

# **Status of the Level-1 trigger algorithm studies**

**A. Somov, JLAB**

**Online meeting, Feb 28, 2008**

# Analysis overview

## Objective

Develop/verify a First Level Trigger (FLT) algorithm for high-luminosity runs. Use hit information from TOF, FCAL, BCAL (Start Counters)

## Method

1. Use MC simulation for hadronic events (Eugene's MC generator) to study
  - FLT rate/reduction ( $0.15 < E_{\gamma} < 12 \text{ GeV}$ )
  - FLT efficiency ( $8 < E_{\gamma} < 12 \text{ GeV}$ )
2. Perform electromagnetic background studies
- 3 Use MC simulation for 'signal' channels

# TOF occupancy

Use hits from

**HDDMTOFHit (no thresholds)**

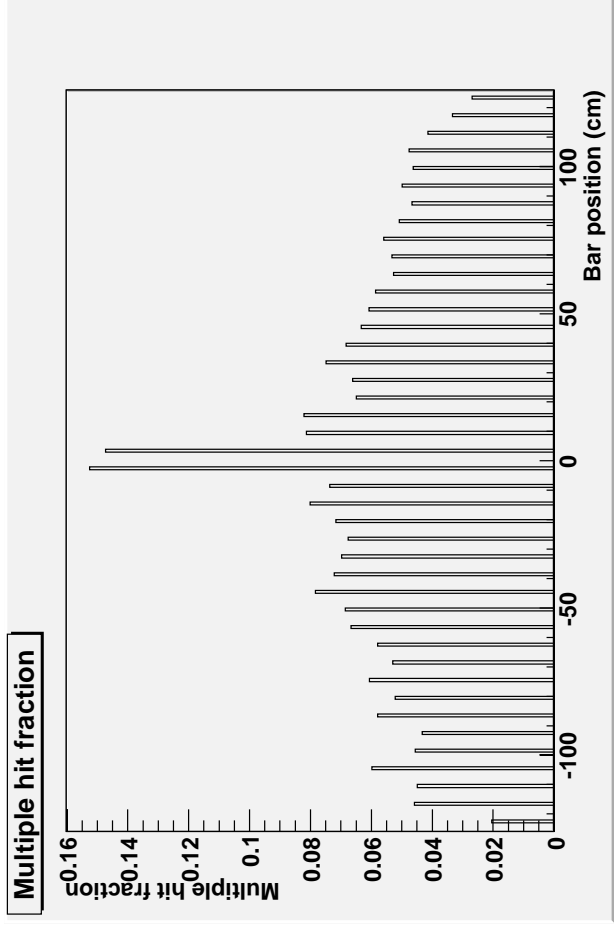
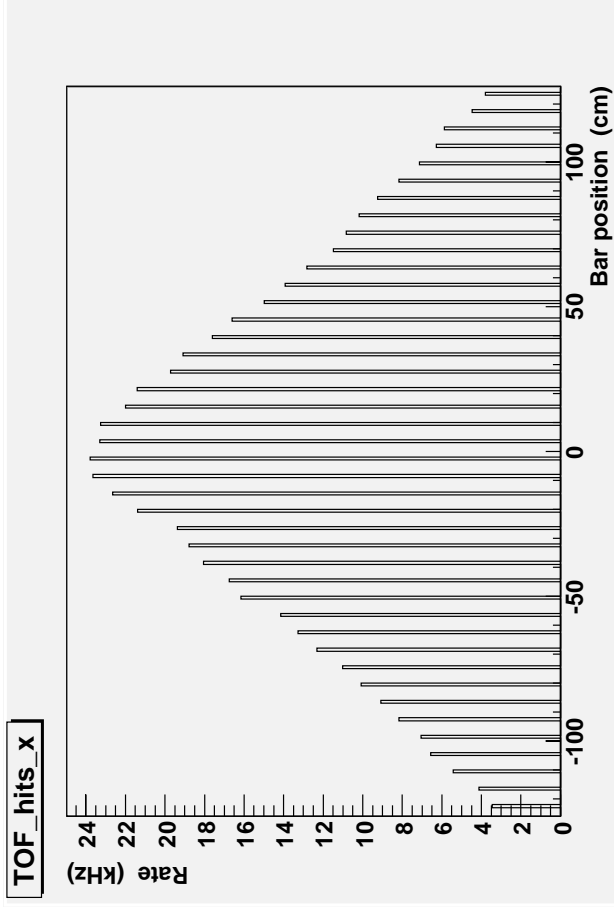
**HTOFMCResponse.**

