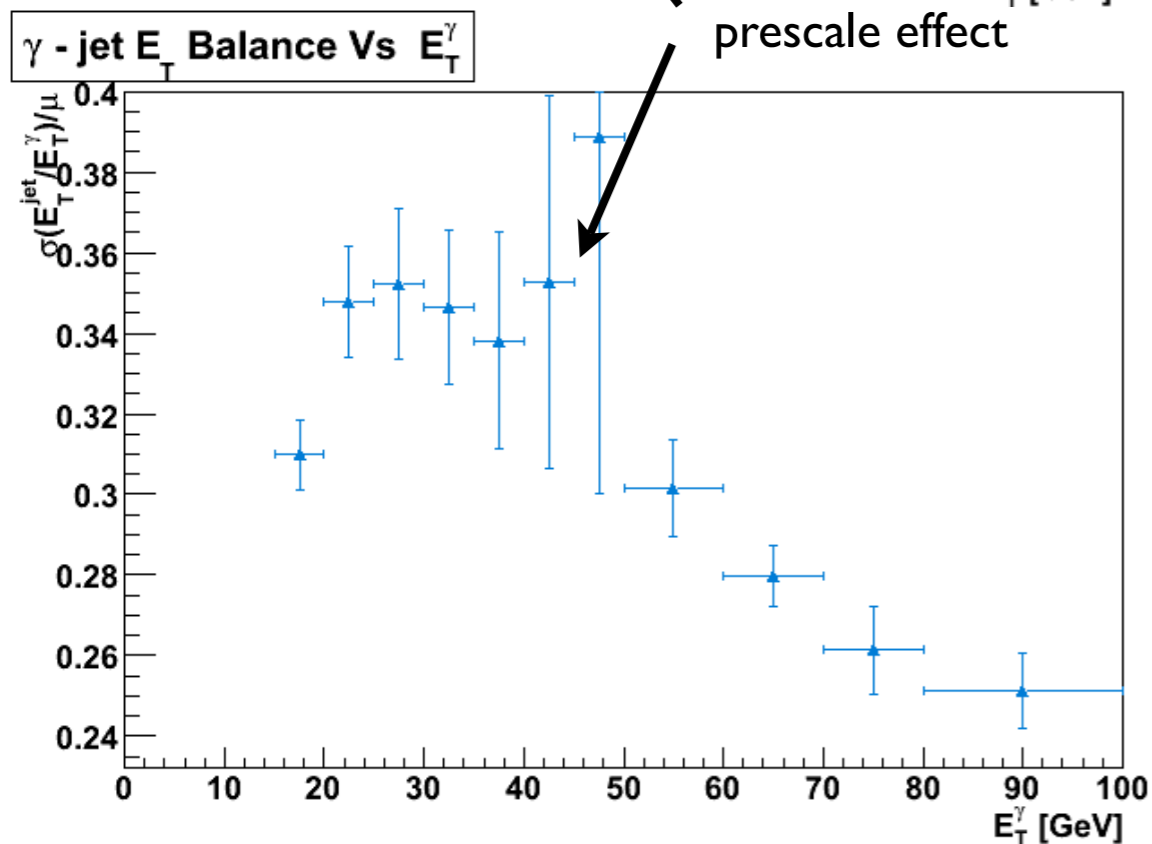
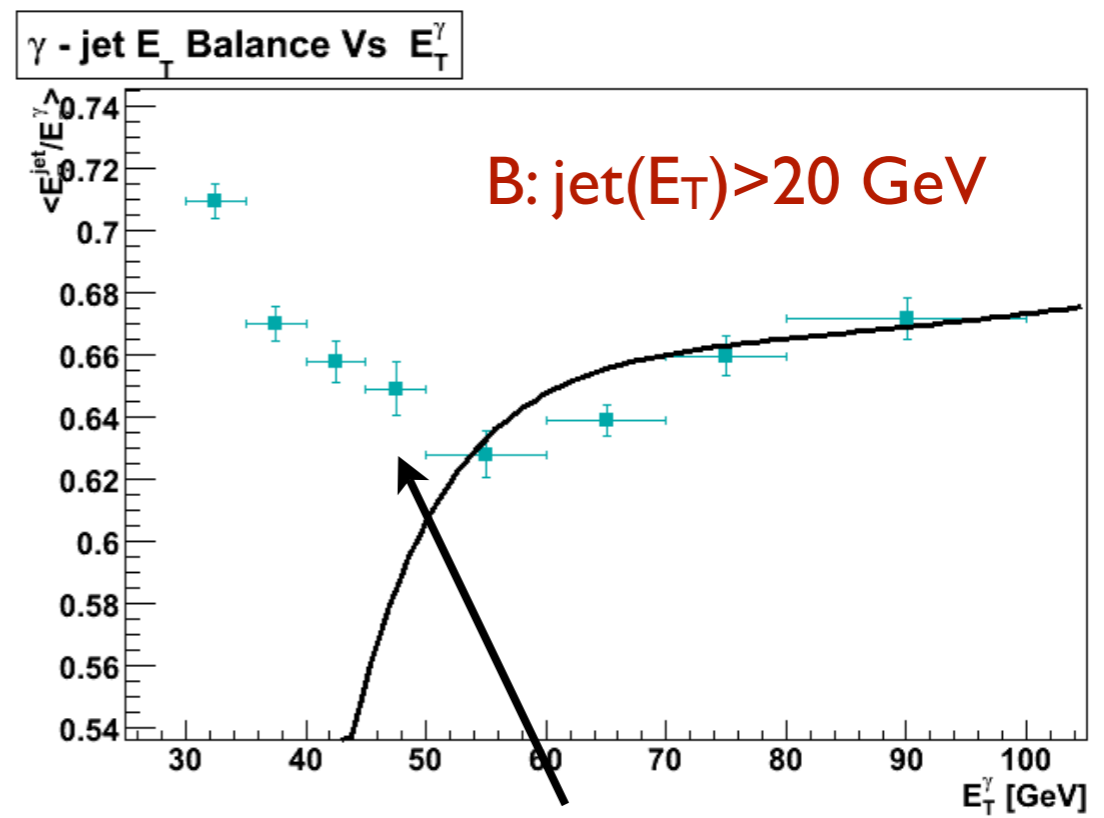
