Cross Sections, $\Gamma_{\gamma\gamma}$'s, and uncertainties for ^{12}C and ^{208}Pb

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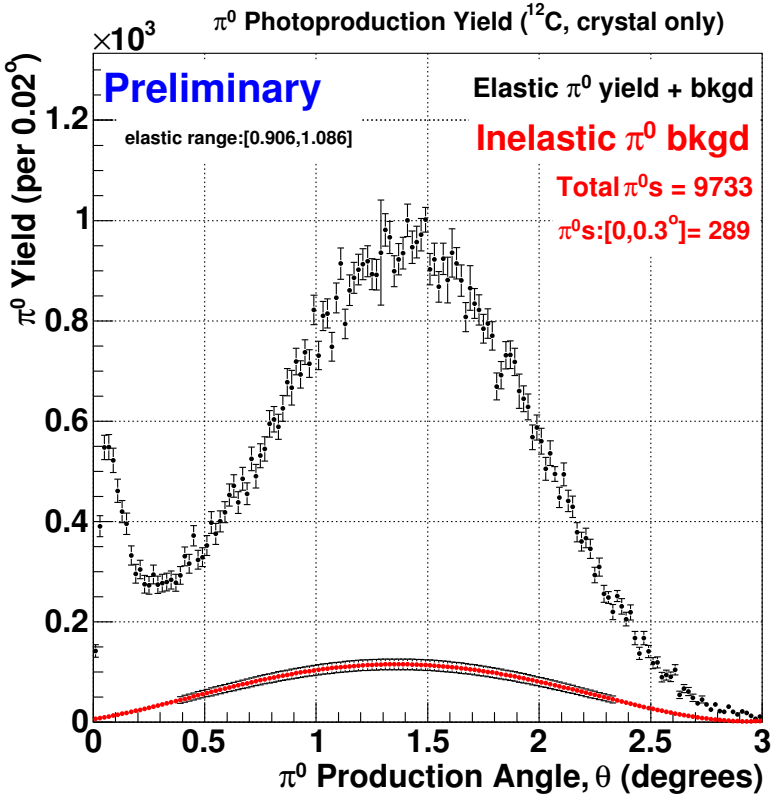
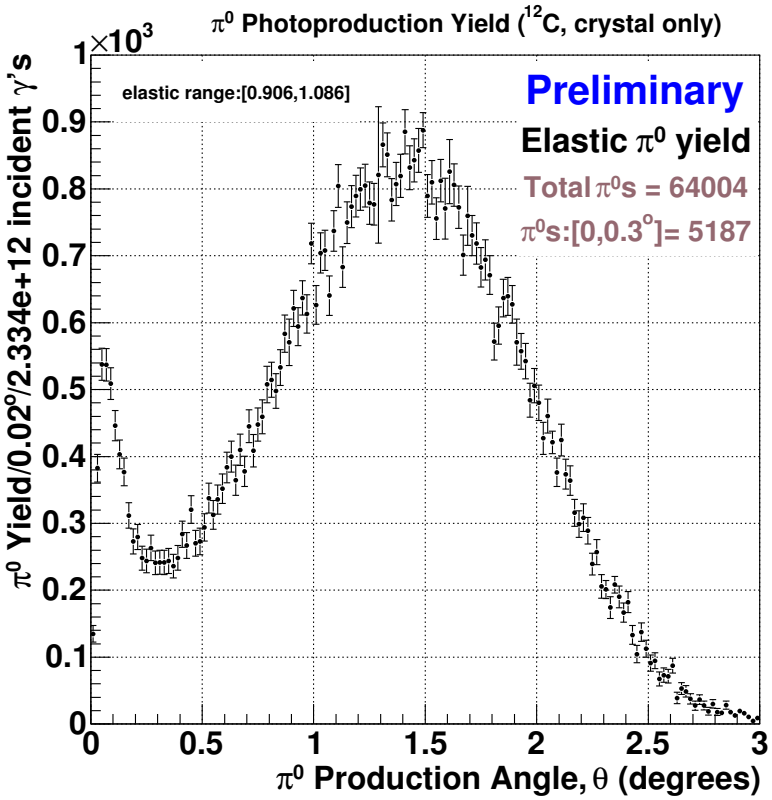
^{12}C Yield


π⁰ Photoproduction Yield (¹²C, crystal only)
Preliminary
elastic range:[0.906,1.086]
Elastic π⁰ yield + bkgd
Inelastic π⁰ bkgd
Total π⁰s = 9733
π⁰s:[0,0.3°]= 289
π⁰ Yield (per 0.02°)
π⁰ Production Angle, θ (degrees)

