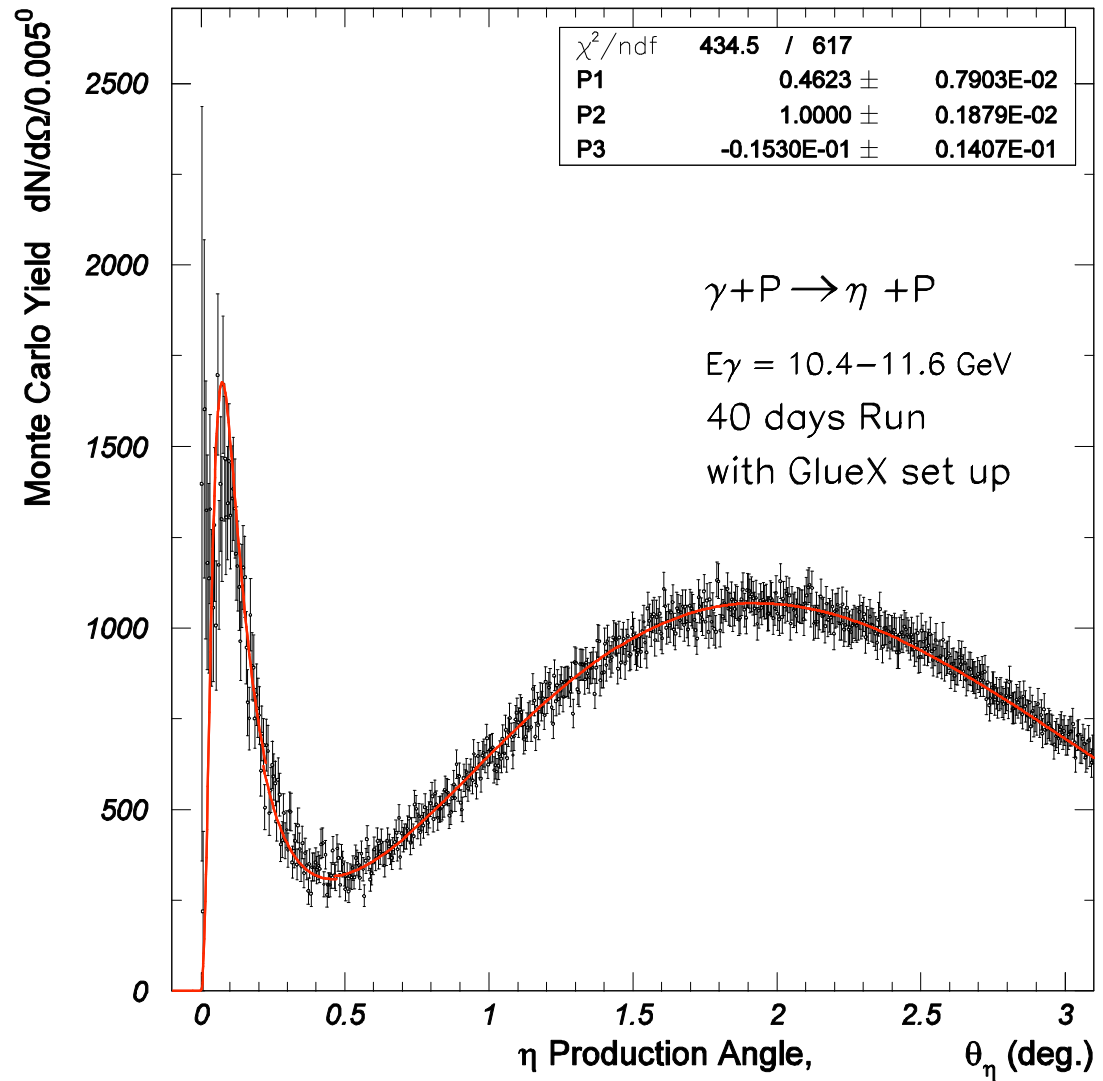# Eta Primakoff Proposal Update for Presentation
