Kinematics of Exclusive π^0 Production for JEF

7/16/21

Motivation

- Azizah studying two-photon gun samples
  - Test island algorithm merging/splitting for a particular opening angle, E_γ, etc.

- Exclusive π^0 production provides exclusive channel with small opening angle, high energy, statistics

- A good topology if/when transitioning to real data

- Today:
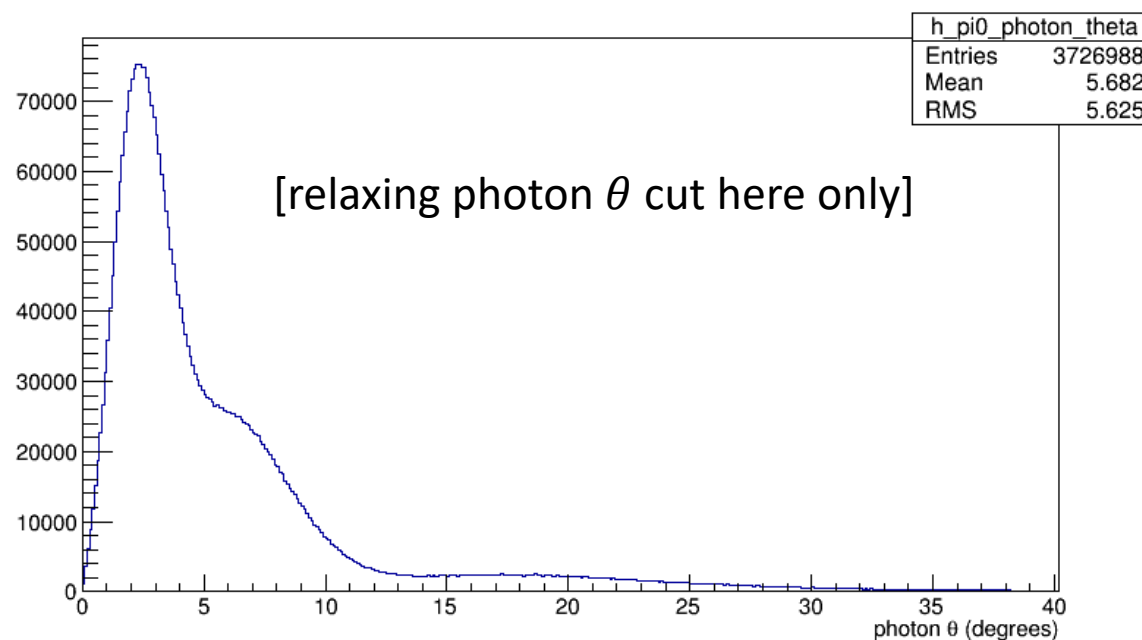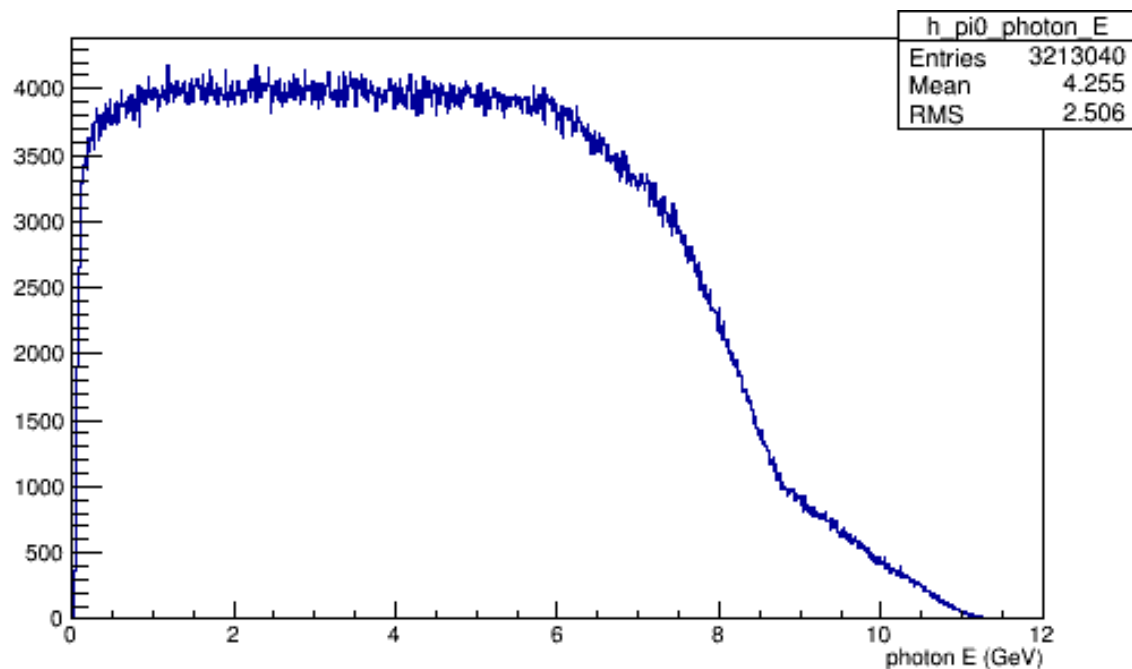 - Just want a rough sense of photon kinematics, opening angle to inform Azizah + others