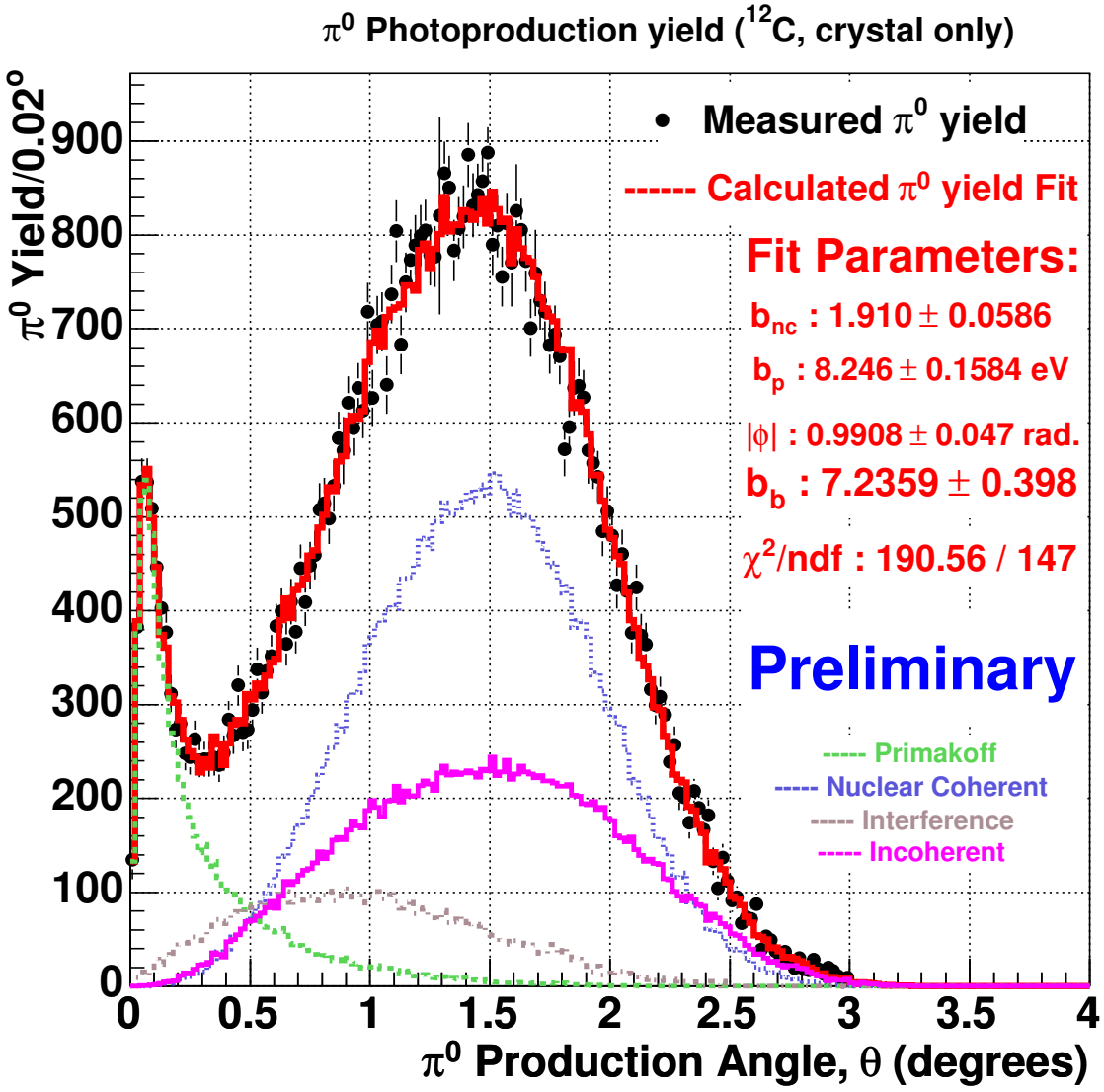

π⁰ Photoproduction Yield (¹²C, crystal only)
elastic range:[0.906,1.086]
Preliminary
Elastic π⁰ yield
Total π⁰s = 64004
π⁰s:[0,0.3°]= 5187
π⁰ Yield/0.02°/2.334e+12 incident γ's
π⁰ Production Angle, θ (degrees)

^{12}C Efficiencies

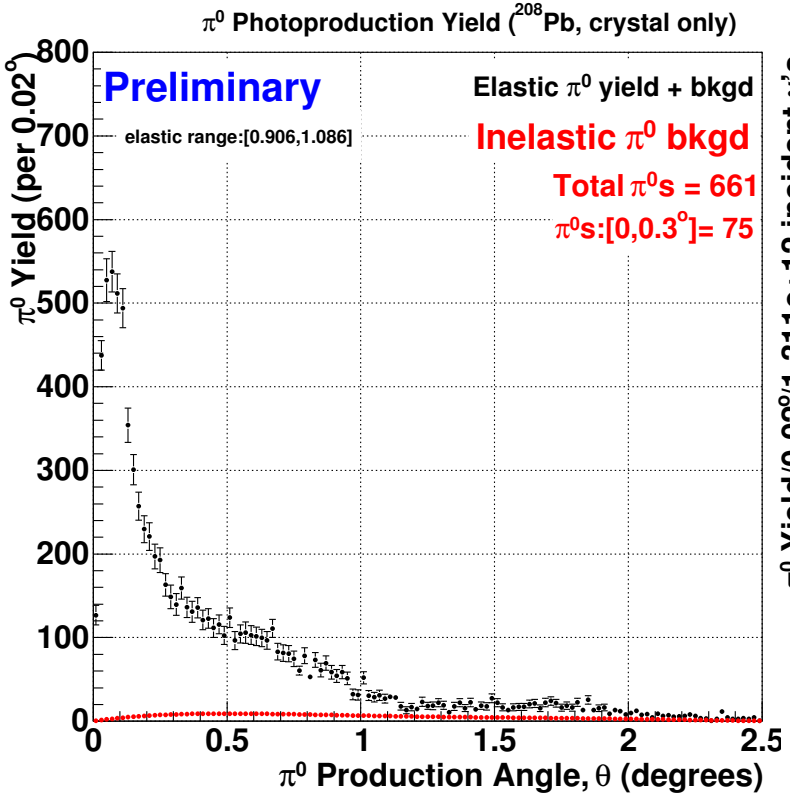
	Losses (%)
Description	^{12}C
ROC Fastbus Errors	0.448 ± 0.009
Photon Absorption in Target	5.41 ± 0.02
Best (tdiff) Candidate selection	2.5 ± 0.3
Elasticity Cut: $[0.906, 1.086]$	1.7 ± 0.3
Veto Cut: all flags $(0, 1, 2, 3)$	1.97 ± 0.12
Branching Ratio $\pi^0 \nrightarrow \gamma\gamma$	1.2 ± 0.03
Total	13.25 ± 0.4

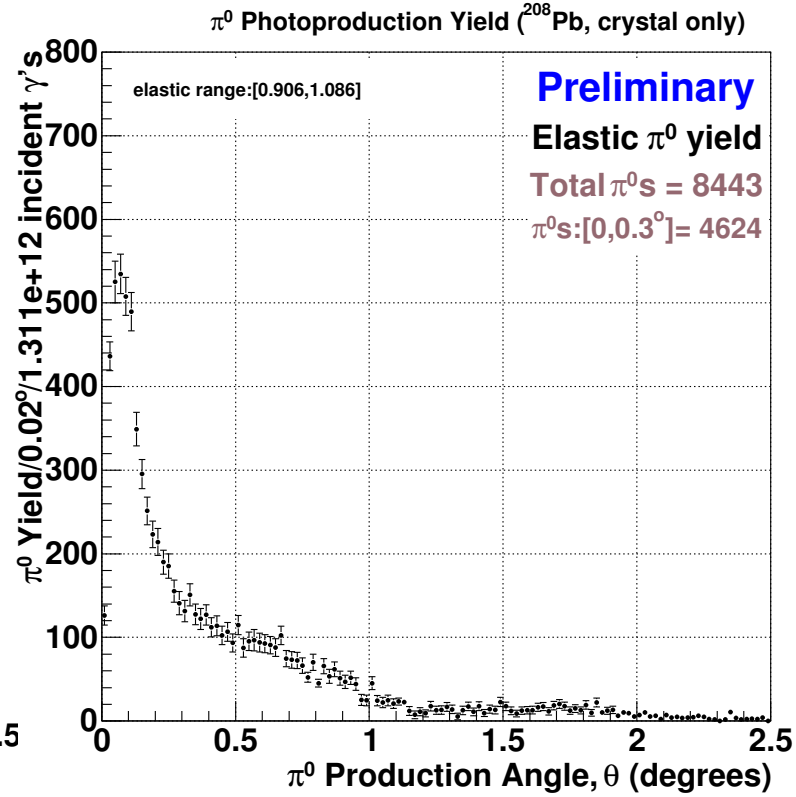
Table 1: Summary of non-geometric losses.

Yield Fit for ^{12}C



^{208}Pb Yield


π0 Photoproduction Yield (208Pb, crystal only)
Preliminary
elastic range:[0.906,1.086]
Elastic π0 yield + bkgd
Inelastic π0 bkgd
Total π0s = 661
π0s:[0,0.3°]= 75
π0 Yield (per 0.02°)
π0 Production Angle, θ (degrees)