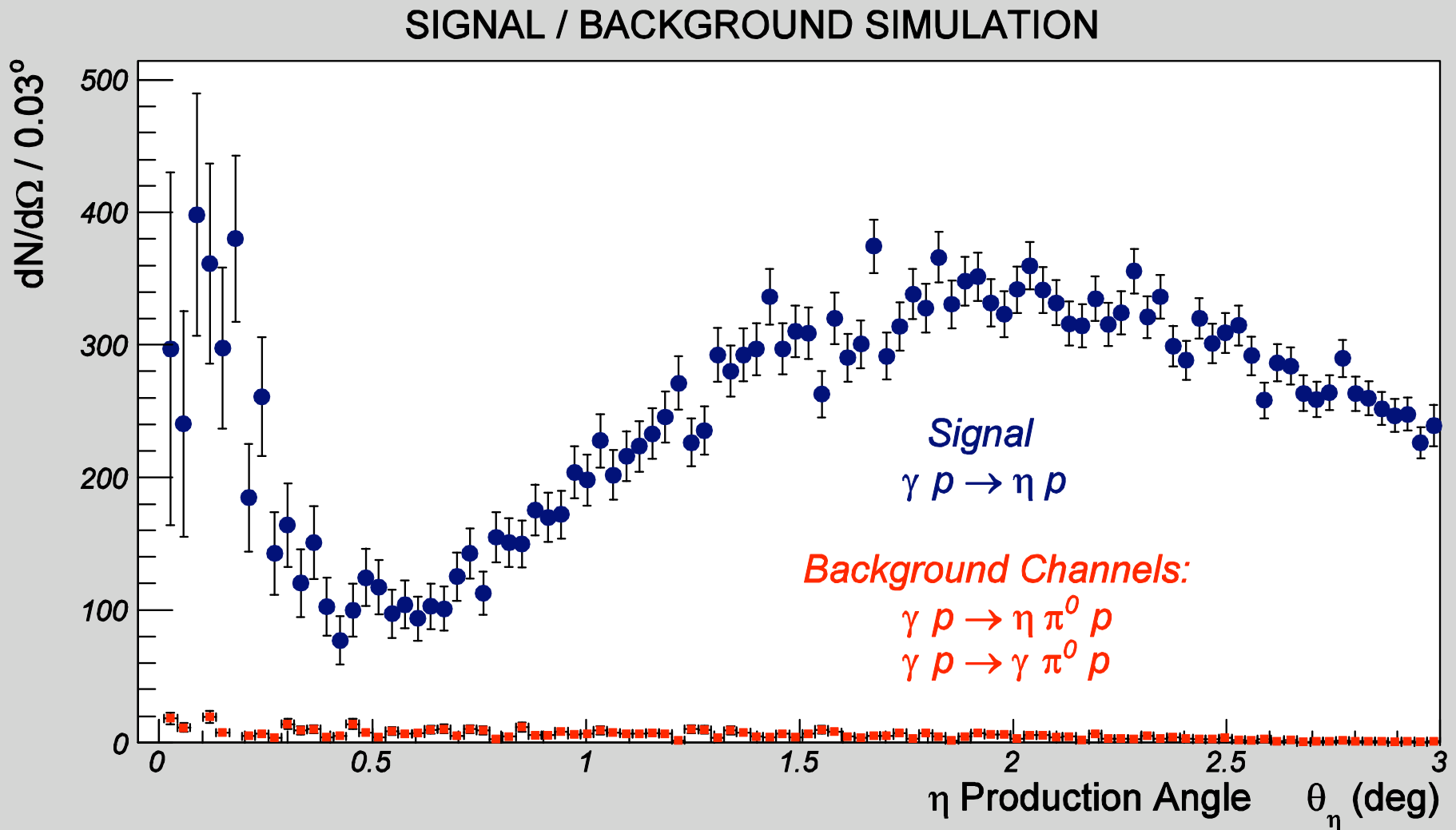
Full Statistics Fit for Hydrogen Target