‘Old’ digitization. Set threshold on the ADC channels:

ADC channel > 0, corresponds to 50 pC

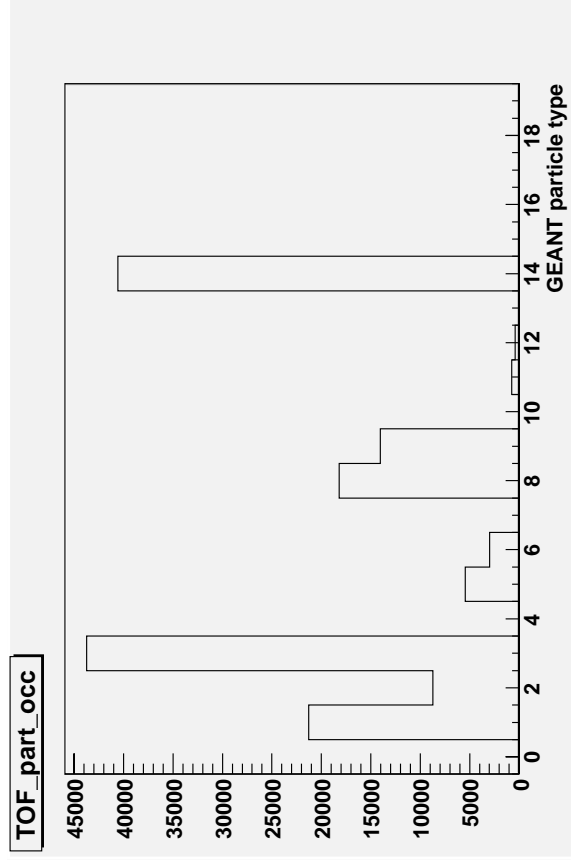
ADC channel > 4                      200 pC

Require ADC hits in both ends of the bar (except short bars)