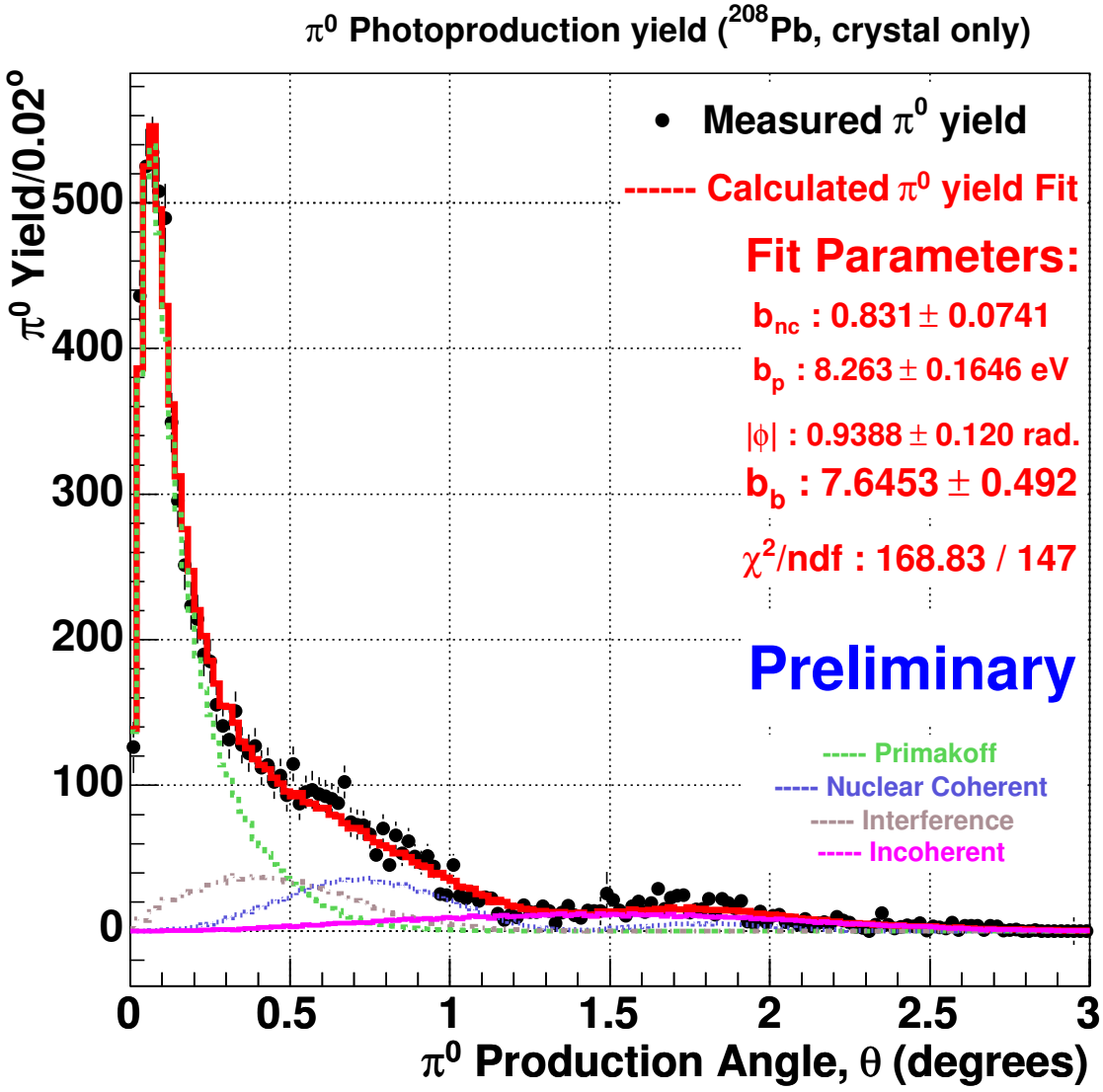

π0 Photoproduction Yield (208Pb, crystal only)
elastic range:[0.906,1.086]
Preliminary
Elastic π0 yield
Total π0s = 8443
π0s:[0,0.3°]= 4624
π0 Yield/0.02°/1.311e+12 incident γ's
π0 Production Angle, θ (degrees)

^{208}Pb Efficiencies

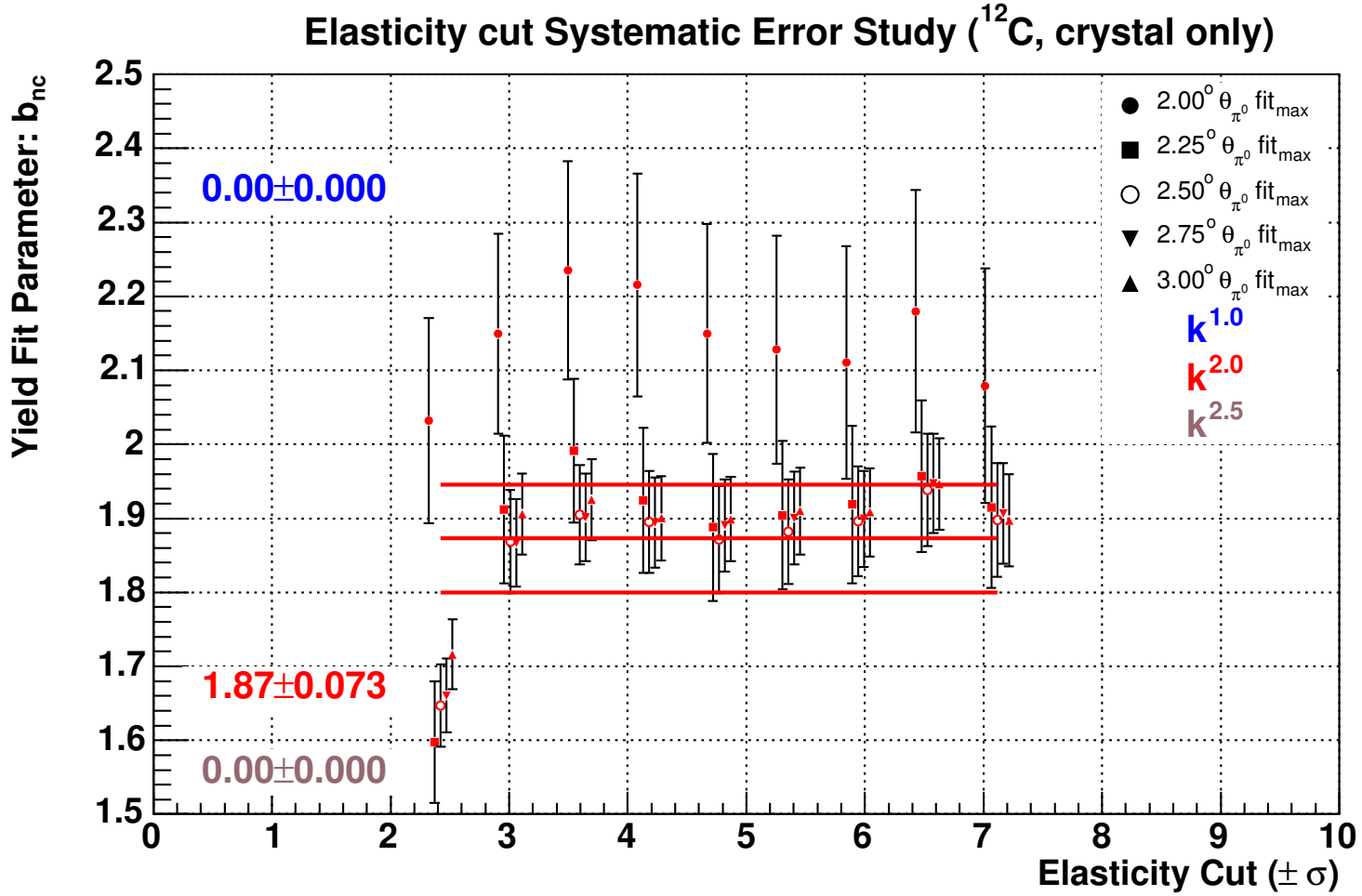
	Losses (%)
Description	^{208}Pb
ROC Fastbus Errors	0.468 ± 0.013
Photon Absorption in Target	5.92 ± 0.01
Best (tdiff) Candidate selection	1.1 ± 0.3
Elasticity Cut: $[0.906, 1.086]$	1.7 ± 0.3
Veto Cut: all flags $(0, 1, 2, 3)$	1.97 ± 0.12
Branching Ratio $\pi^0 \nrightarrow \gamma\gamma$	1.2 ± 0.03
Total	12.34 ± 0.4

Table 2: Summary of non-geometric losses.