χ^2/ndf **434.5 / 617**

P1	0.4623 $\pm$	0.7903E-02
P2	1.0000 $\pm$	0.1879E-02
P3	-0.1530E-01 $\pm$	0.1407E-01

$\gamma + P \longrightarrow \eta + P$

$E\gamma = 10.4 - 11.6$ GeV

40 days Run

with GlueX set up

Monte Carlo Yield $dN/d\Omega/0.005^0$

η Production Angle, θ_η (deg.)

Full Statistics Fit for ^{4}He Target

χ^2/ndf **222.0 / 406**

P1	$0.4572 \pm$	0.8551E-02
P2	$0.9659 \pm$	0.1430E-01
P3	$-0.9125 \pm$	0.4198E-01
P4	$1.015 \pm$	0.4048E-02

$\gamma + {}^4\mathrm{He} \rightarrow \eta + {}^4\mathrm{He}$

$E\gamma = 10.4 - 11.6$ GeV

30 days Run
with GlueX set up

Monte Carlo Yield $dN/d\Omega/0.01^0$

η Production Angle, θ_η (deg.)

Physics Background with Signal

SIGNAL / BACKGROUND SIMULATION

Signal
$\gamma\, p \to \eta\, p$

Background Channels:
$\gamma\, p \to \eta\, \pi^0\, p$
$\gamma\, p \to \gamma\, \pi^0\, p$

y-axis: $dN/d\Omega$ / $0.03°$

x-axis: η Production Angle $\quad \theta_\eta$ (deg)

Physics Background with Signal

SIGNAL / BACKGROUND SIMULATION

Plot axes: $dN/d\Omega$ / $0.03°$ (vertical), η Production Angle θ_η (deg) (horizontal)

$\gamma\, p \rightarrow \eta\, p$ (Signal)

$\gamma\, p \rightarrow \eta\, \pi^0\, p$ (Background)

Physics Background with Signal

SIGNAL / BACKGROUND SIMULATION

Signal
$\gamma\, p \rightarrow \eta\, p$

Background Channels:
$\gamma\, p \rightarrow \eta\, \pi^0\, p$
$\gamma\, p \rightarrow \gamma\, \pi^0\, p$
$\gamma\, p \rightarrow \eta\, \pi^+\, n$

y-axis: $dN/d\Omega$ / 0.03°

x-axis: η Production Angle θ_η (deg)