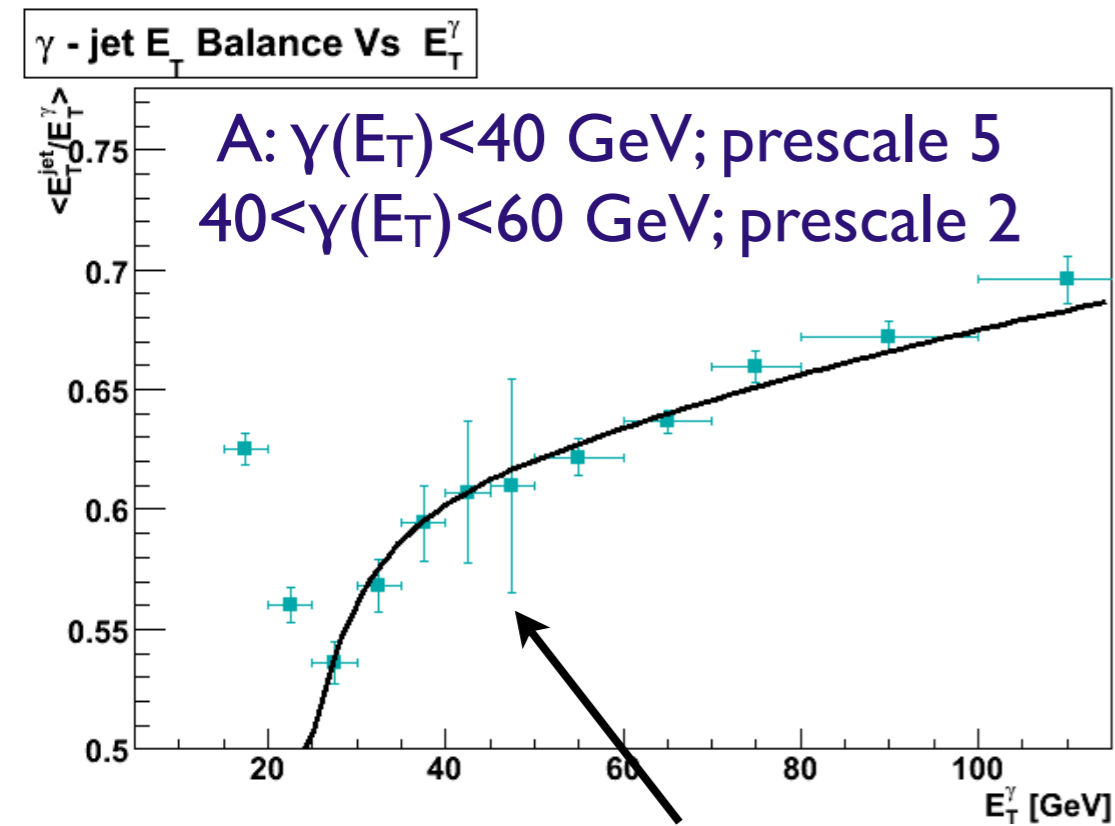
Balancing procedure