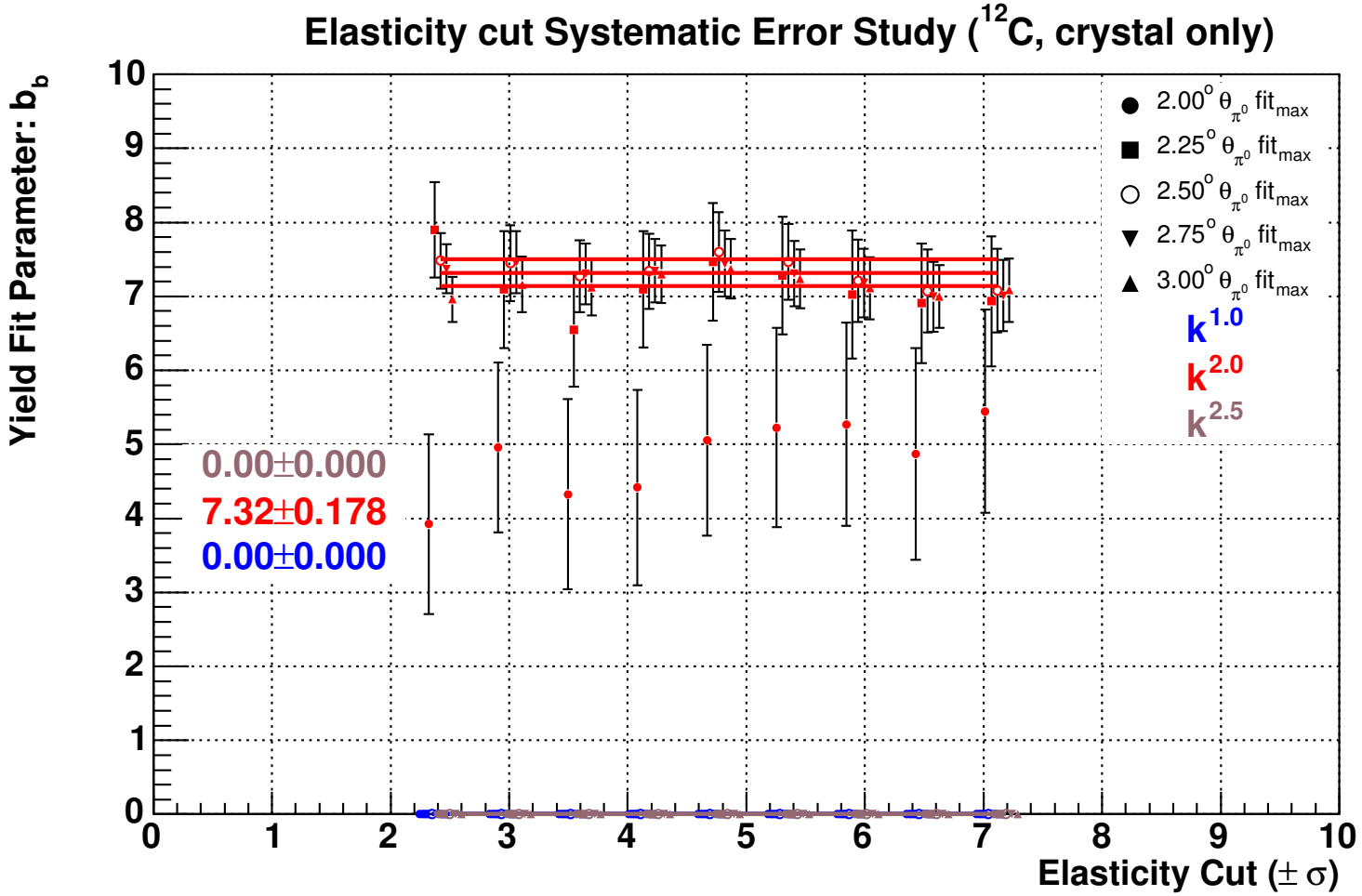
Yield Fit for ^{208}Pb



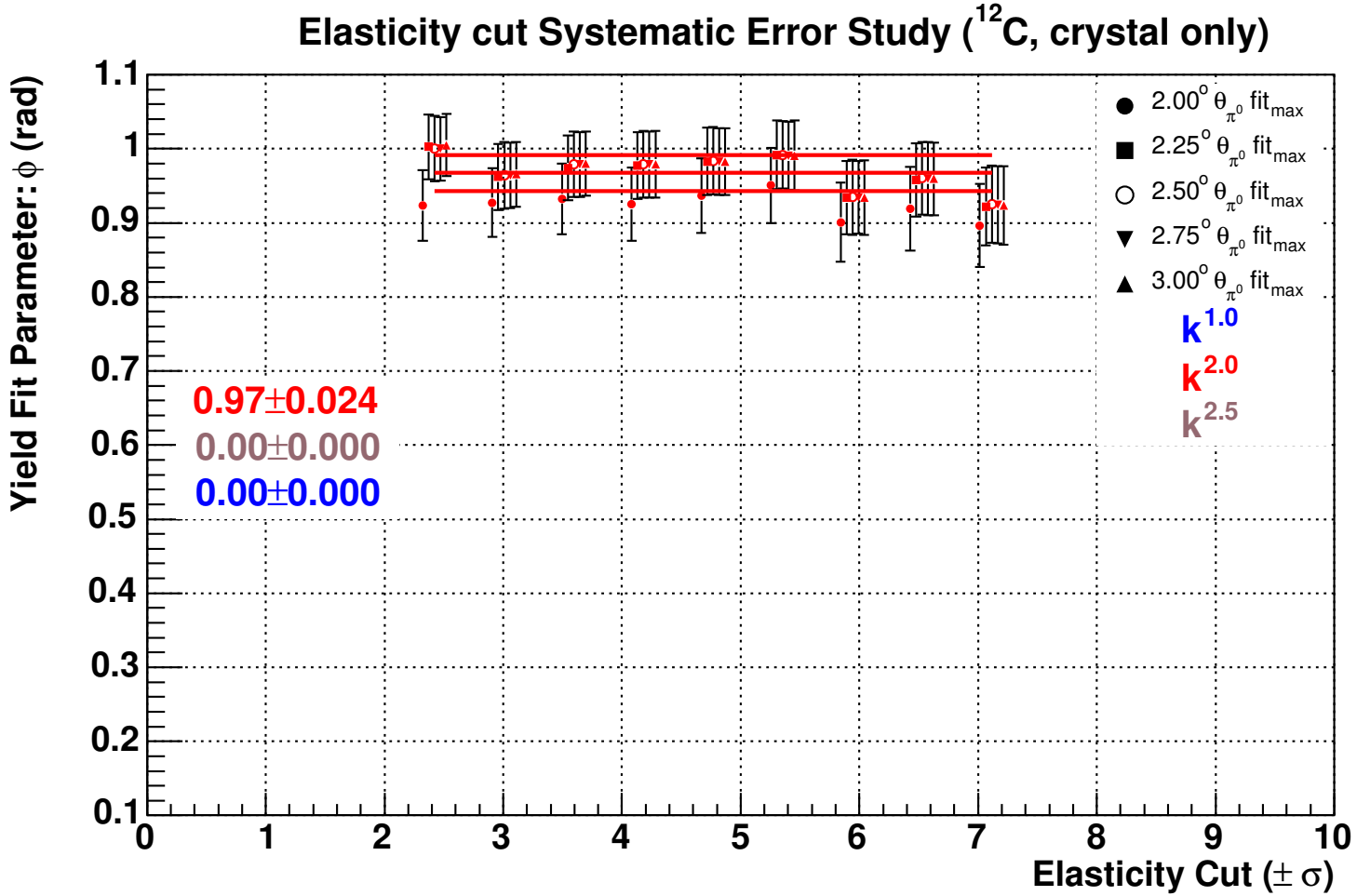
Nuc. Coherent Parameter vs. Elasticty Cut and Fit Range