Beam Background in Inv. Mass for ~20 second of Run Time
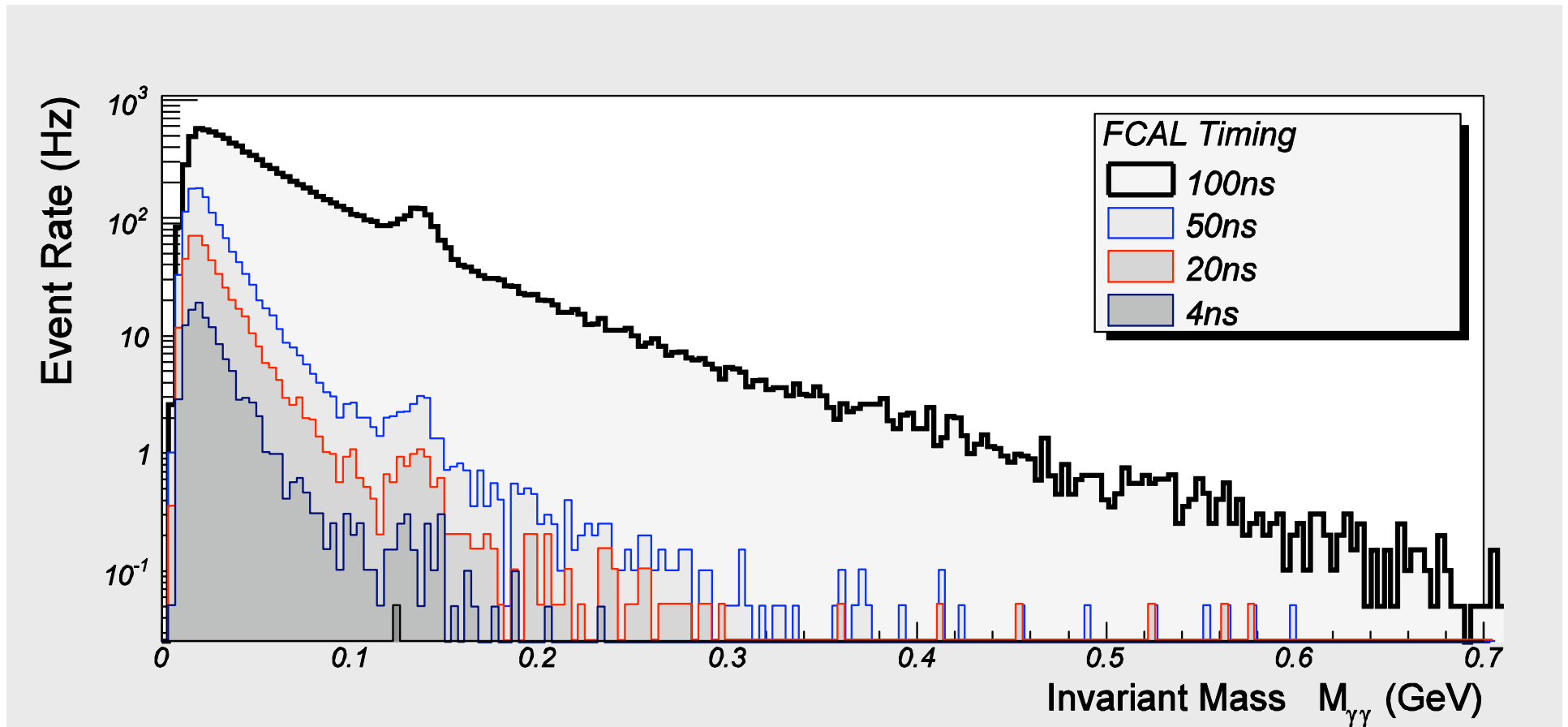
Beam Background in Inv. Mass for ~20 second Run Time