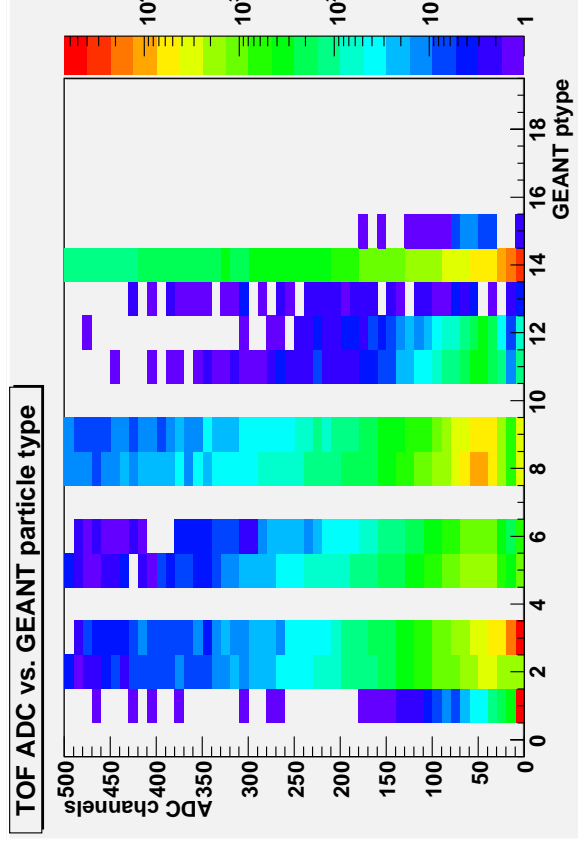


# TOF occupancy (cont'd)

ptype occupancy



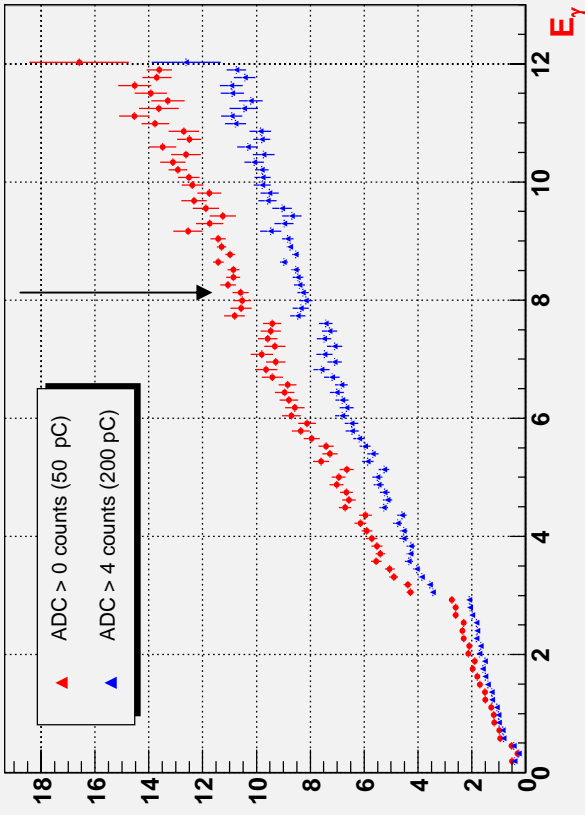
ADC vs ptype



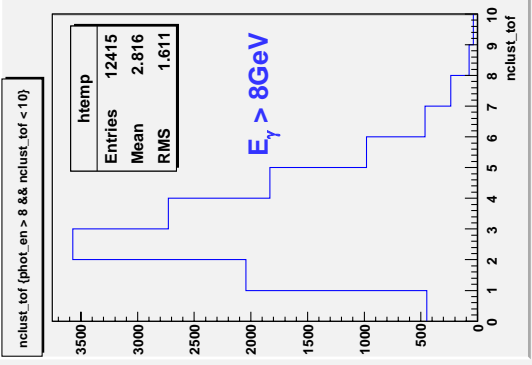
