ECLCluster energy correction for release-00-06

ECL weekly meeting

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Outline

- Shift in reco'd energy observed in MC5 sample
  - confirmed by Anze with independent sample and tools
- Up to now, ad-hoc correction implemented in analysis package
  - obsolete correction
  - want to move it inside ecl package

- New correction needed for release-00-06

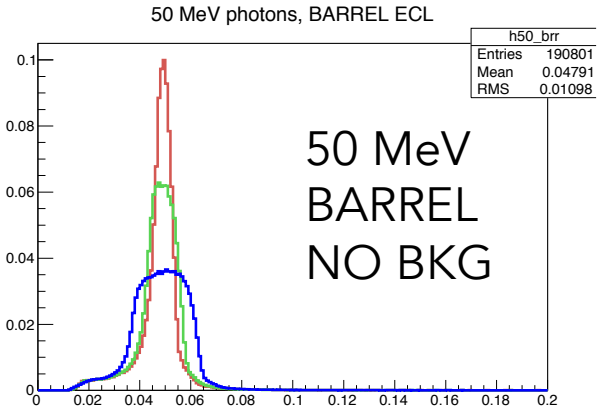
Samples

- use MC5 OFFICIAL PRODUCTION : B0B0bar generic events w and w/o machine bkg superimposed

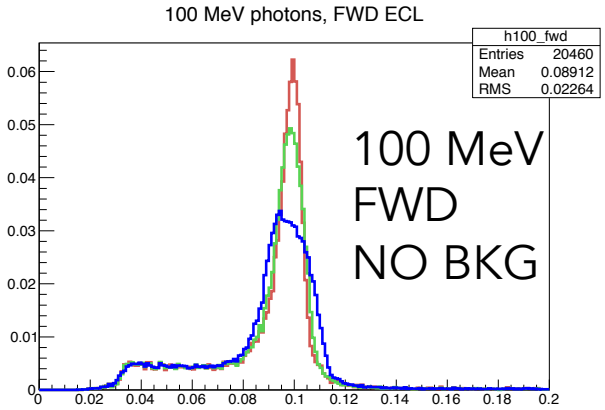
- Create single photon-like sample by:
  - choose energies of interest [E_{peak} = 50,100,150,200,250,300,350,400,450,500,550,600,650,700,750,800,850,900,950,1000 MeV]
  - select events with GENERATED energy in the range $E_{peak} \pm \sigma_{fit}$ with σ_{fit}= frac_sigma•σ_{TDR}
    frac_sigma= 1/2, 1/4, 1/8
  - studies performed separately for barrel, fwd and bwd

Choiche of optimal frac_sigma

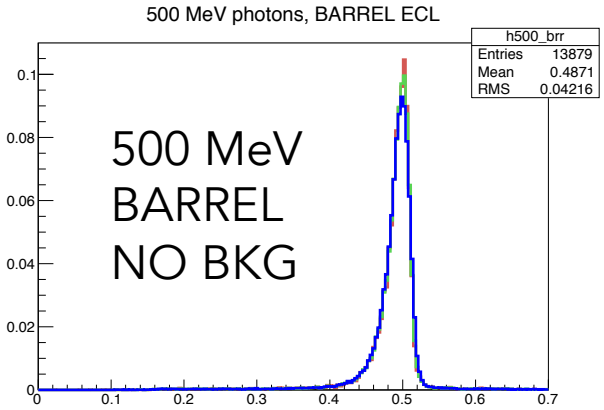
E_{reco} in $E_{true} \pm \sigma_{TDR}/2$
$E_{true} \pm \sigma_{TDR}/4$
$E_{true} \pm \sigma_{TDR}/8$



σ_{TDR}= 1.27 MeV

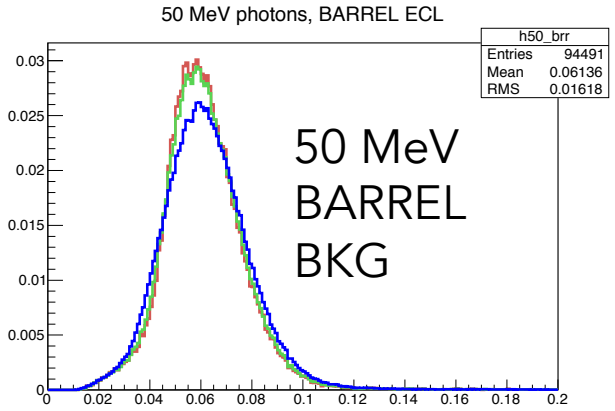


σ_{TDR}= 2.07 MeV



σ_{TDR}= 8.28 MeV

- no BKG sample:
  - reconstruction effects visible in $E_{true} \pm \sigma_{TDR}/2$ distribution
  - effects mitigated at higher energy
- BKG sample
  - bkg effects dominates on reconstruction ones