- Use the balancing of reconstructed jet at the EM scale and photon to check the effect of the skimming criteria (benchmark balance results in the backups)
- AntiKt6; TopoCluster; EM scale
- $E_T(\gamma) > 20\text{GeV}; |\eta_{\text{jet}/\gamma}| < 2.5; \Delta\varphi_{\text{jet}-\gamma} > 2.9$
- $E_T^{\text{Corr}} = \text{Corr}(E_T^{\text{Meas}}) * E_T^{\text{Meas}}$
- $\text{Corr}(E_T) = \sum_{i=0,4} P_i / [\text{Log}(E_T)]^i$; with P_i fitted to $B(E_T)$
- $B(E_T^\gamma) = \langle E_T^{\text{jet}}/E_T^\gamma \rangle (E_T^\gamma) \Rightarrow B(E_T^{\text{jet}}) = B(E_T^\gamma * \text{Corr}(E_T^\gamma))$; (where “(x)” means function of x)
- $\langle x \rangle$ corresponds to the mean μ of gaussian fit of x in the region $\mu \mp 2\sigma \Rightarrow$ it is important that it does not have big tails

skimming selection

- **A:** Events which pass at least one of the following filters:
 - Z-->ee filter : both electrons $E_t > 15$ GeV, $|\eta| < 2.5$, Medium (author=egamma), $60 < \text{di-electron mass} < 120$ GeV
 - Low Et photon filter : ≥ 1 photon $E_t > 20$ GeV, $|\eta| < 2.5$, Tight (prescaled by 5)
 - Medium Et photon filter : ≥ 1 photon $E_t > 40$ GeV, $|\eta| < 2.5$, Tight (prescaled by 2)
 - High Et photon filter : ≥ 1 photon $E_t > 60$ GeV, $|\eta| < 2.5$, Tight (no prescale)
- **B:** Photon+Jet filter : EF_g20 trigger + Photon cut + Jet cut (no prescale)
 - Photon cut = at least one tight photon with $E_T > 20$ GeV and $|\eta| < 2.5$
 - Jet cut = at least one jet with $E_T > 20$ GeV and $|\eta| < 2.5$ (for p2 sample), $|\eta| < 100$ (for p4 sample), $\Delta\Phi(\text{Photon}, \text{Jet1}) > \text{PI} - 0.3$

