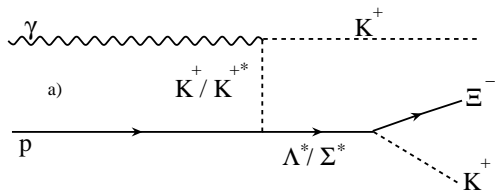# Cascade Simulations Update

Nathan Sparks
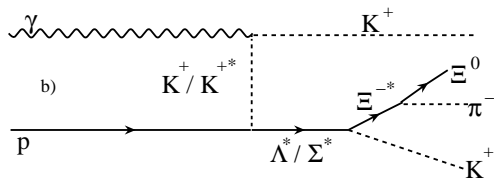
Florida State University, Tallahassee, Florida

January 30, 2012

Possible Production Mechanism

$K^+(\Xi^- K^+)$, $K^+(\Xi^0 K^0)$, $K^0(\Xi^0 K^+)$

Production of excited states via a

1. forward-going K^0 meson
   ➔ $K^0 (\Xi^- \pi^+) K^+$, etc.
2. forward-going K^+ meson
   ➔ $K^+ (\Xi^- \pi^+) K^0$,
 $K^+ (\Xi^0 \pi^-) K^+$, etc.

Procedure

Photoproduction of $\Xi^-(1320)$ and $\Xi^0(1315)$ using 9 GeV photons

- t-channel production using the genr8 program
- Reactions and decay chains
  - $\gamma p \to K^+ Y^*$ with $Y^* \to K^+ \Xi^-$, $\Xi^- \to \Lambda \pi^-$, $\Lambda \to \pi^- p$
  - $\gamma p \to K^+ Y^*$ with $Y^* \to K_s \Xi^0$, $\Xi^0 \to \Lambda \pi^0$, $\Lambda \to \pi^- p$, $K_s \to \pi^+ \pi^-$, $\pi^0 \to \gamma\gamma$
  - $\gamma p \to K_s Y^{*+}$ with $Y^* \to K^+ \Xi^0$, $\Xi^0 \to \Lambda \pi^0$, $\Lambda \to \pi^- p$, $K_s \to \pi^+ \pi^-$, $\pi^0 \to \gamma\gamma$
- Excited hyperon parameters:
  m(Y^*) = 1960 MeV and $\Gamma(Y^*)$ = 220 MeV
  from (Guo *et al.*, PRC **76**, 025208 (2007))
- t-channel slope parameter: 1.4 (GeV)$^{-2}$
- Swim particles through GlueX detectors using HDGeant
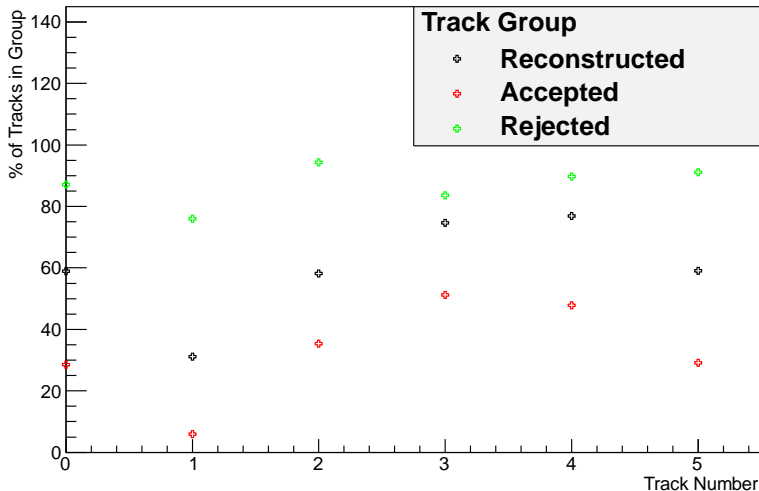 (minimal control.in file with HADR==0)

Number of low FOM Tracks before Pruning

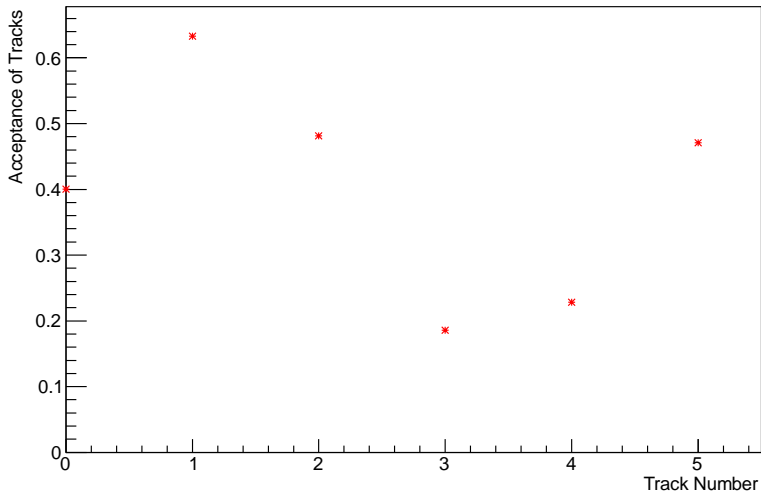% of Tracks with χ^2 Probability < 0.01
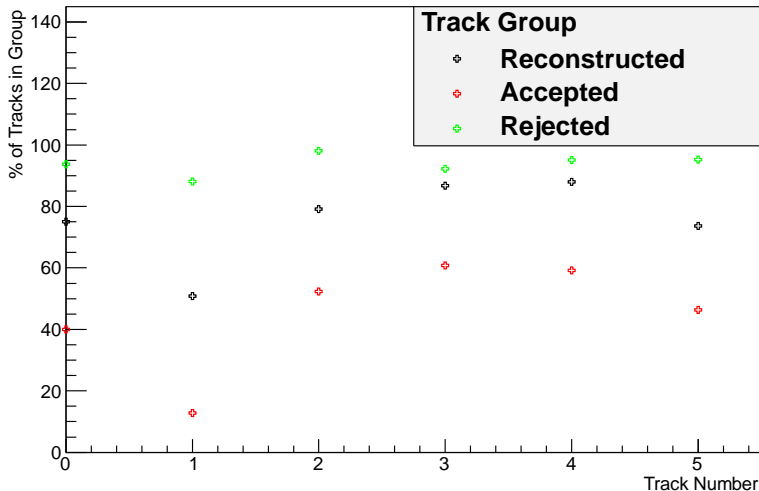
Number of low FOM Tracks after Pruning

% of Tracks with χ^2 Probability < 0.01

Acceptance before Pruning

Acceptance after Pruning