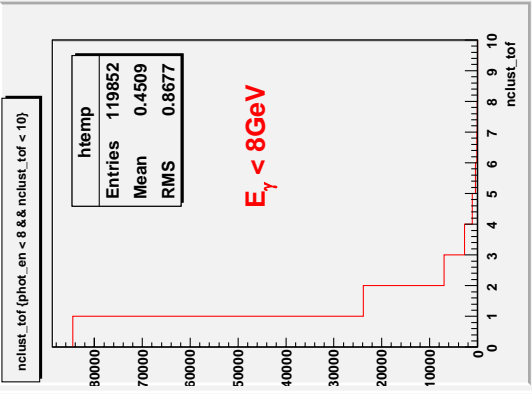
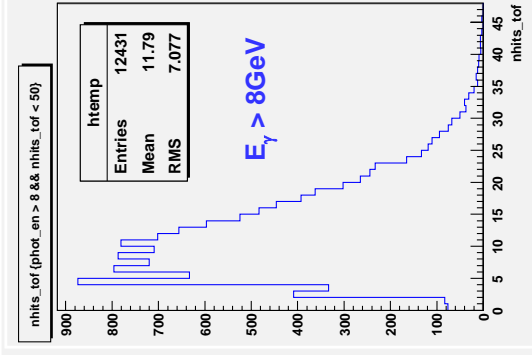
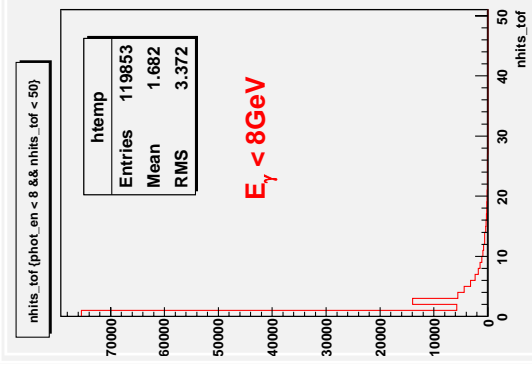
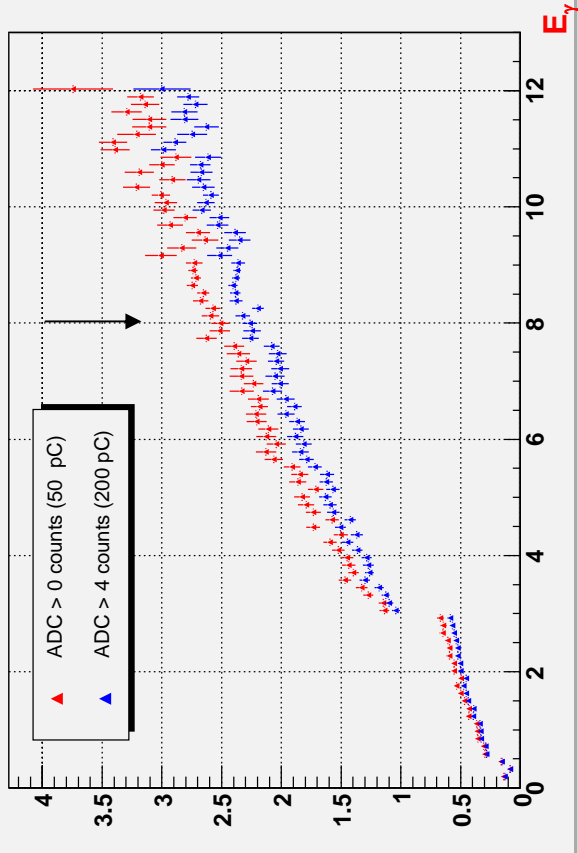
$\gamma$  e  $\mu$   $\pi$  K p