DPD skim strategy

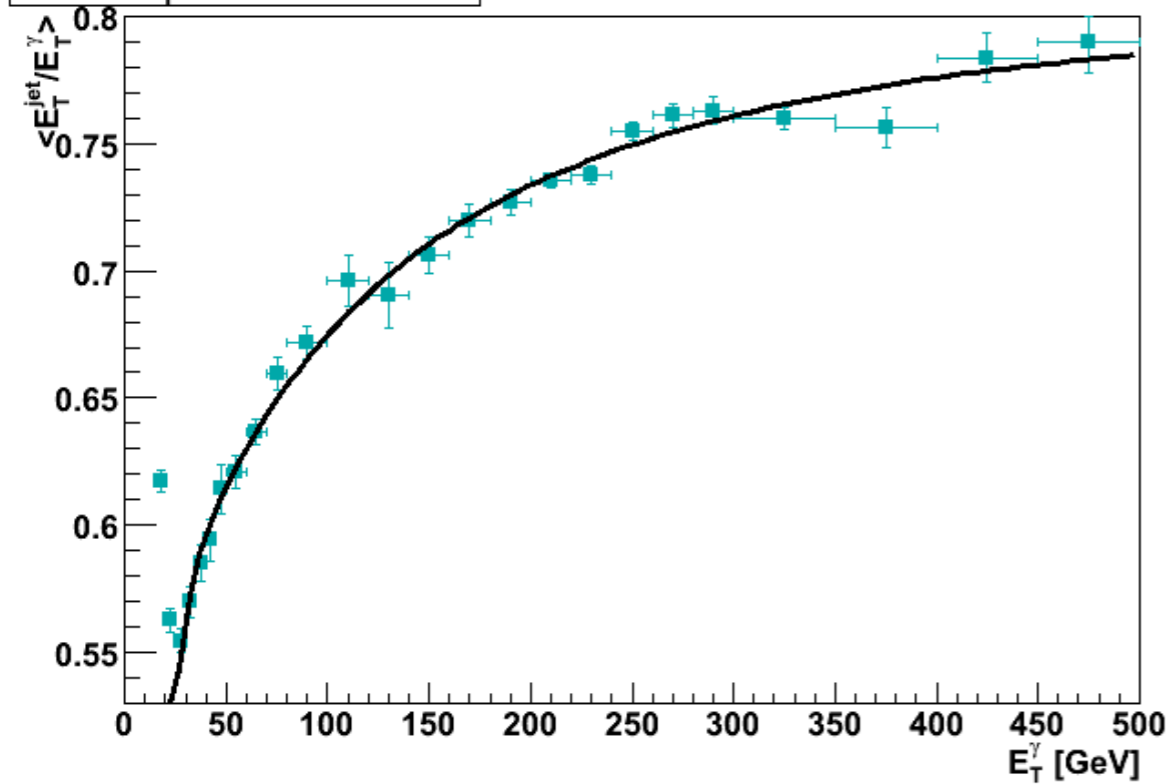


Conclusions

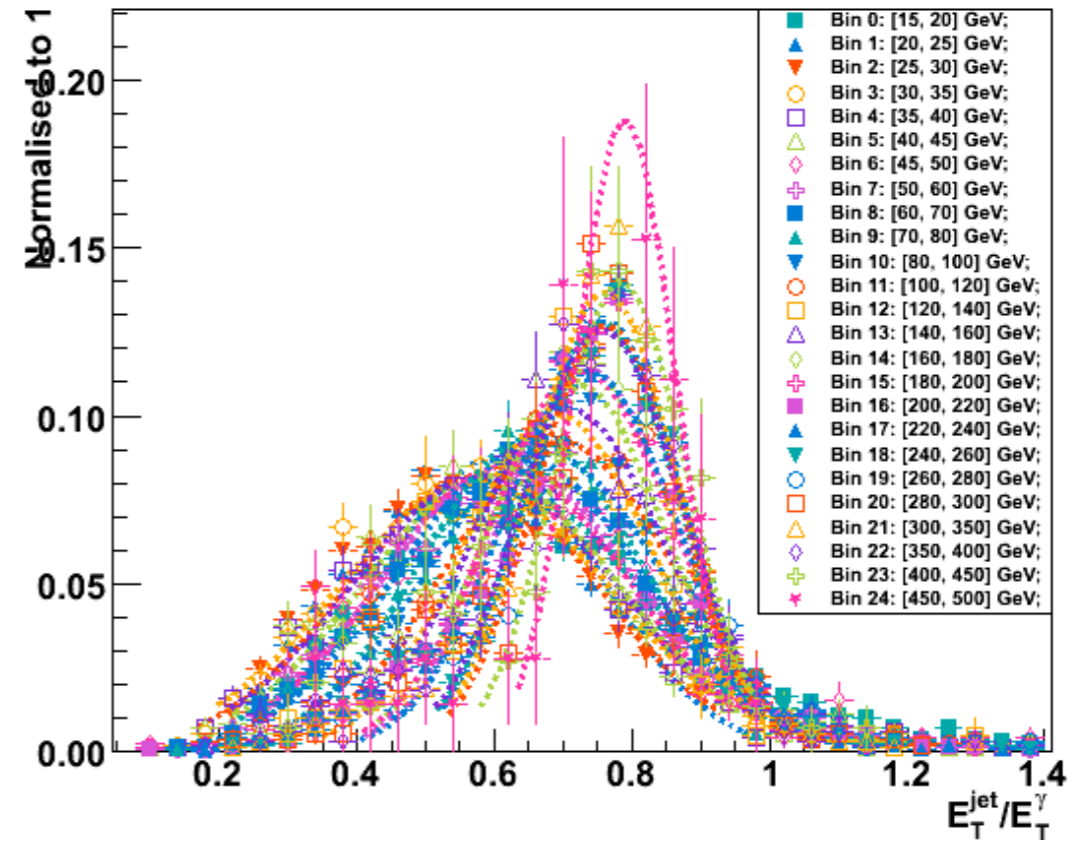
- it is preferable a D2PD skimming procedure based on prescales. Selecting on E_T jet is biasing the results. Selecting on variables used later to clean the sample could be dangerous. It is always best to have some sidebands to study the sample.