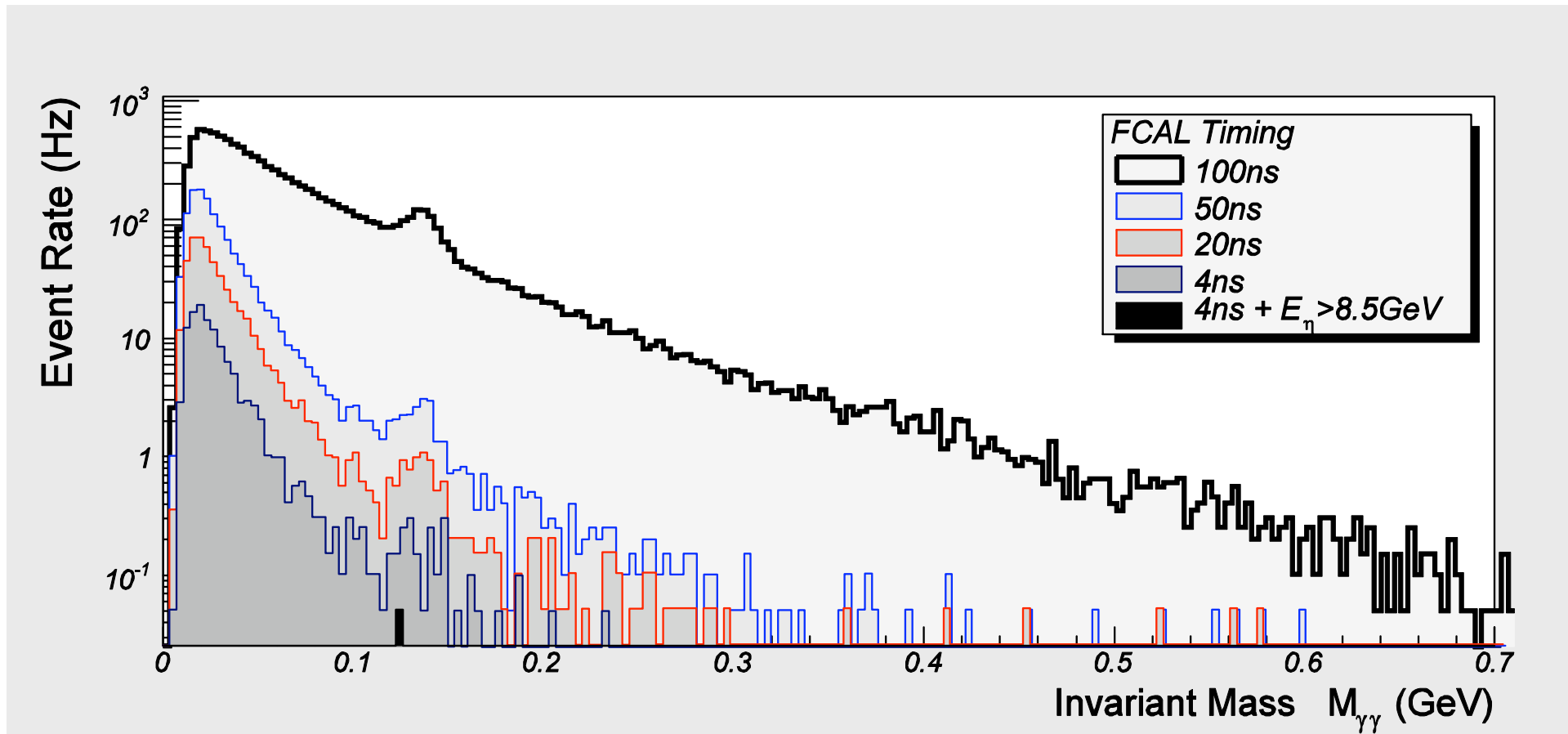
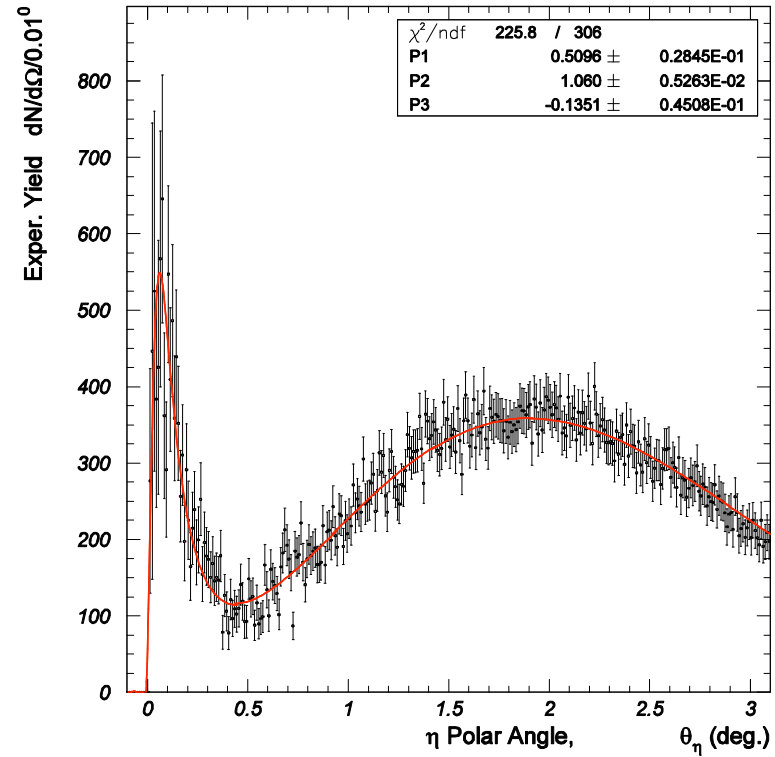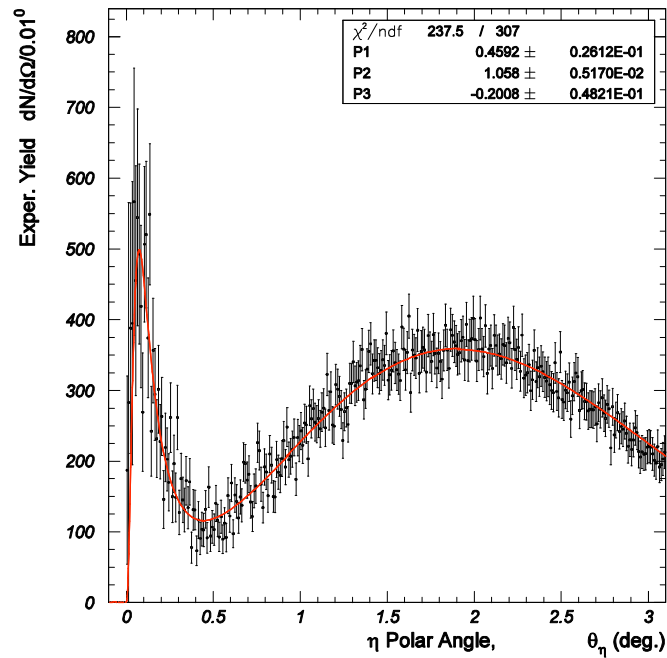# Systematic