# TOF: #hits/tracks vs $E_\gamma$

nhits\_tof:phot\_en

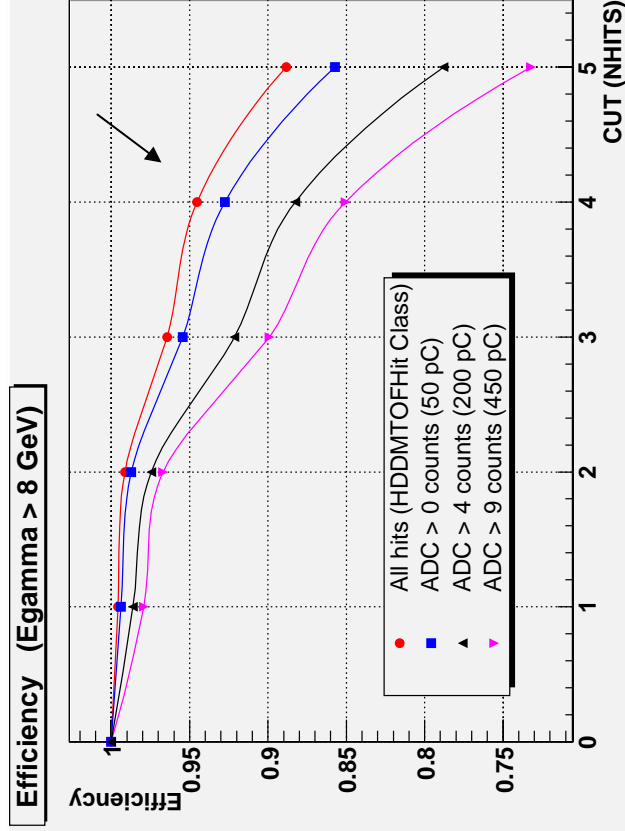


nclust\_tof:phot\_en

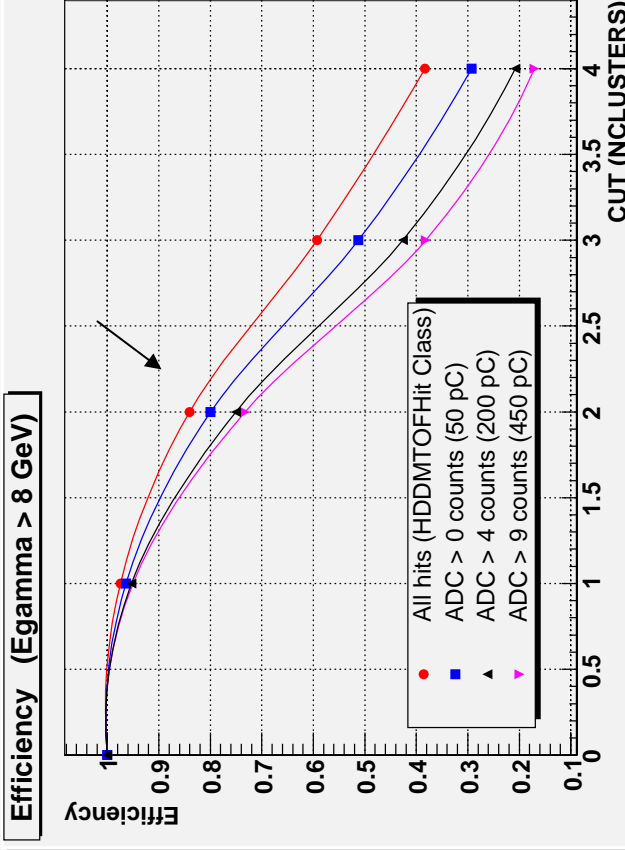


# TOF: Efficiency

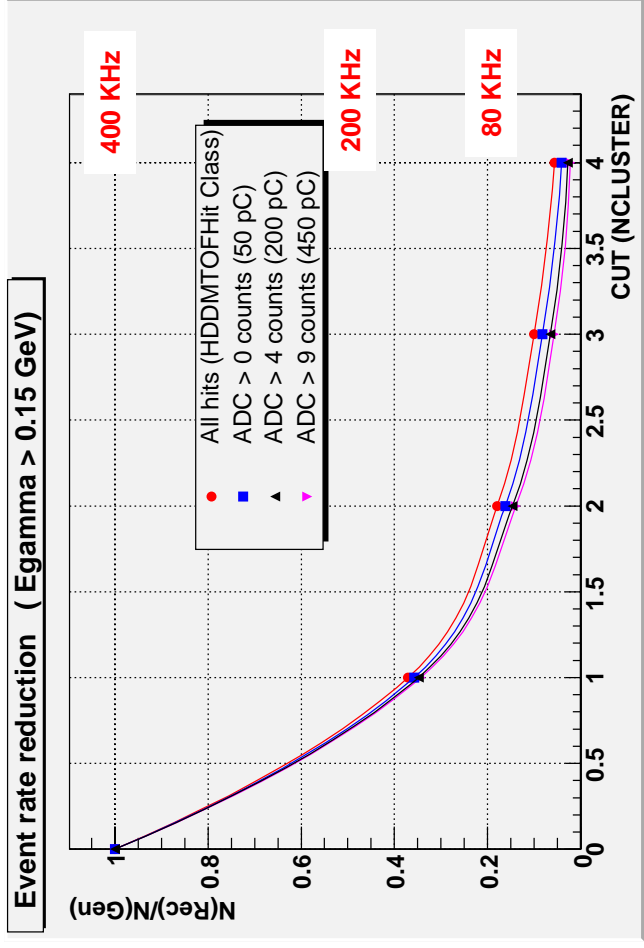
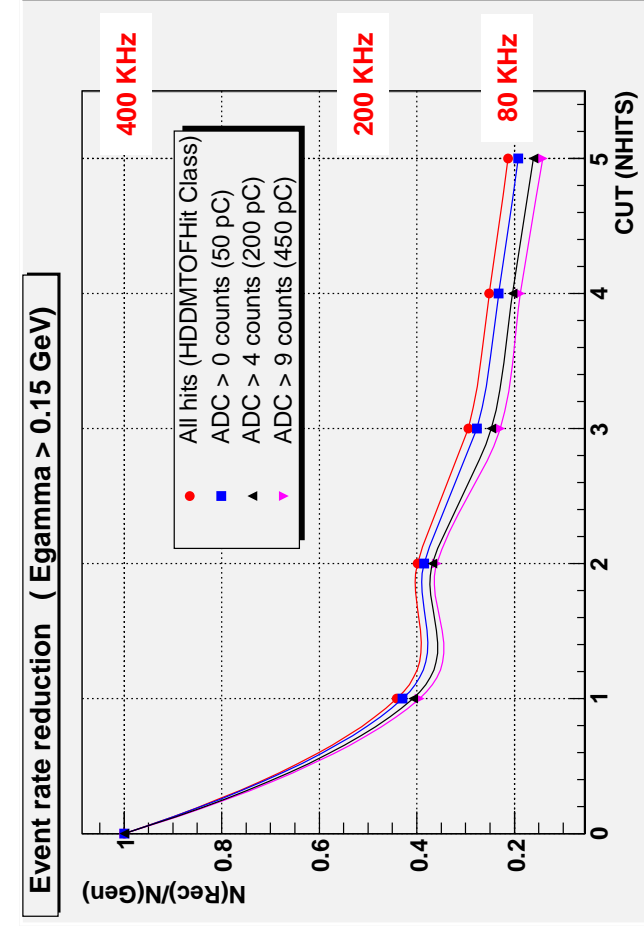
## Hits



