

ACD Recon Upgrade -- Cosmic Ray Tracks

Introduction

We would like to make sure to propagate tracks from Robert Johnson's cosmic-ray track finder to the the new ACD recon.

Implementation

AcidReconV2 appends the cosmic-ray track collection to the end of the primary track collection incrementing the track index by 100. The original merit variables added by Robert Johnson to the old AcidValsTools have been transposed into AcidValsTool. These cosmic-ray (CR) variables are broken into two sets: 1) CR variables which pick the "best" CR track for vetoing the event, 2) CR1 variables, choosing the cosmic-ray track with the most hits.

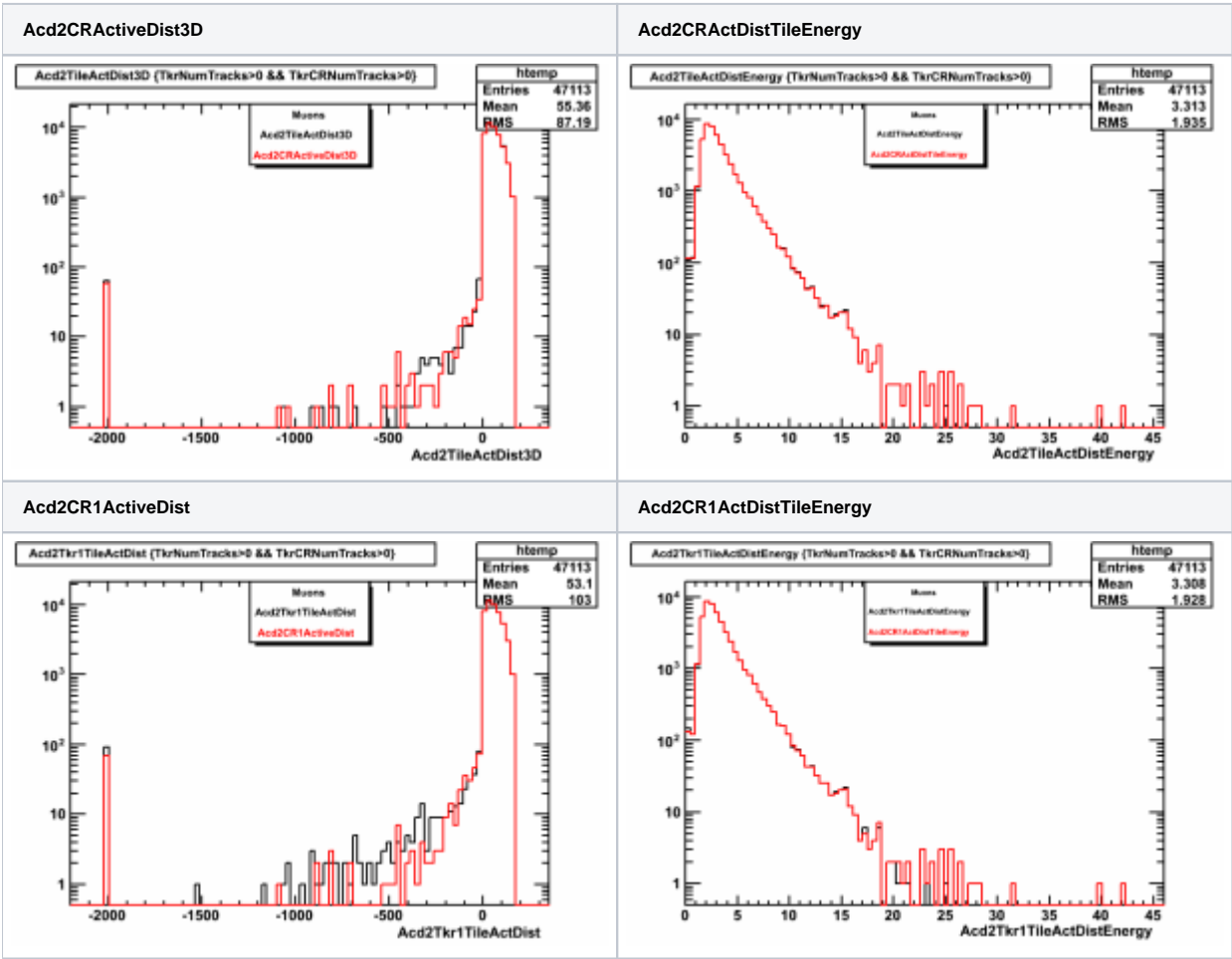
Validation

I've run a few streams of diagnostic muons and all gamma with the CR track finder turned on. It appears that the all of the Acid2CR variables are being filled. I look at a few variables in a bit more detail. Specifically I show comparisons between the distance to active tiles and the energy deposited in active tiles between the cosmic-ray tracks and the tree-based tracking. To compare on equal footing, I apply the cut:

```
"TkrNumTracks > 0 && TkrCRNumTracks > 0"
```