EM Scale balance

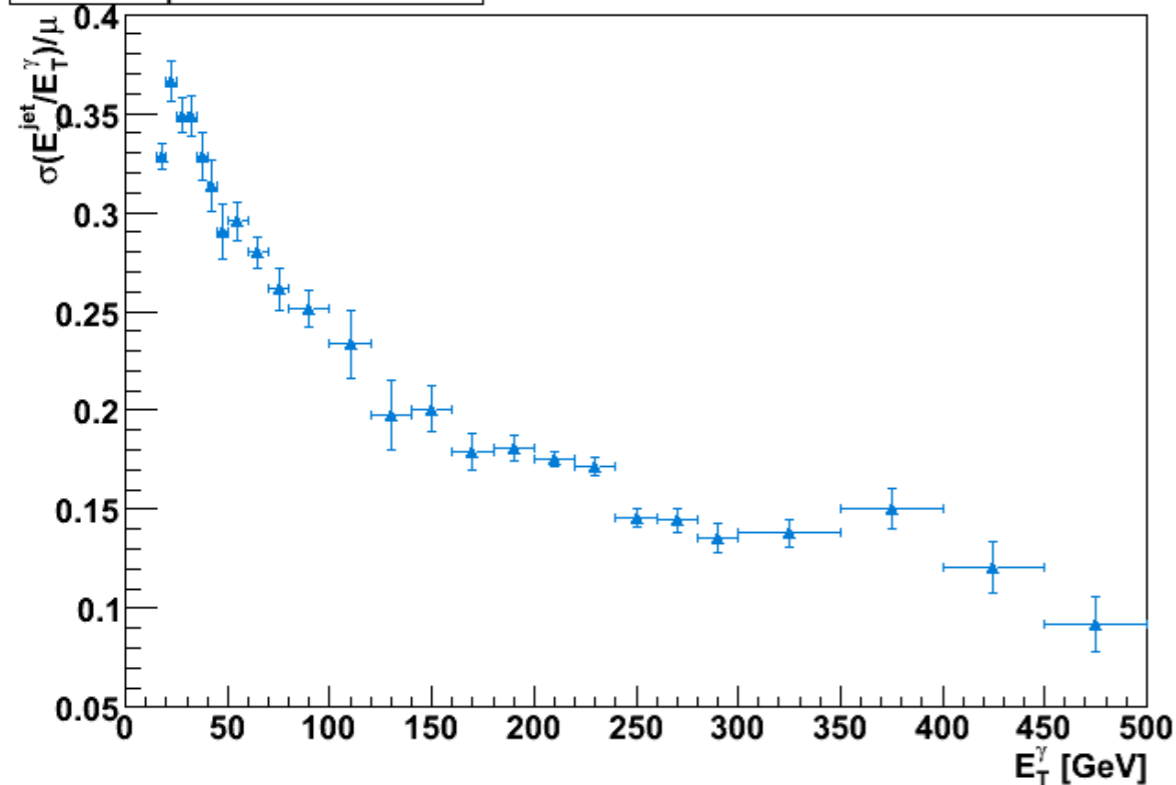
γ - jet E_T Balance Vs E_T^γ



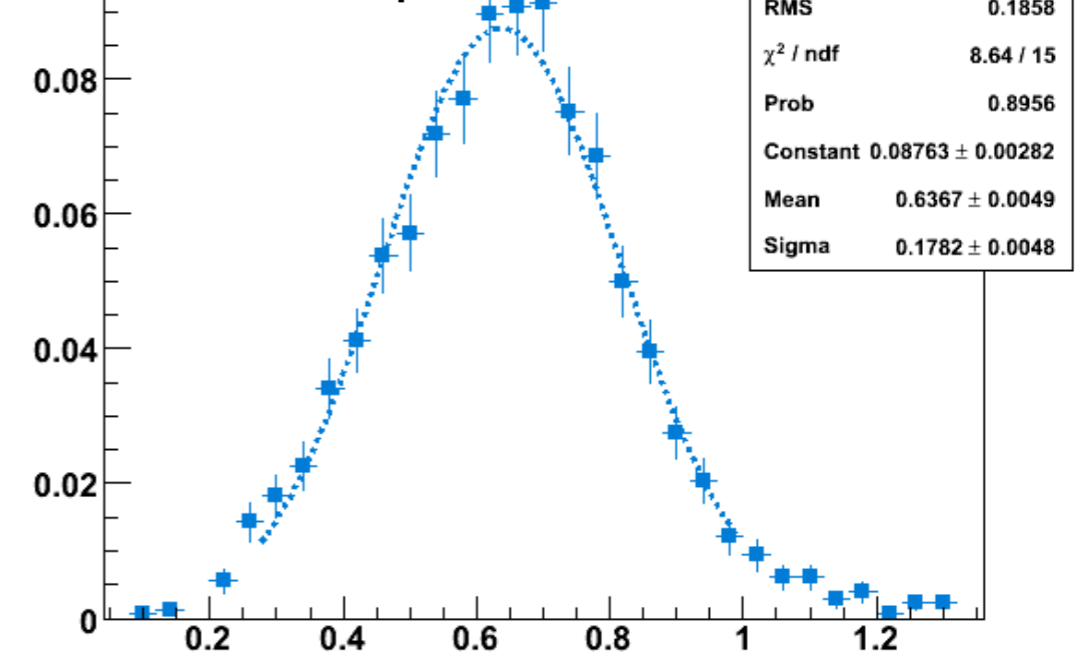
γ - jet E_T Balance



γ - jet E_T Balance Vs E_T^γ



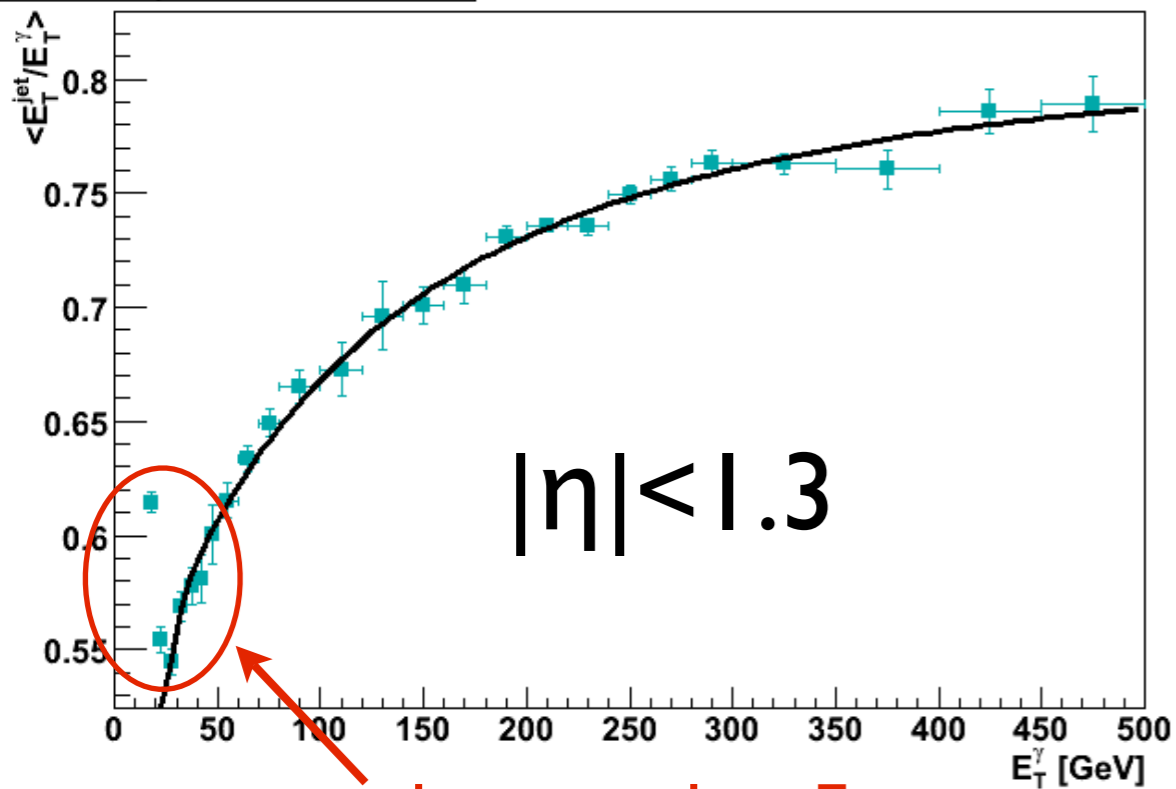