## Clusters



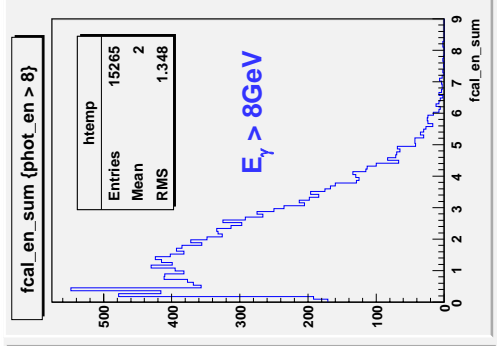
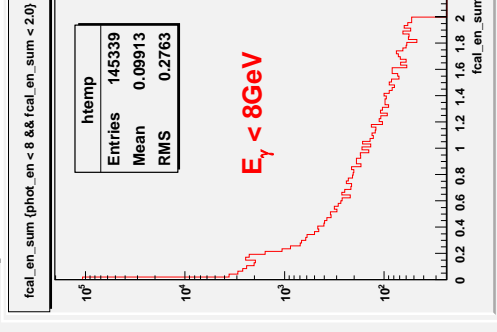
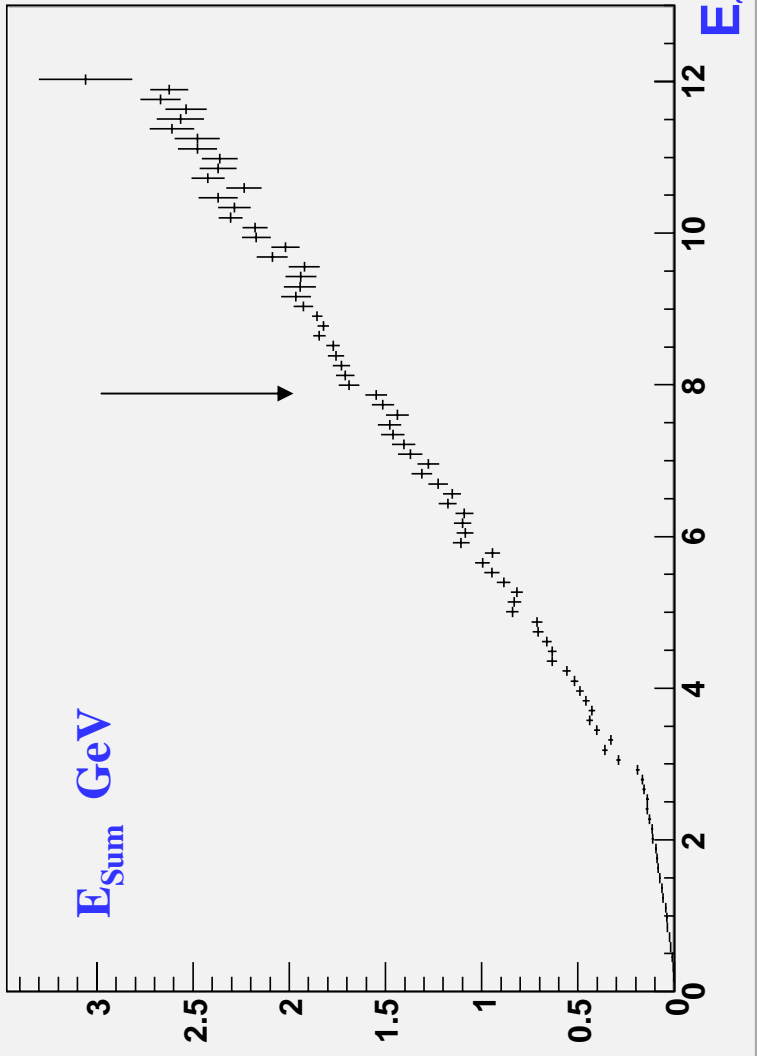
# TOF: FLT event rate reduction