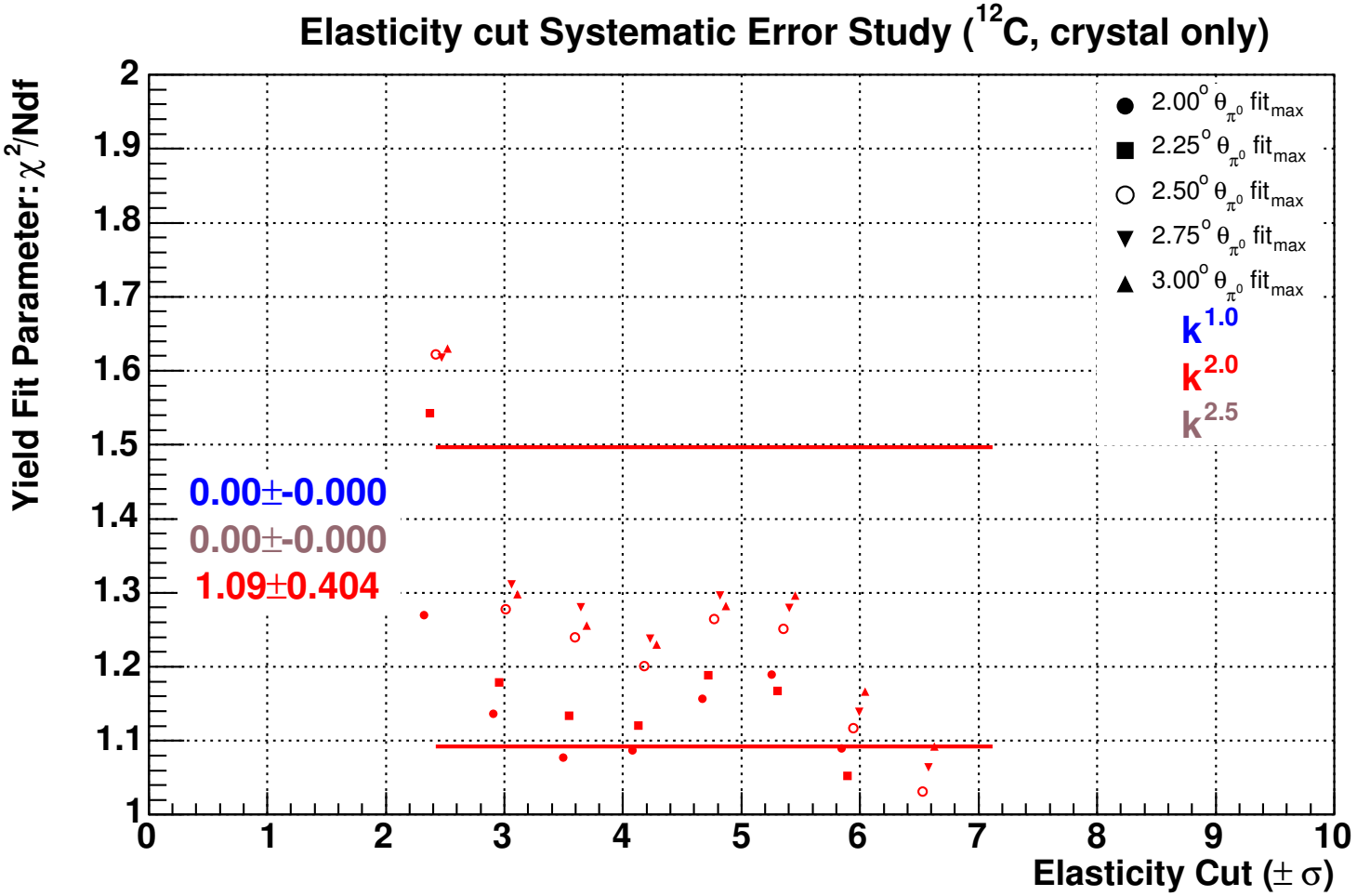
Incoherent Parameter vs. Elasticty Cut and Fit Range



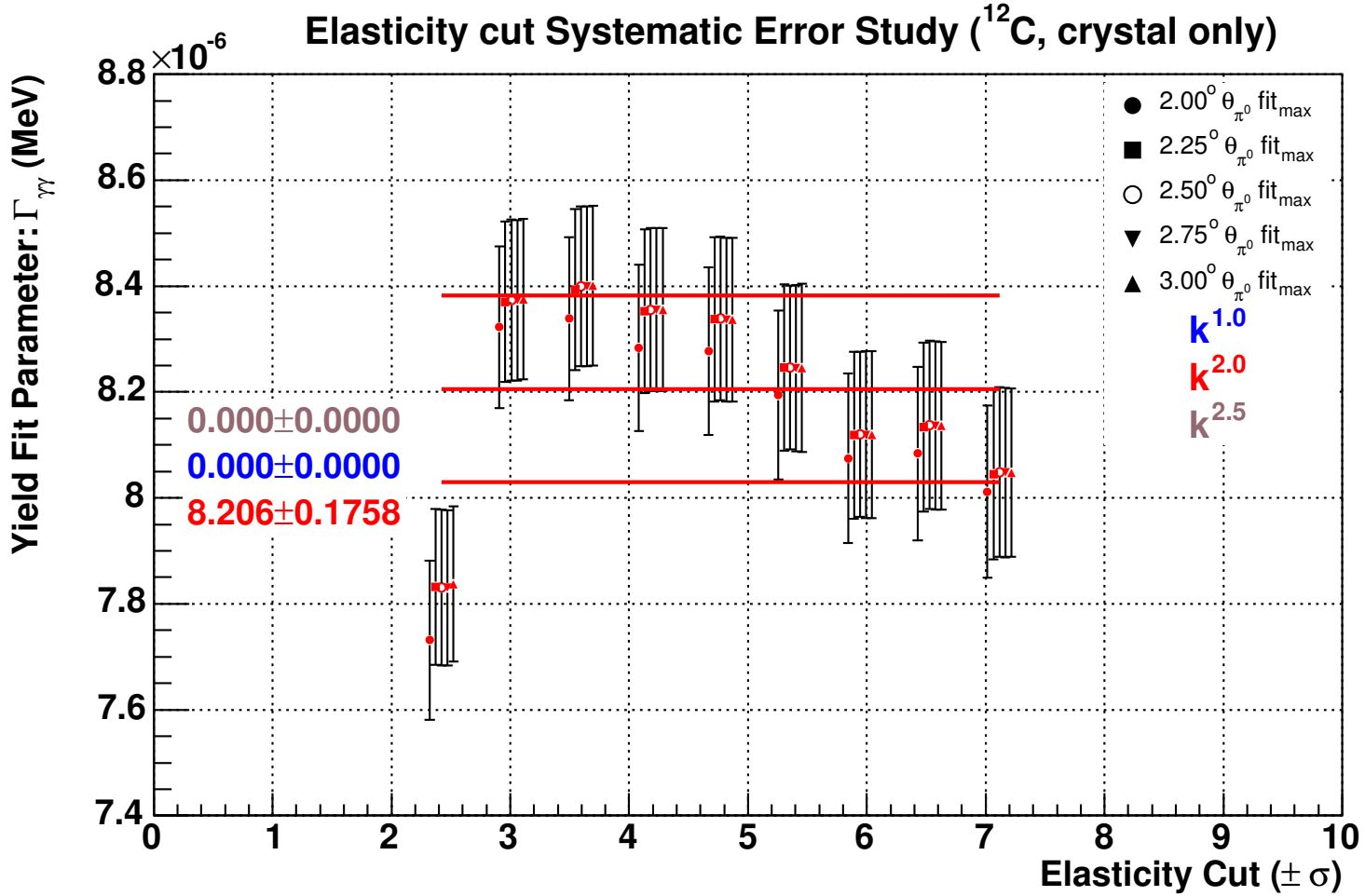
ϕ Parameter vs. Elasticty Cut and Fit Range