gen_pi0 Sample

- gen_pi0:
  - Uses Vincent's Regge model of process $\gamma p \rightarrow \pi^0 p$
  - Models distribution of events in beam E, t

- Thrown trees from a 50 M event sample
  (no reconstruction!)

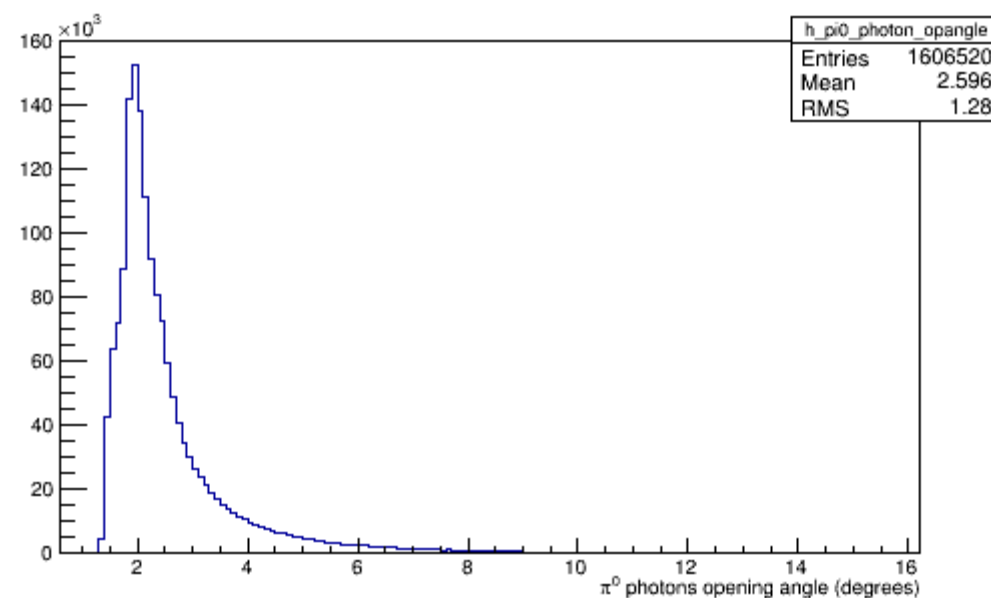- Thrown 4-vectors
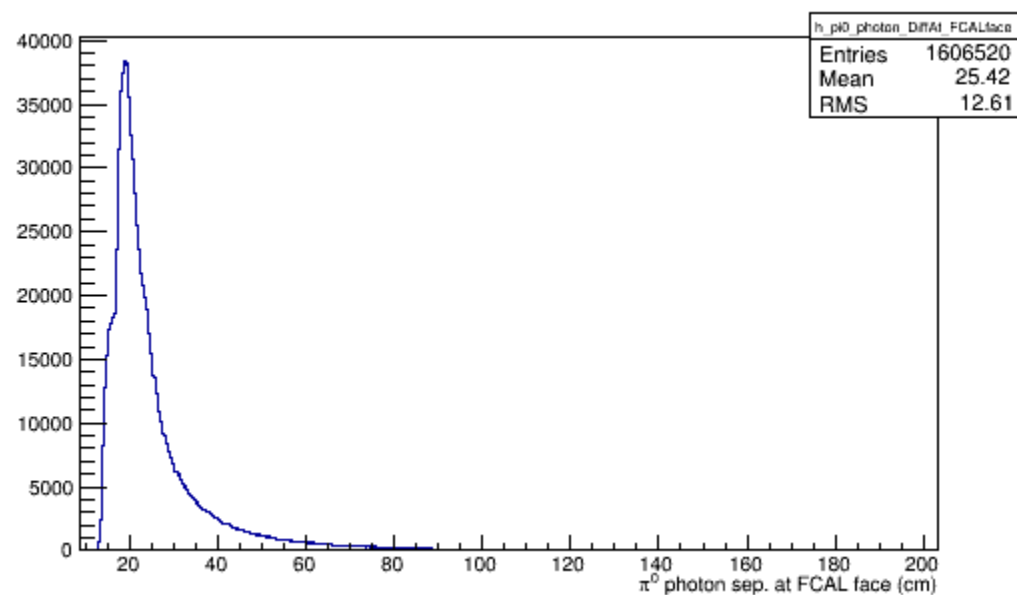 - Require both photons $\theta < 10.5°$