# FCAL: $E_{\text{sum}}$

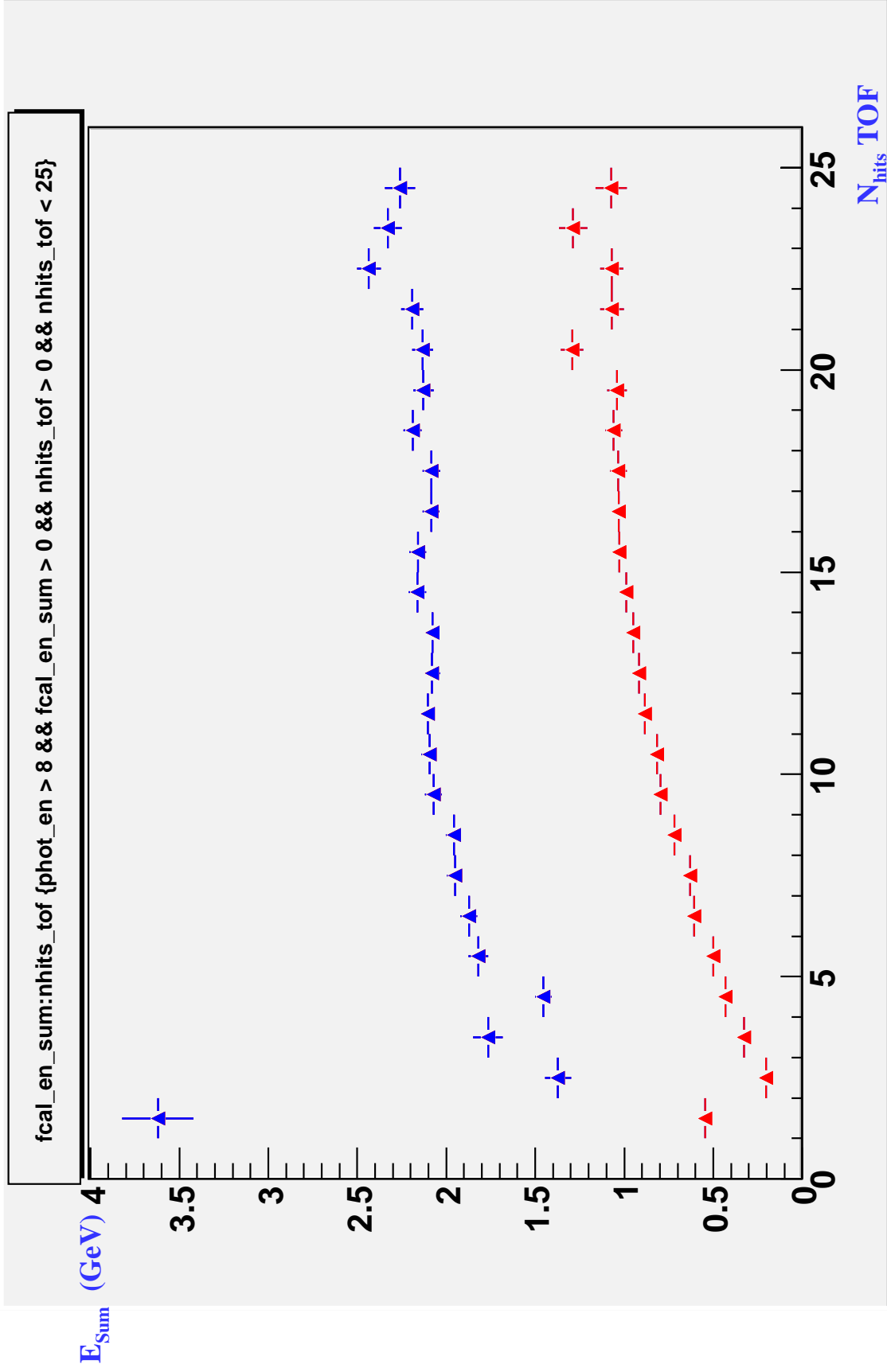
# vs $E_{\gamma}$

fcal\_en\_sum:phot\_en





# TOF FCAL correlations



# Next Steps

- **Include BCAL into analysis**
- **Study correlations among  $N_{\text{hits}}$   $E_{\text{sum}}$**
- **Study electromagnetic background**