Error in Decay Width from Misalignment
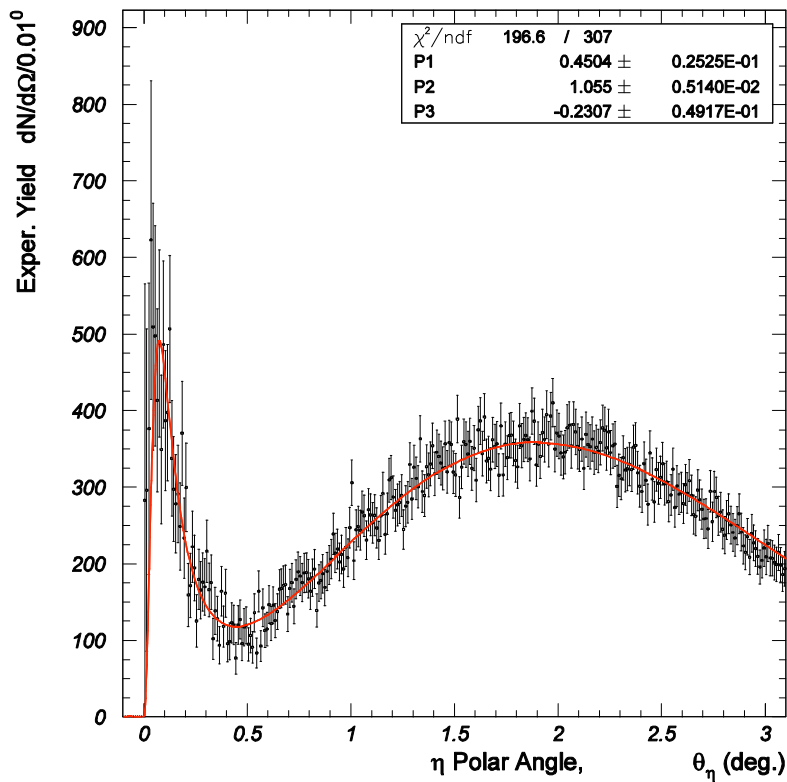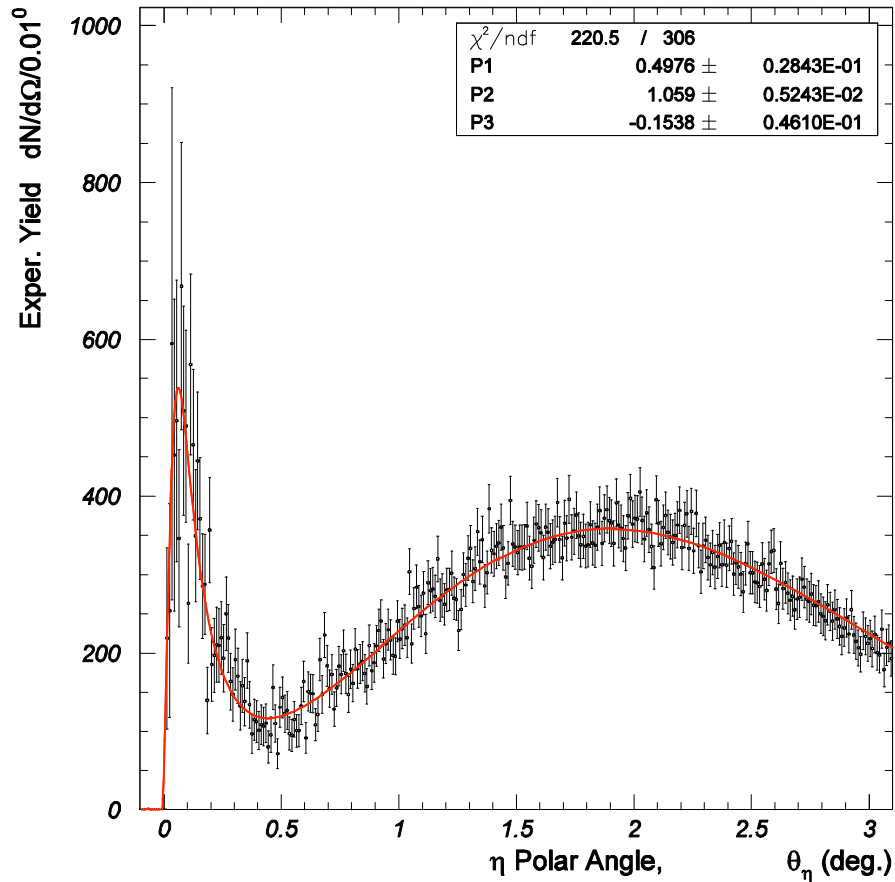