50 GeV < p_{T^γ} < 60 GeV



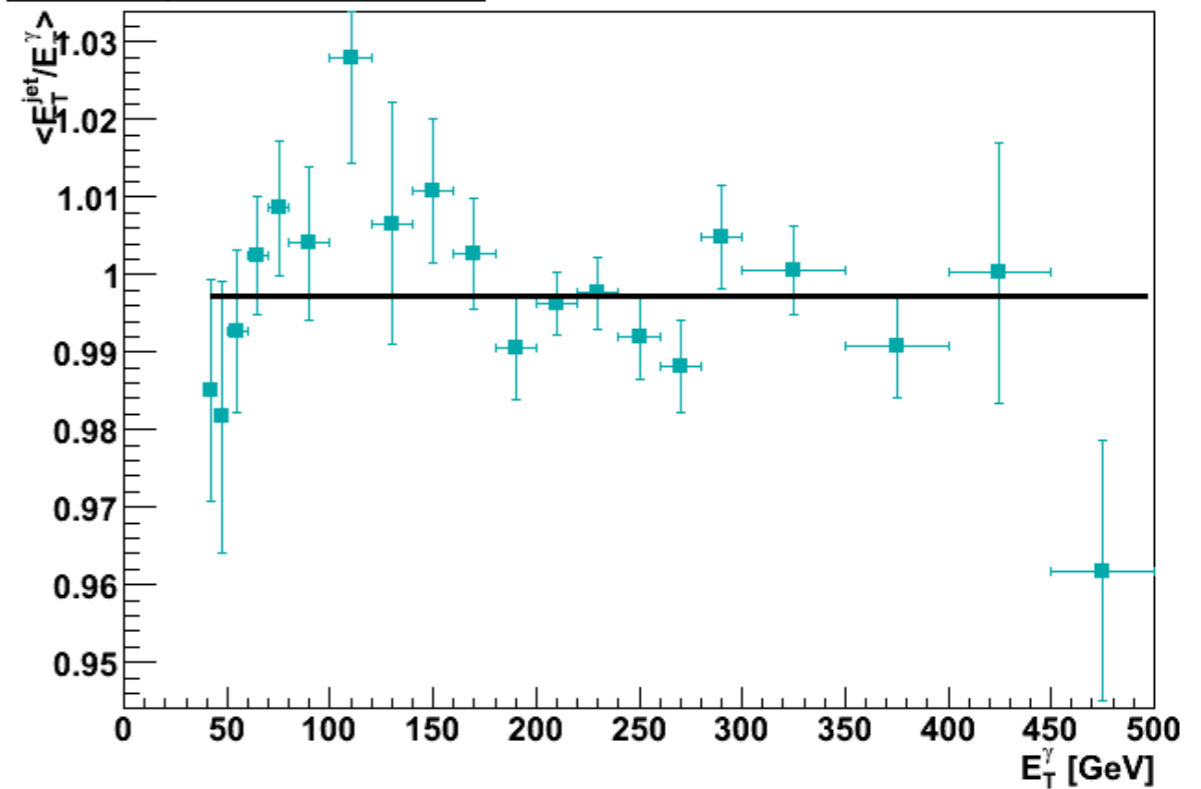
_py_8	
Entries	1819
Mean	0.6442
RMS	0.1858
χ^2 / ndf	8.64 / 15
Prob	0.8956
Constant	0.08763 ± 0.00282
Mean	0.6367 ± 0.0049
Sigma	0.1782 ± 0.0048