A few 1D distributions

[relaxing photon θ cut here only]

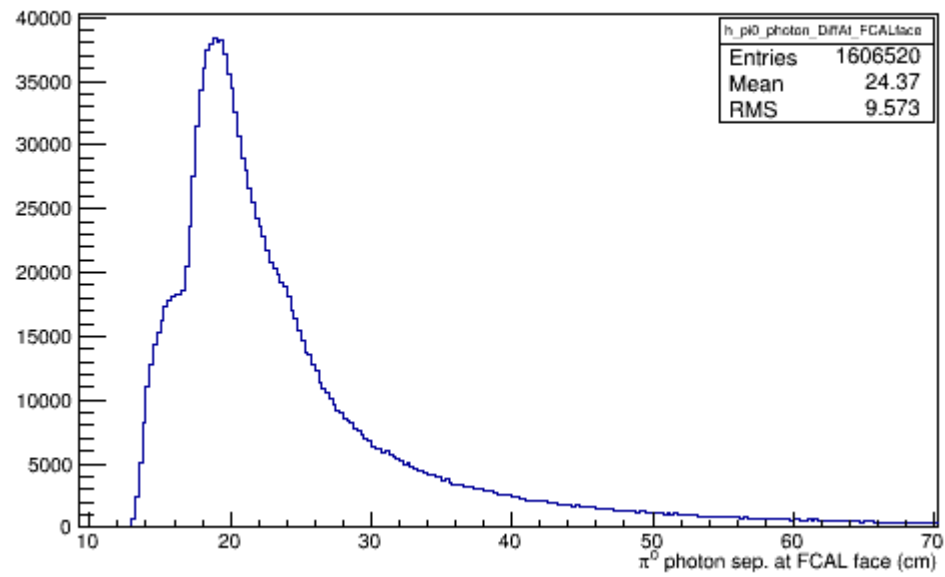(filled once for each photon)