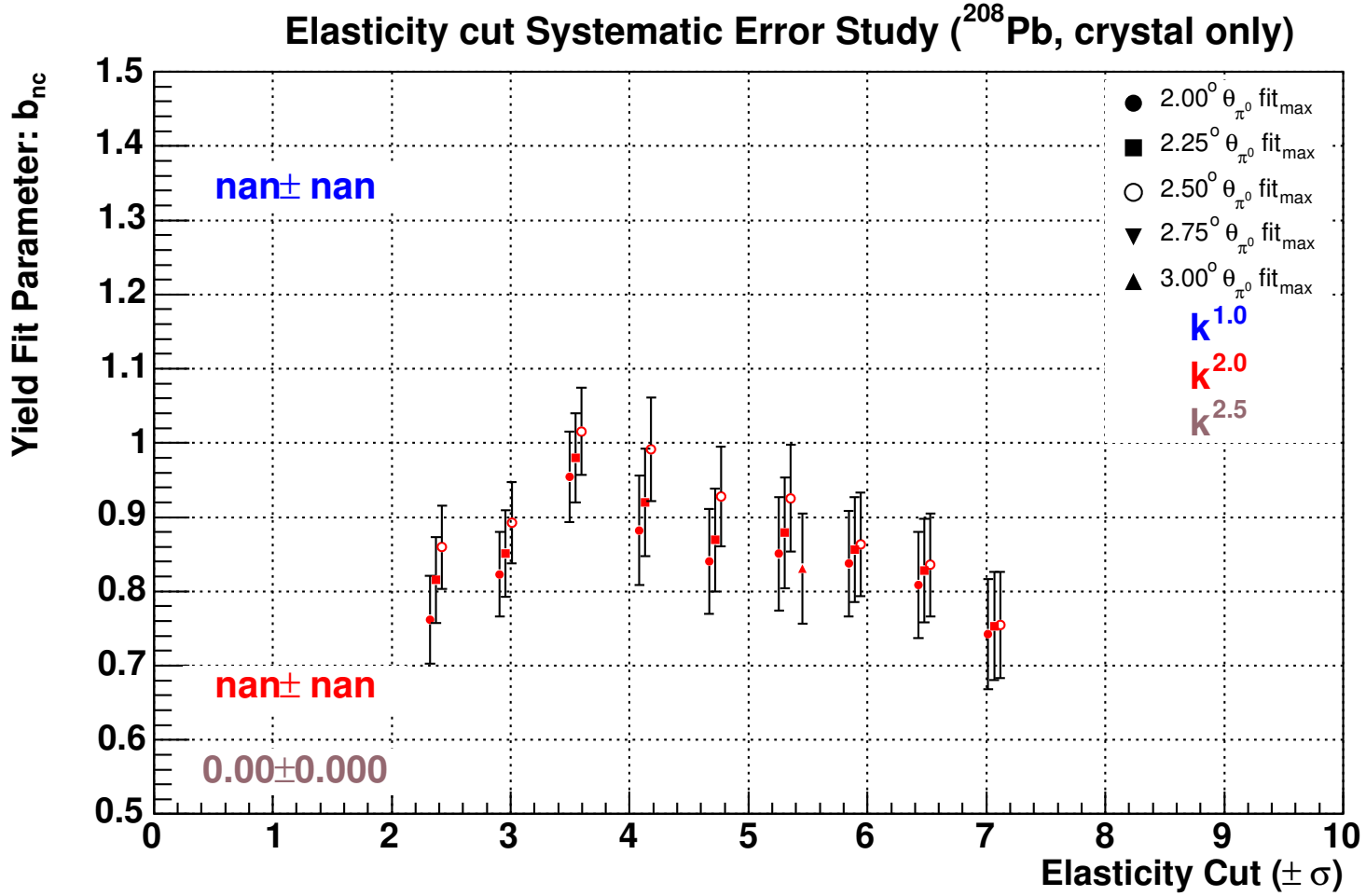
Fit χ^2/d.o.f vs. Elasticty Cut and Fit Range



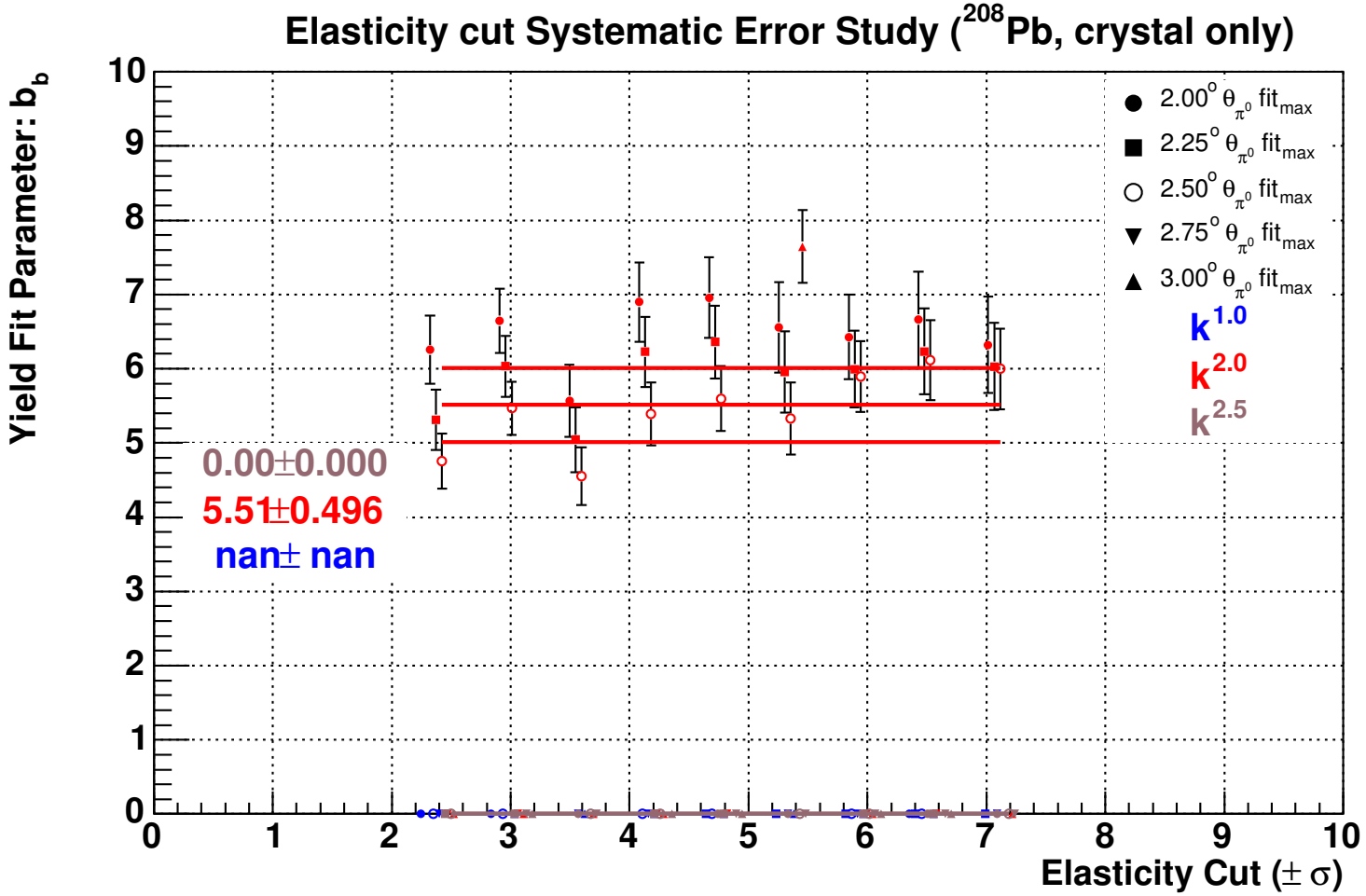
$\Gamma_{\gamma\gamma}$ Parameter vs. Elasticty Cut and Fit Range