Balance versus η

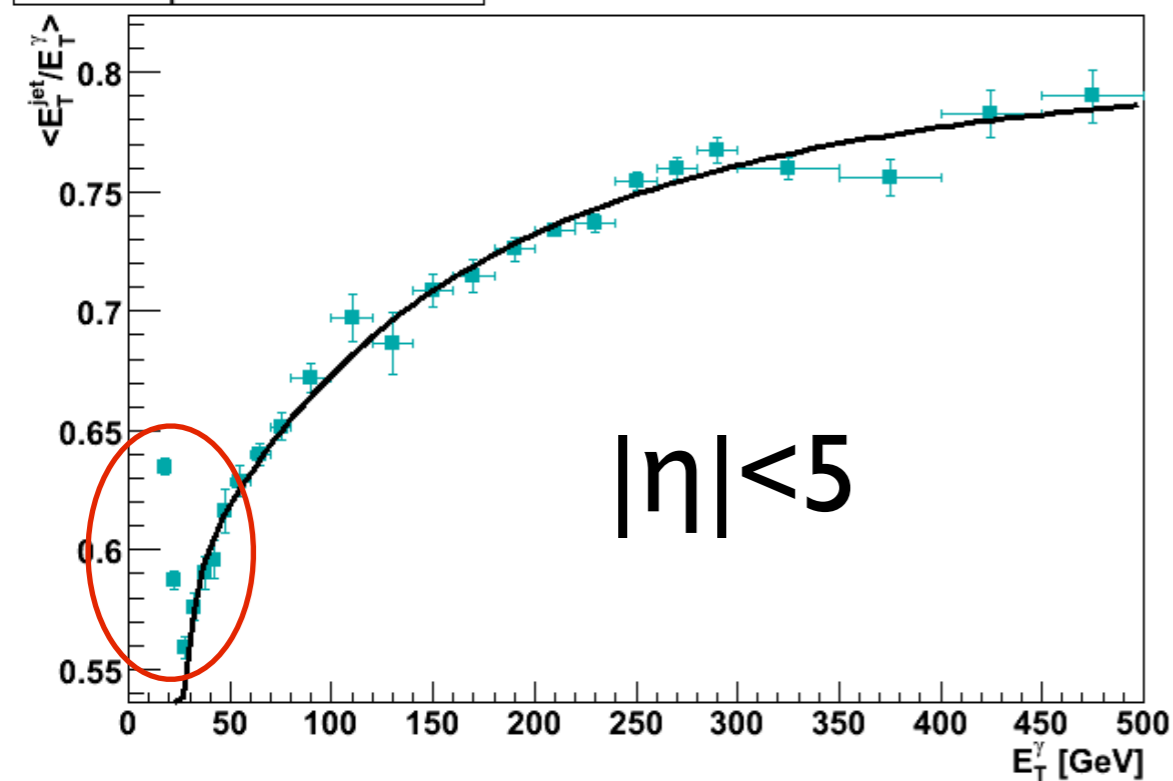
γ - jet E_T Balance Vs E_T^γ



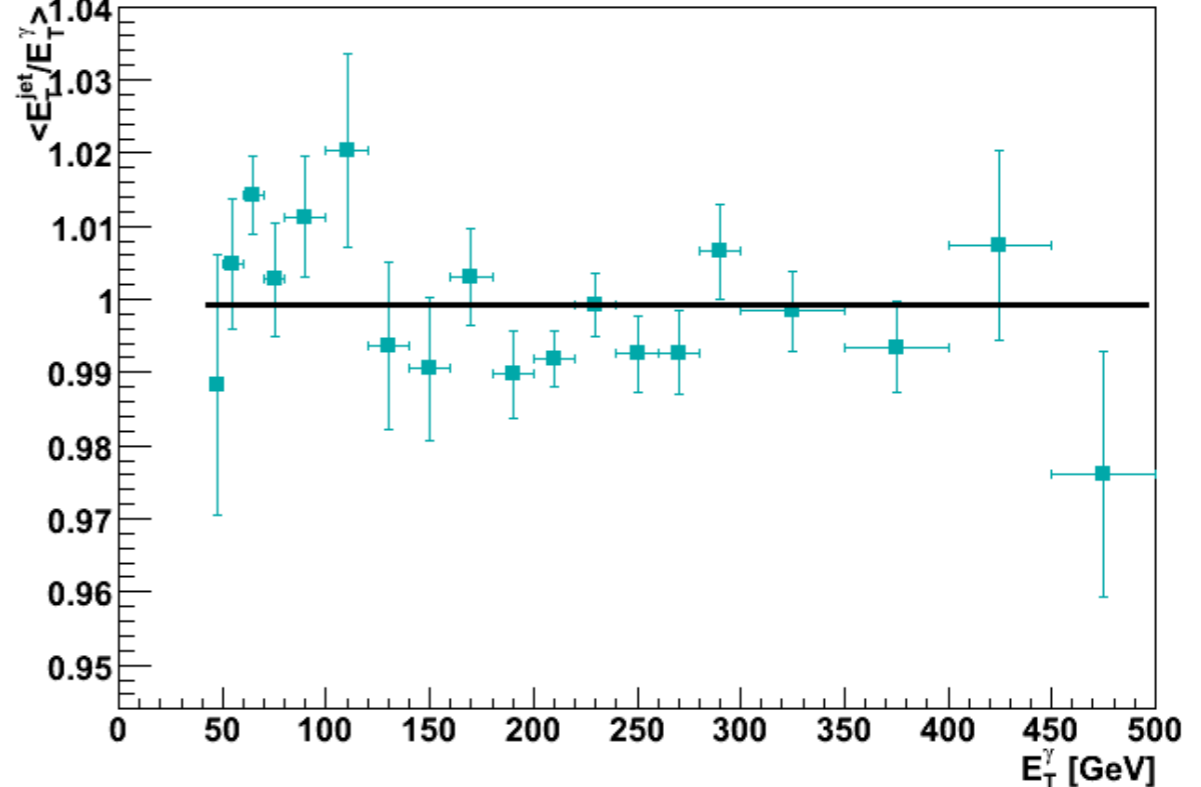
γ - jet E_T Balance Vs E_T^γ



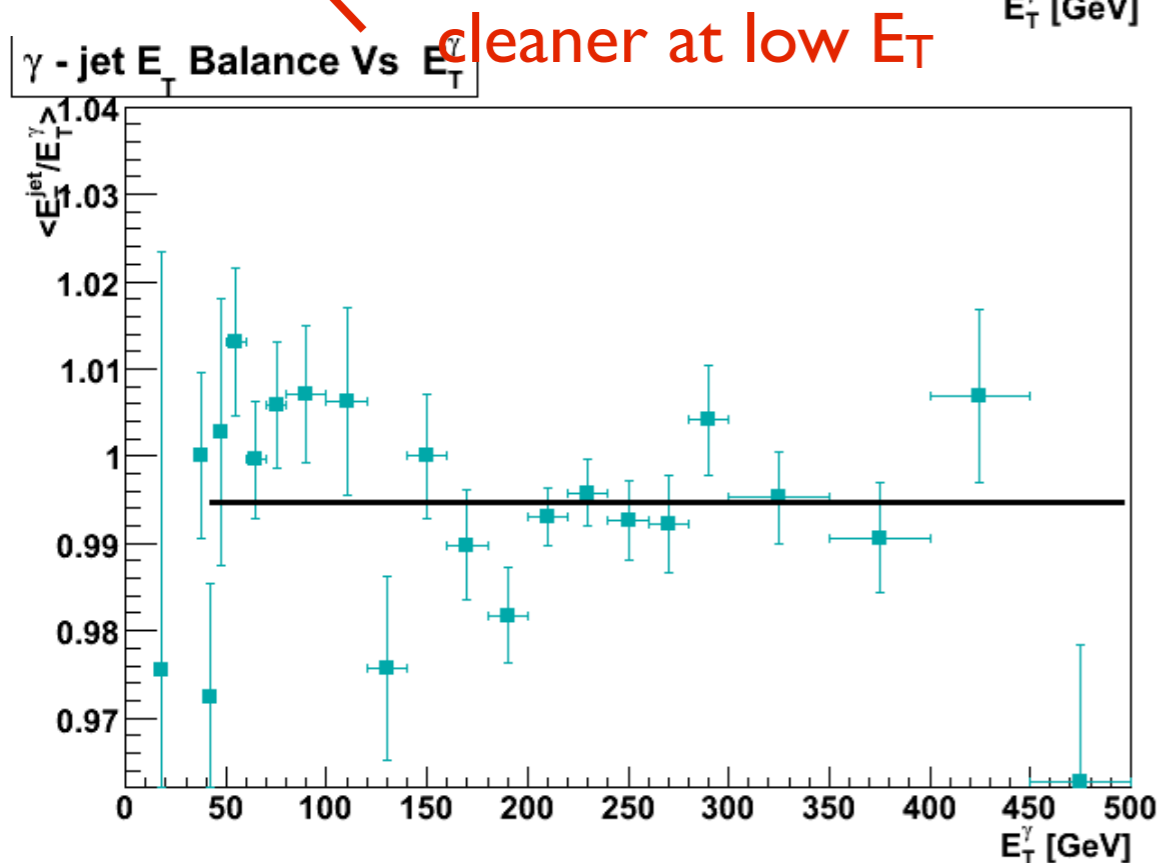