➤ 0.0 mm misalignment
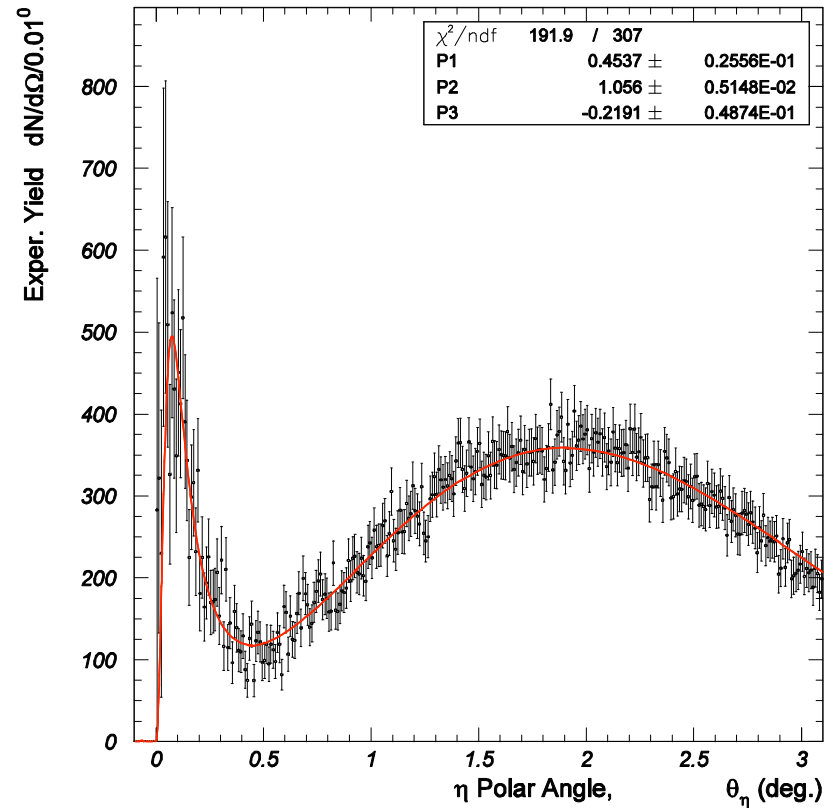
➤ 1.0 mm misalignment