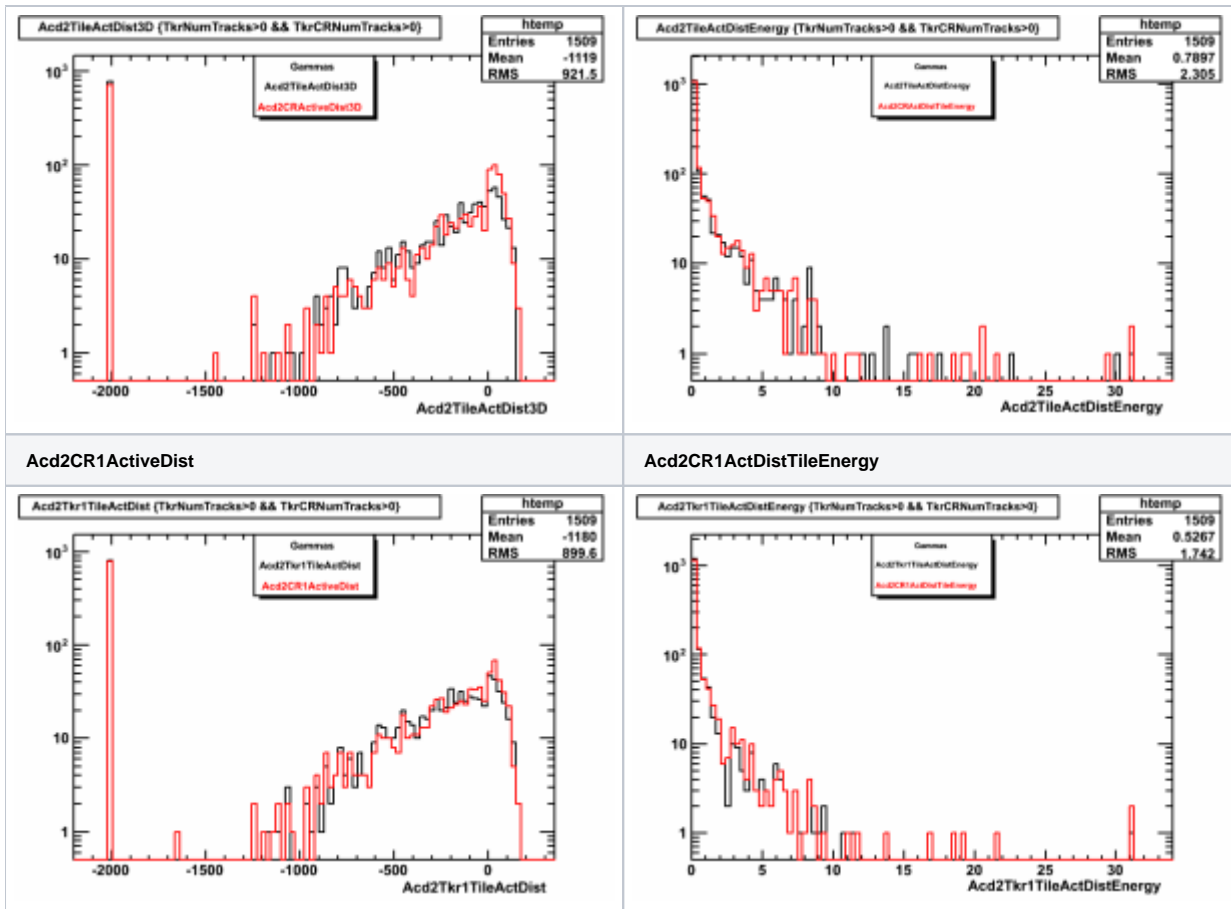
The distributions look very similar for both photons and muons.

Diagnostic Muons



All-Gamma

Acid2CRActiveDist3D	Acid2CRActDistTileEnergy
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CR-Only Tracks

To get a very precursory look at what we can gain from the CR tracking, I look at events in the muon sample where the CR tracker finds a track but the tree-based tracking does not:

```
TkrNumTracks==0 && TkrCRNumTracks > 0
```

I don't show them here, but there are a similar number of muon events for which the tree-based tracking finds a track and the CR tracker does not (actually there are about 15% more events of this type). Of course for gammas the tree based tracking does significantly better (by design).

Diagnostic Muons

