

ATLAS RHUL Meeting

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Problems with ATLFAST I in v14 - jets

➤ Zero energy jets:

Atlfast-1 jets when running in 14.5.X have zero energies. Problem occurs when reading in jets from an AOD file that were produced in 14.5.X. This happens even if you are reading the jets into a very up to-date release like 15.2.0. It appears to be a problem with the jet TP converters, and is not something that can easily be fixed.

➤ Solution:

- produce the jets in the same job as running on them, avoiding the TP conversion.
- produce the AODs in release 15!

Problems with ATLFAST I in v14 - photons

➤ Flipping Photons:

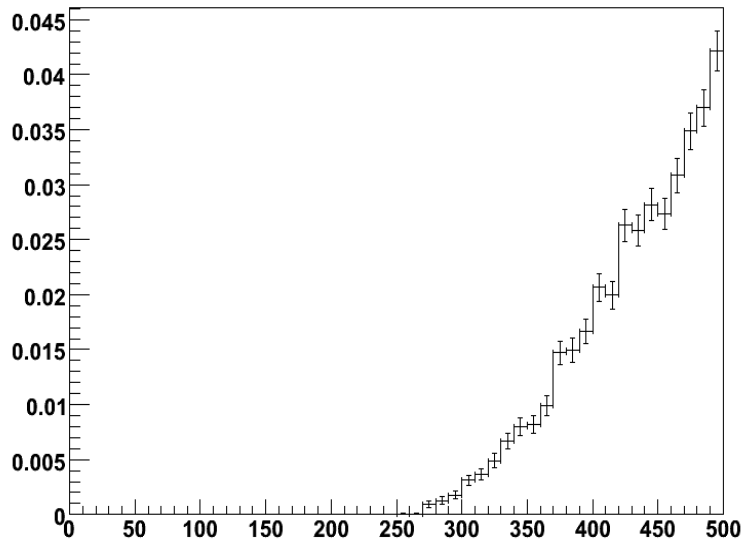
High pT Atlfast photons appear to flip direction during reconstruction. e.g.

```
> ----- Truth Photon(s) -----  
> [index] [pt] [eta] [phi]  
> 0 420418 -2.33433 -1.26303  
> -----  
> ----- Reco Photon(s) -----  
> [index] [pt] [eta] [phi]  
> 0 -429313 2.33433 1.87856
```

Problems with ATLFAST I in v14 - photons

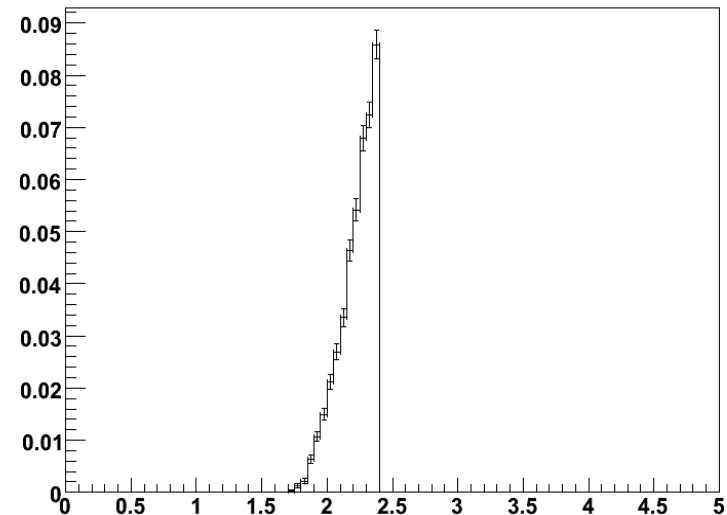
- Scale of the problem (γ s in a single γ ($E_{t80-500\text{GeV}}$) sample):

Un Matched Pt Efficiency



How far in pT does this go?