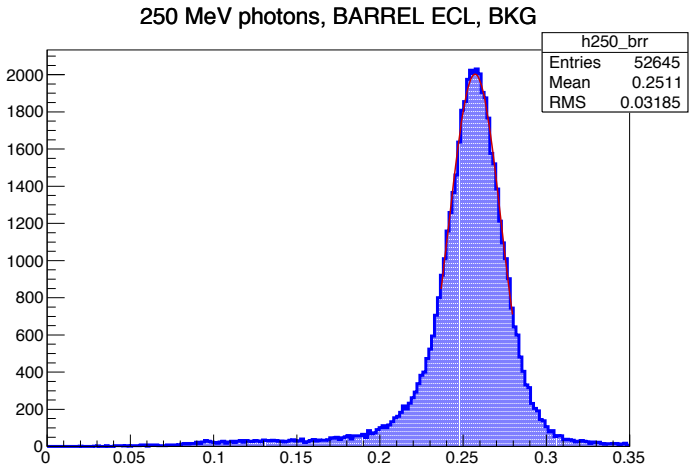


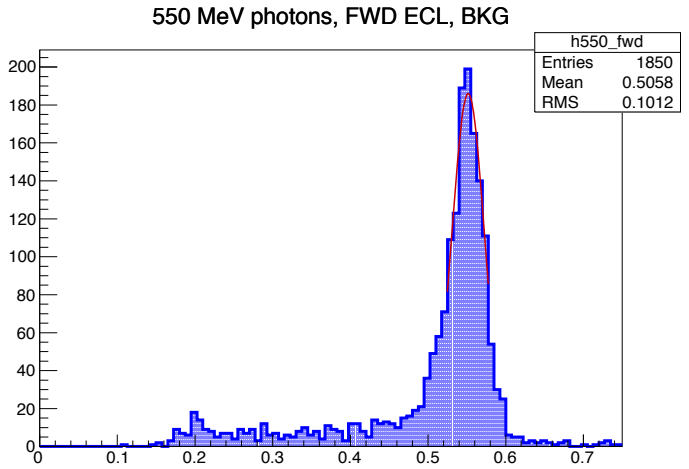
σ_{TDR}= 1.27 MeV

--> $E_{true} \pm \sigma_{TDR}/2$ chosen for the following studies

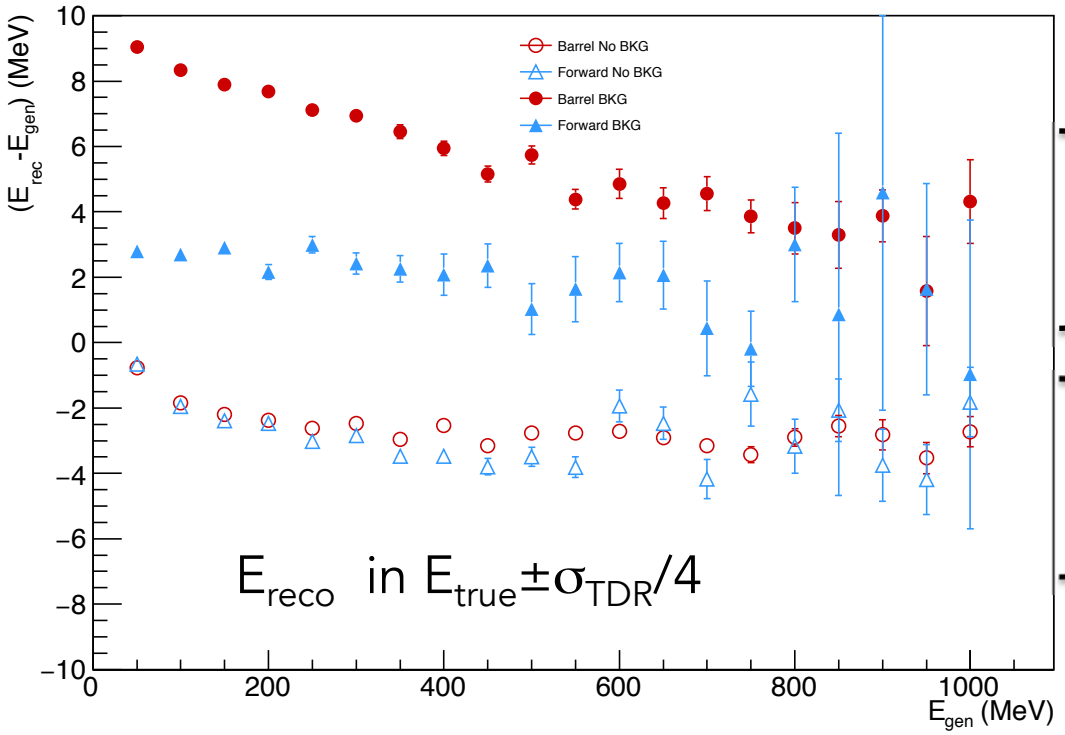
Gaussian fits

- For this study, only peak position matters
  - fit reco'd energy distribution with Gaussian around peak position (instead of asymmetric function, e.g. Crystal Ball or Novosibirsk used so far for resolution studies)