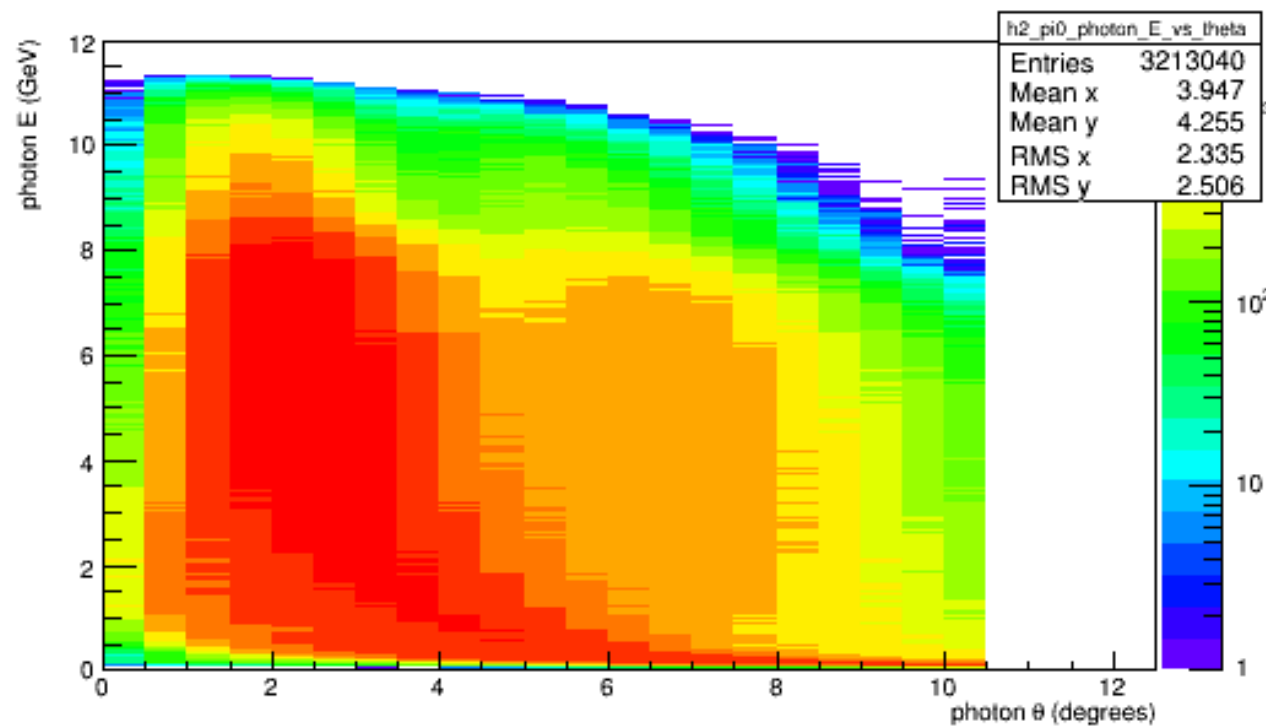# Separation at FCAL Face / Opening Angle
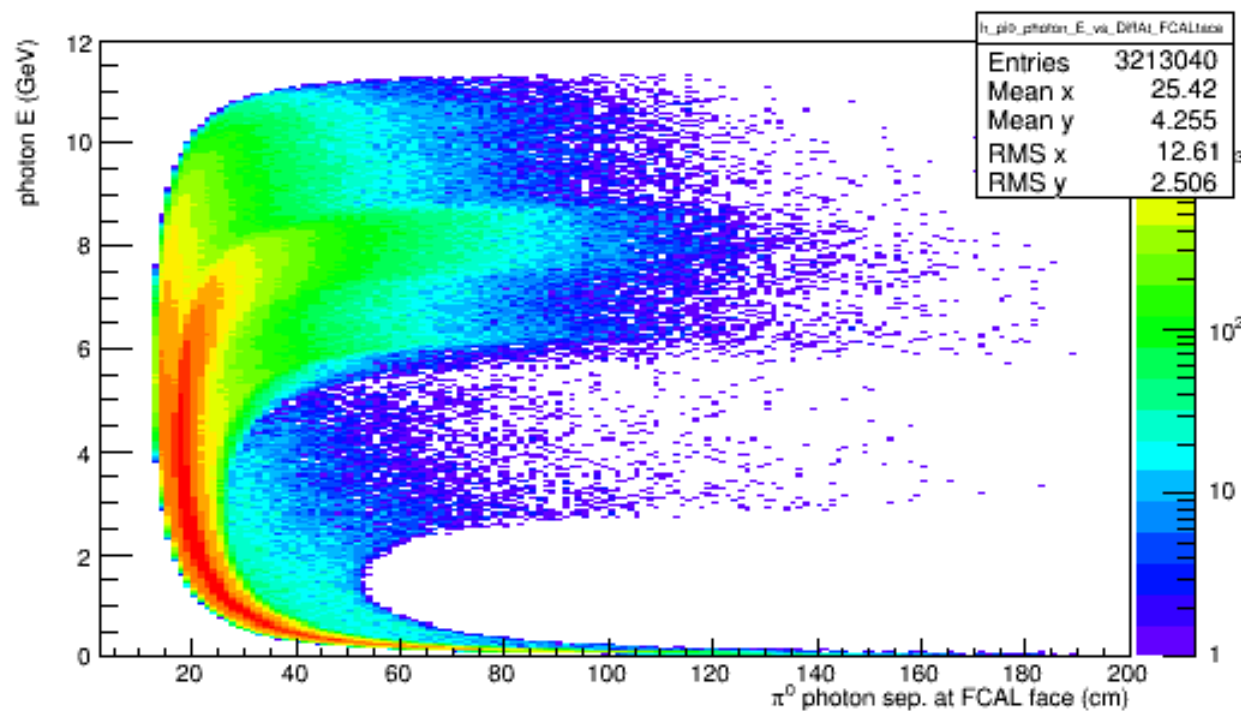

FCAL diameter is about 228 cm

Zoomed in

2D Distributions

2D Distributions

2D Distributions