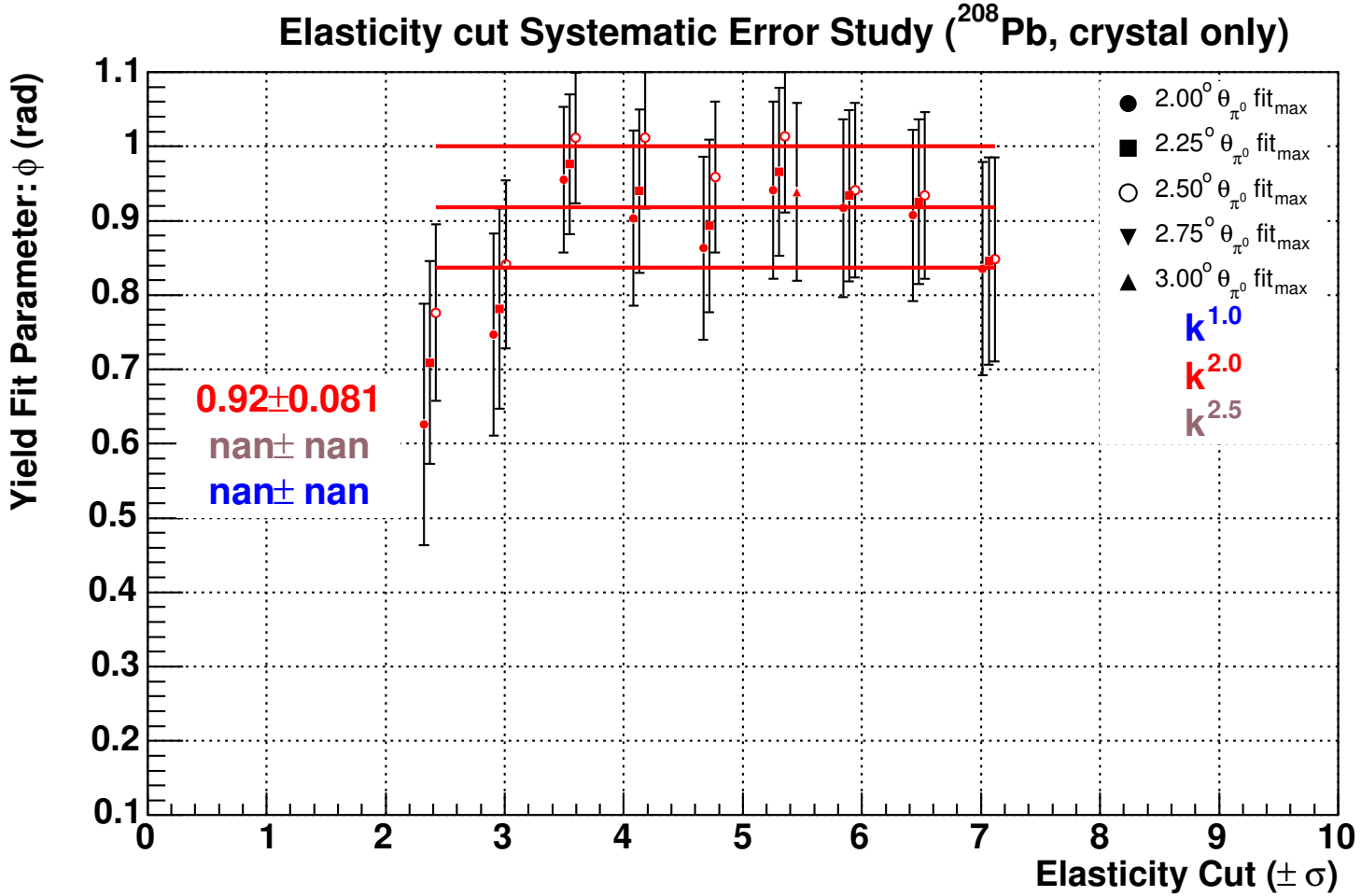
Nuc. Coherent Parameter vs. Elasticty Cut and Fit Range