Corrections vs energy (I)

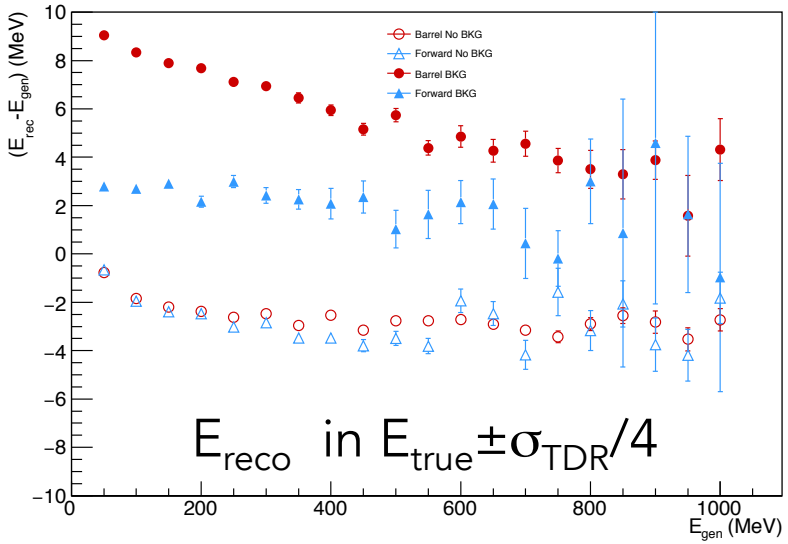


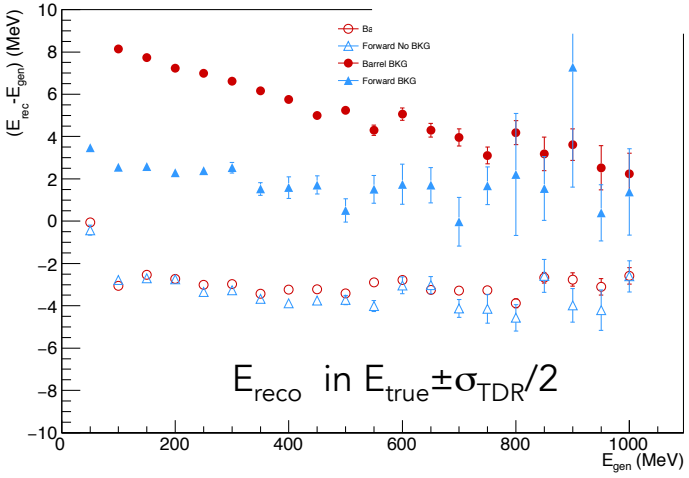
w BKG sample:
- correction slowly decreasing with energy
- large difference between barrel and fwd

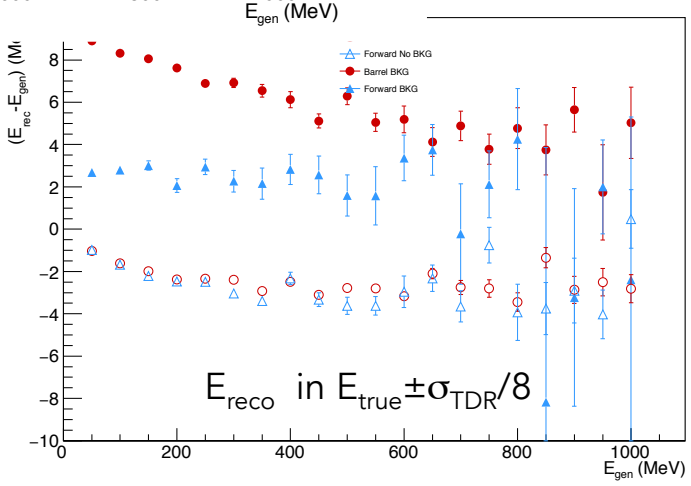
w/o BKG sample:
- correction slowly decreasing with energy
- similar trend for barrel and fwd
- fits to be improved, trend should not change