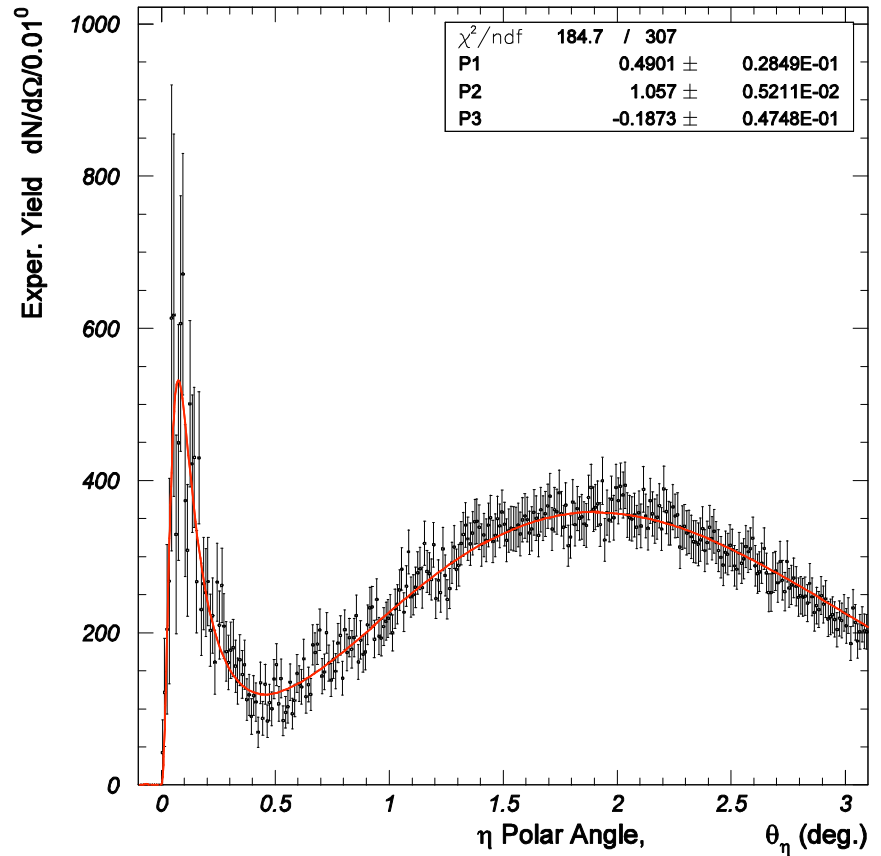# Systematic Error from Misalignment

> 2.0 mm misalignment

> 2.5 mm misalignment

Systematic Error from Misalignment

➢ 3.0 mm misalignment

➢ 4.0 mm misalignment