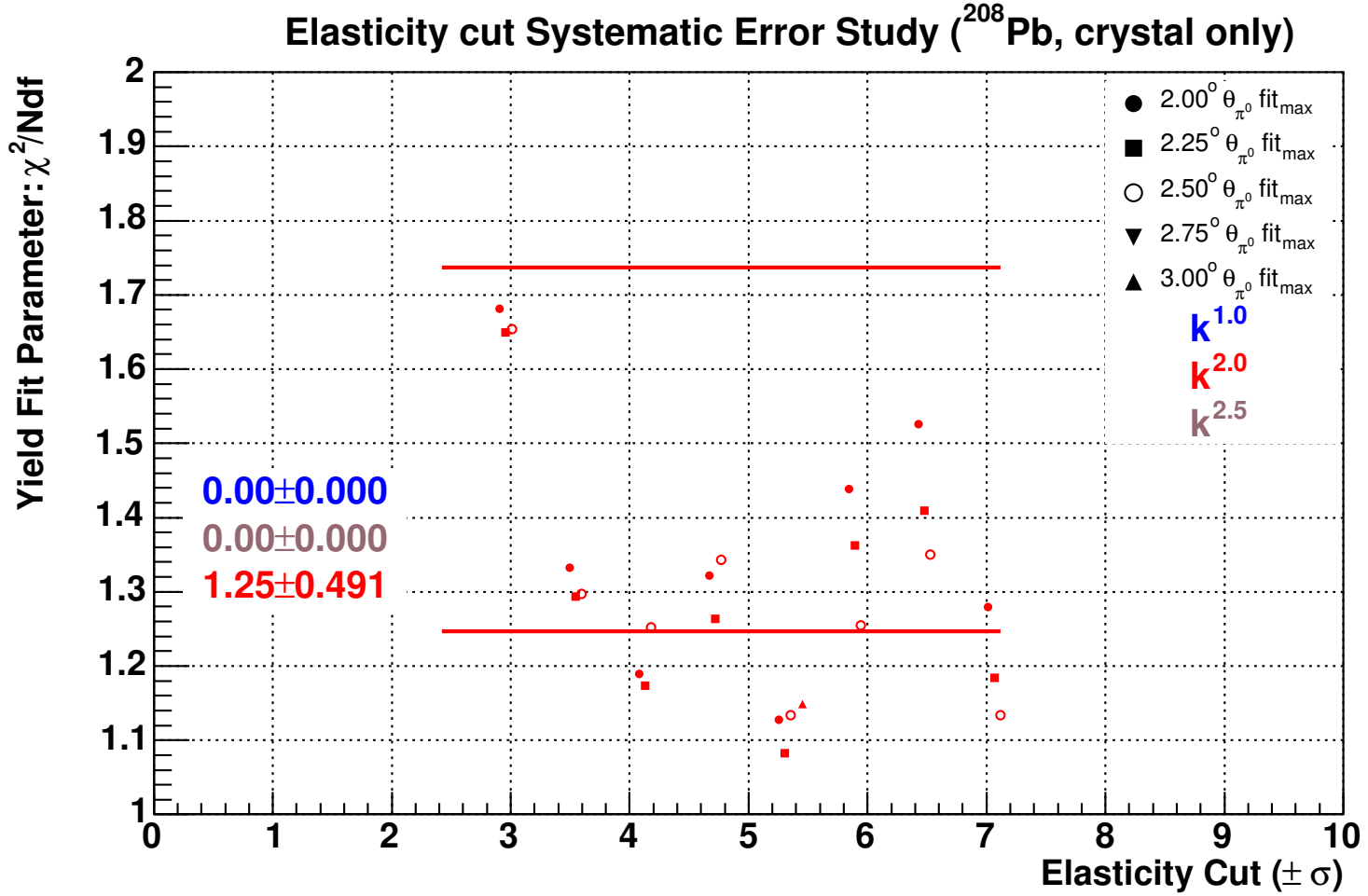
Incoherent Parameter vs. Elasticty Cut and Fit Range



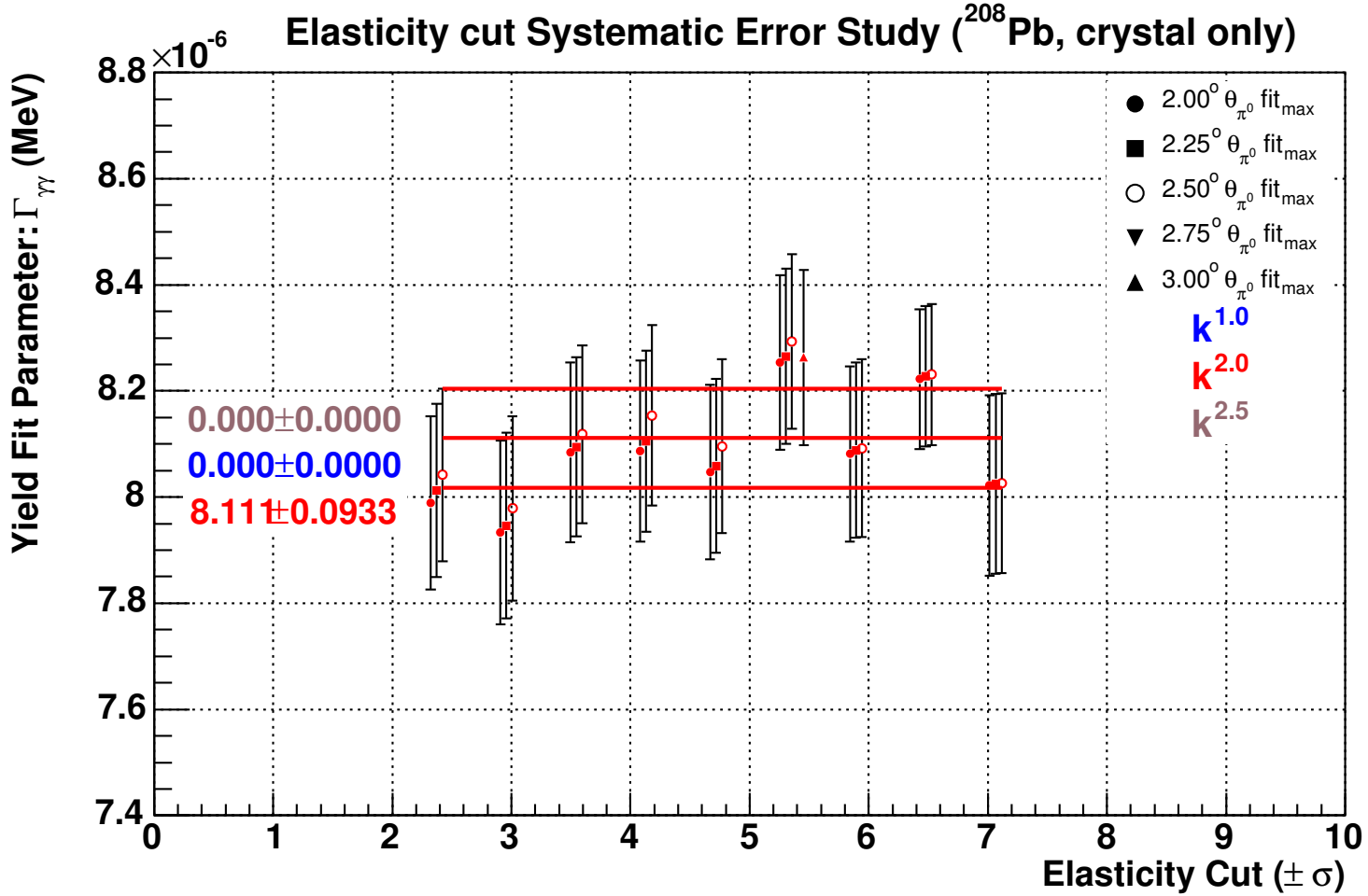
ϕ Parameter vs. Elasticty Cut and Fit Range



Fit χ^2/d.o.f vs. Elasticty Cut and Fit Range



$\Gamma_{\gamma\gamma}$ Parameter vs. Elasticty Cut and Fit Range



Systematic Error Table

Description	Uncertainty (%)	
	^{12}C	^{208}Pb
$m_{\gamma\gamma}$ fits + inelast bkgd corr.	1.8	1.1
Photon flux	1.1	1.1
Nuclear coh. XS energy dep.	0.04*	0.04*
Detection/Recon efficiency	0.5	0.5
Fiducial Acceptance	0.6	0.6*
Event Selection	1.0	1.0*
Target thick. + branch ratio	0.06	0.5
Tagged Photon Energy	0.3	0.3*
Total	2.4	2.1

Table 3: Preliminary summary of systematic uncertainties. * => Not been re-evaluated yet.

Preliminary Result Summary

From ^{12}C:

$\Gamma_{\pi^0\to\gamma\gamma} = 8.20\text{eV} \pm 1.8\%(\text{stat}) \pm 2.4\%(\text{syst}) \pm 1.3^*\%(\text{model})$

From ^{208}Pb:

$\Gamma_{\pi^0\to\gamma\gamma} = 8.11\text{eV} \pm 2.0\%(\text{stat}) \pm 2.1\%(\text{syst}) \pm 1.3^*\%(\text{model})$

$** =>$ **Not been fully evaluated.**

Above width results for Sergey's incoherent XS parameterization