Un Matched Eta Efficiency

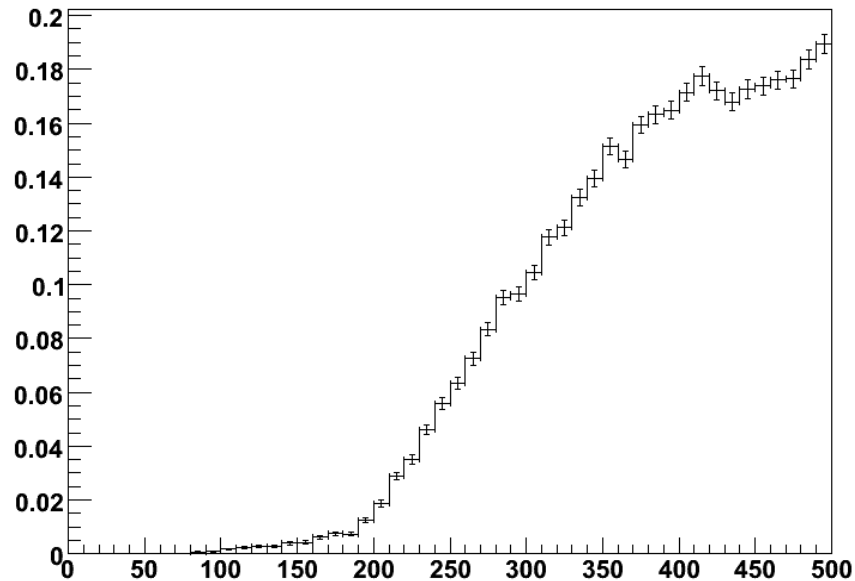


Upto a 10% effect in eta

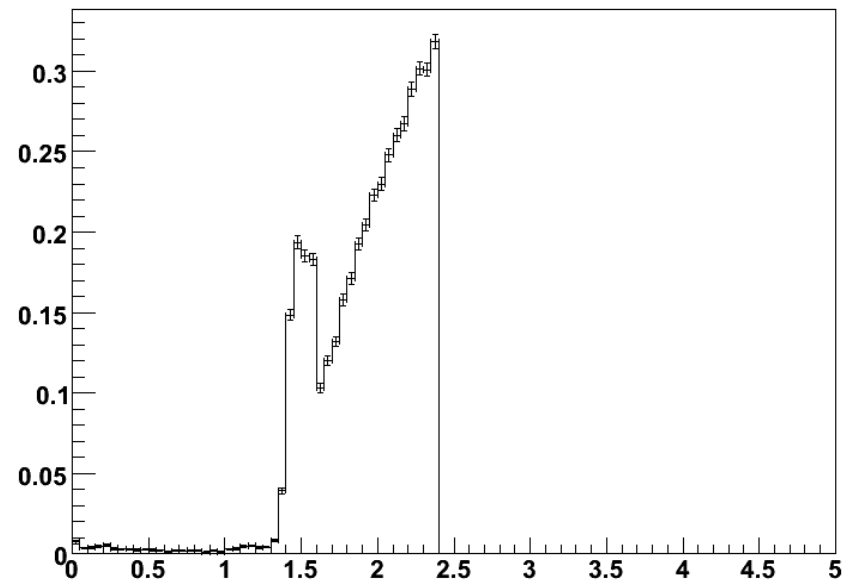
Problems with ATLFAST I in v14 - photons

- Scale of the problem (isolated γ s in a single γ ($E_{t80-500\text{GeV}}$):

Un Matched Pt Efficiency



Un Matched Eta Efficiency



Upto a 30% effect in eta with a crack region appearing!

Problems with ATLFAST I in v14 - photons

- Cause of the problem:
 - Originates in the PhotonSmearer routine (later called PhotonReconstructor). Since r13 a new eGamma param from the eGamma group was used to smear photons.
 - Works by making a linear interpolation between points in eta and energy space, and applying a measured correction factor and width for the particle momentum.
 - Valid for photons in range of $\eta < 2.475$, $E < 1000$ GeV.
 - Problem is that it is not defined how photons close to and outside of this range are smeared – random value chosen!!
 - Author of routine is going to fix.