- w BKG, barrel seems to be performing worse than FWD
  - effect already observed with resolution studies presented at b2gm, not yet understood

Corrections vs energy (II)



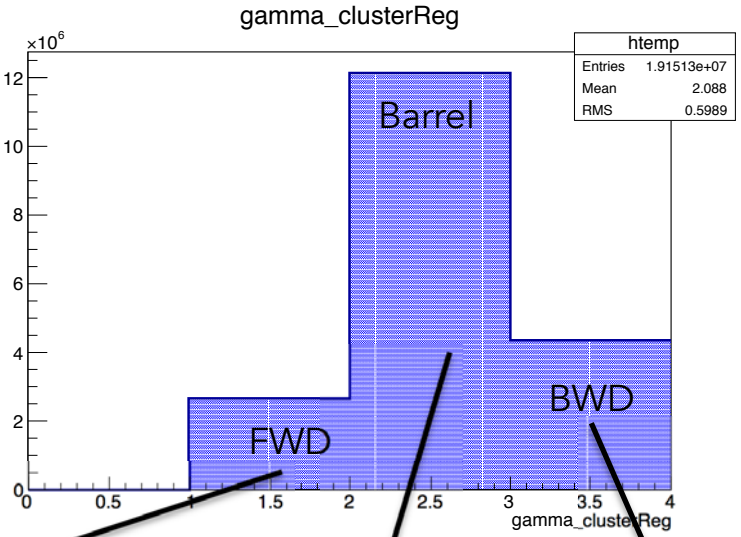


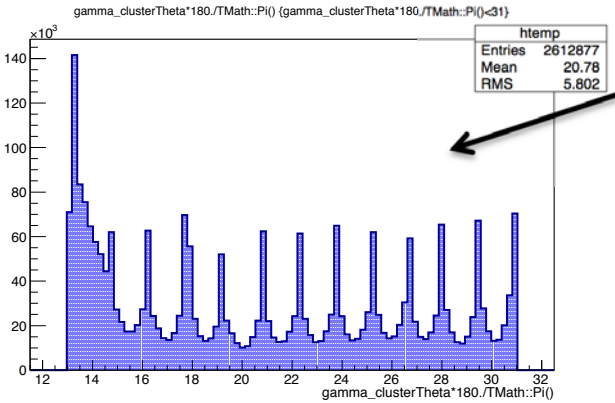


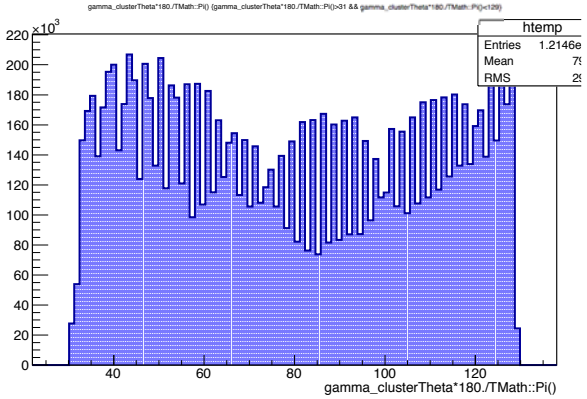
- similar results for the three frac_sigma options

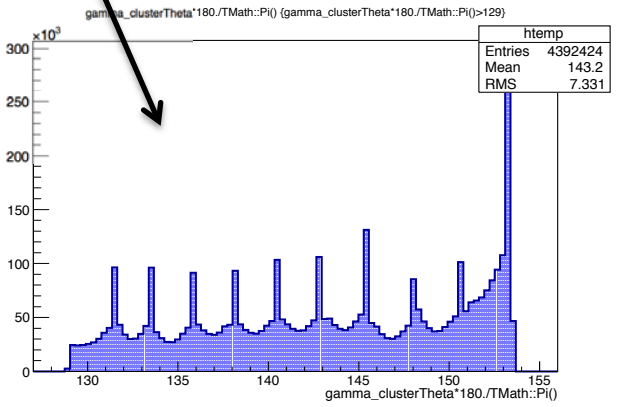
Angular acceptance X-check

B0B0bar with machine bkg









Still work in progress

- correction factors for bwd
- corections vs theta

- Guglielmo has set up the code to incorporate the correction in the ecl package, config files with constants to be committed