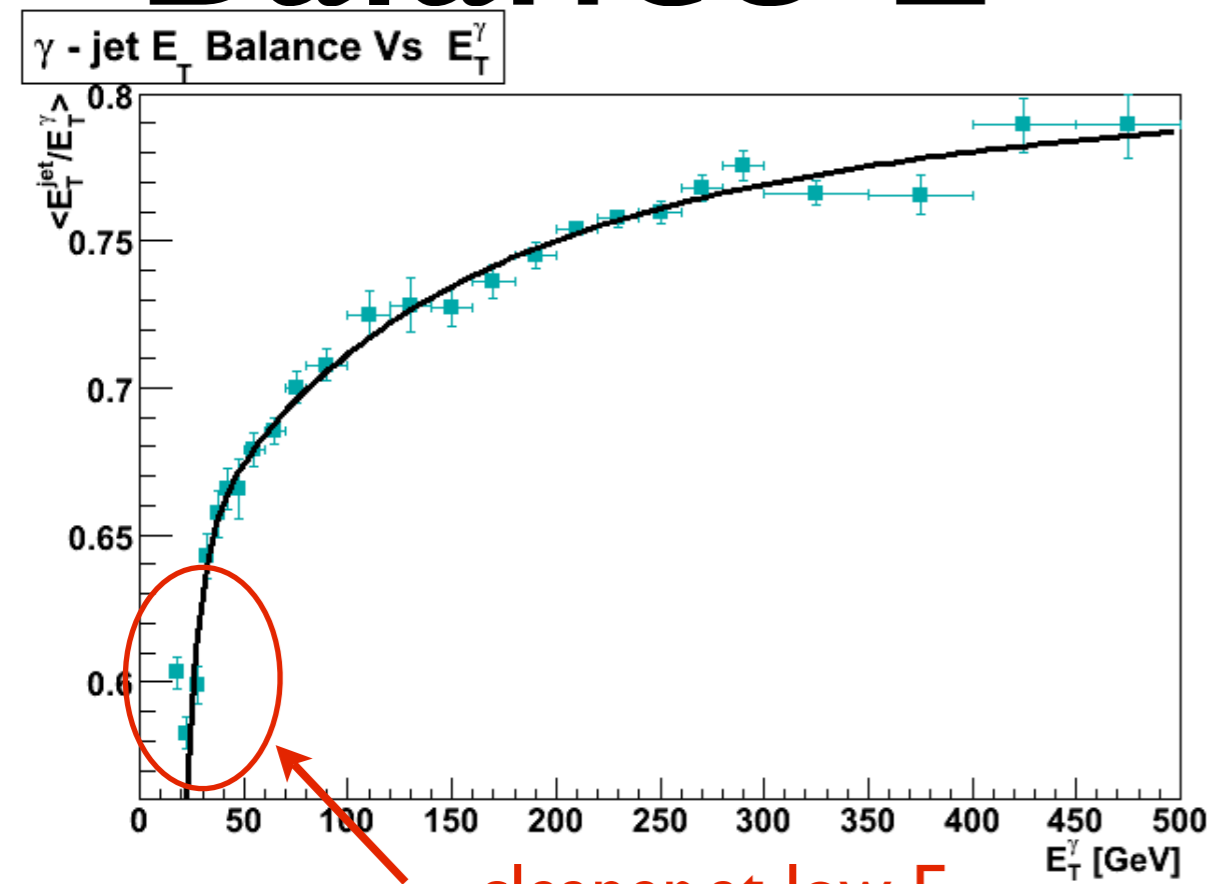
γ - jet E_T Balance Vs E_T^γ



γ - jet E_T Balance Vs E_T^γ



Balance $E_T^{2nd} / E_T^{1st} < 30\%$



EtBalancing vs Et gamma

