Polarized Cross Section data/model XS comparison

Toby Badman

04/19/17
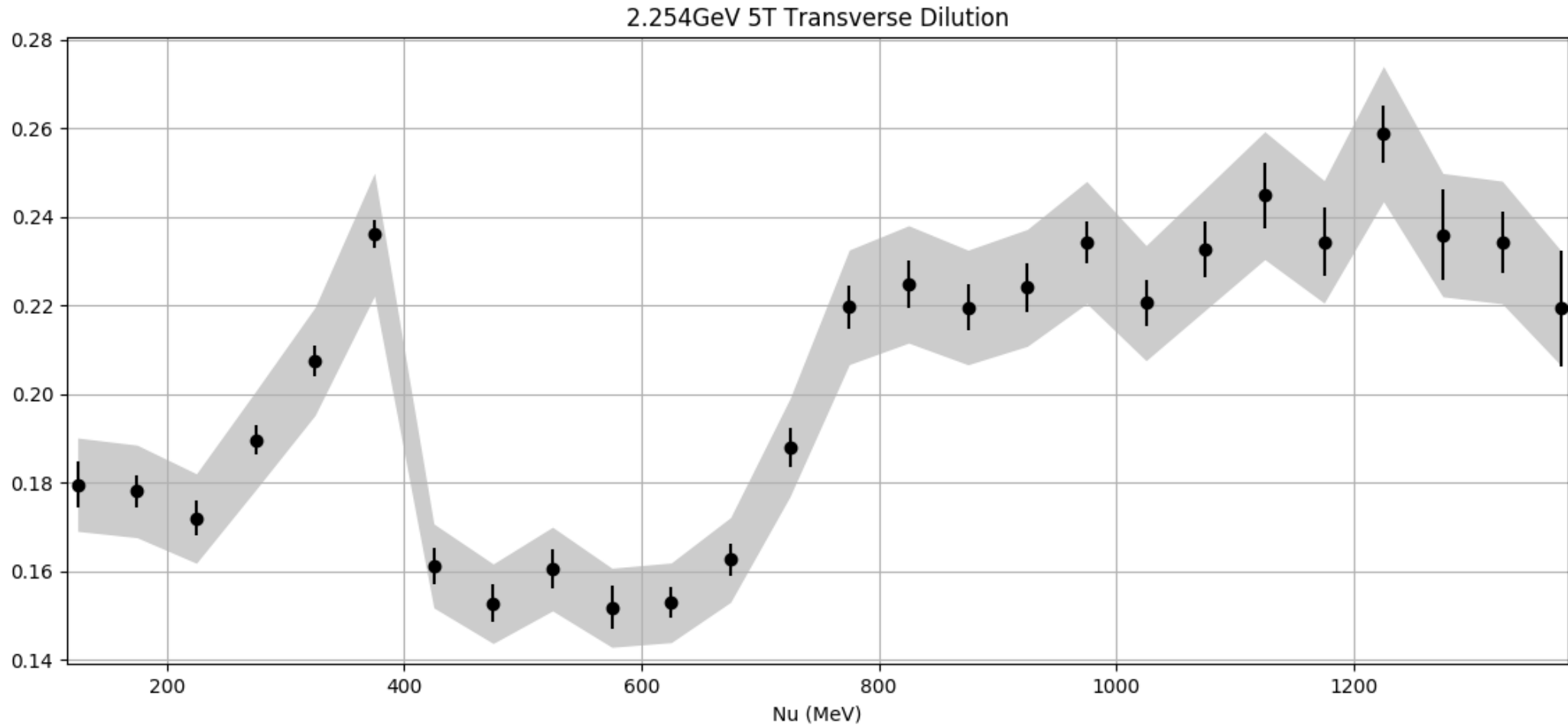
Systematic Errors

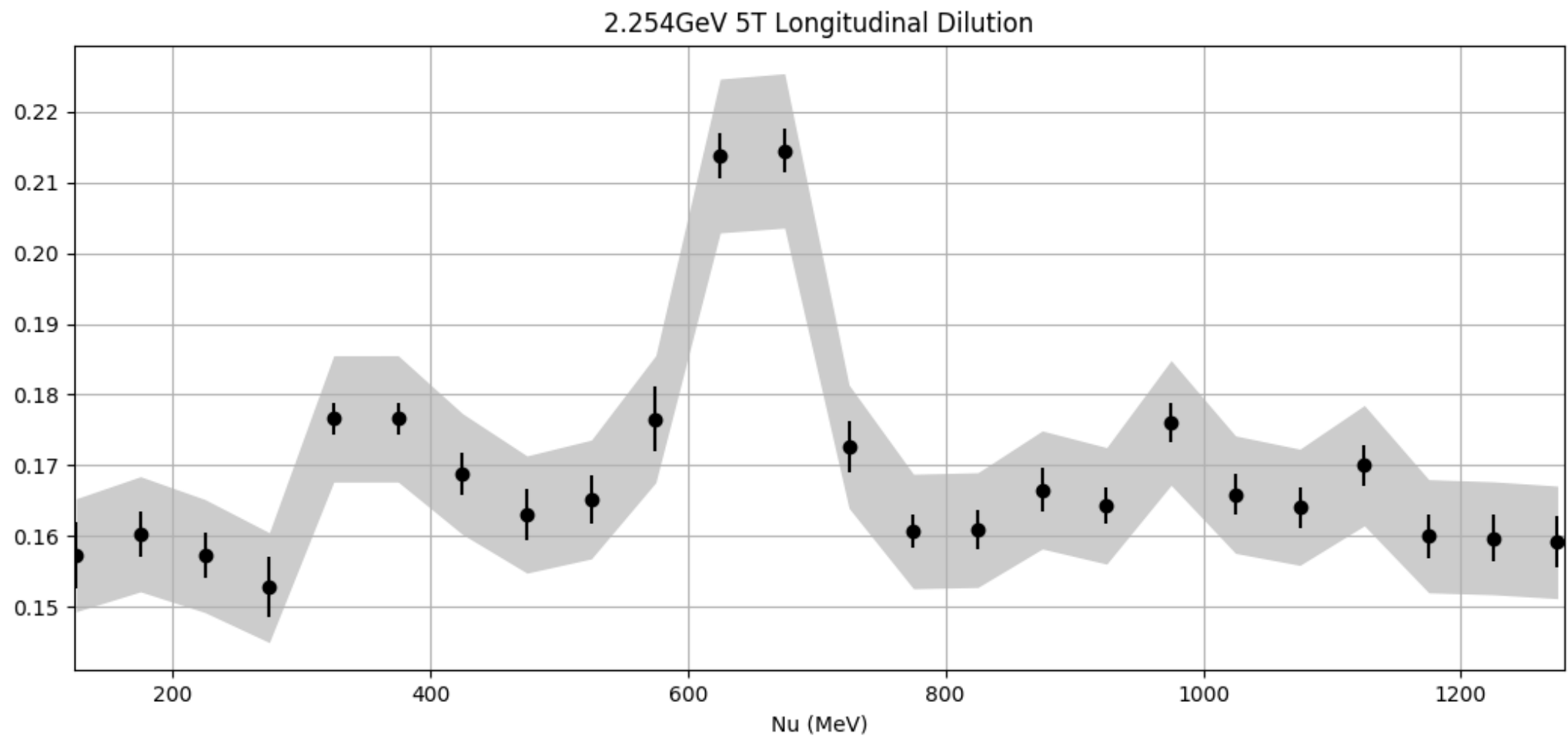| Measured Quantity	Source	Relative Error
Dilution	Model ratios (several)	3%
	Packing Fraction	3-7% (ratio method)
	Target Length	0.3% (From Melissa's Technote)
Asymmetry	Beam Polarization	1.7%
	Target Polarization	2-5%
	Out-of-plane correction	1% (From Ryan)
Cross Section (data)	Acceptance	22.36%
	Packing Fraction	3-7%
	Target Length	0.3%
Cross Section (model)	Bosted Proton Model	10%
Additional	Q^2 scaling	1-3%

Dilution and Asymmetry Cut Summary

- Helicity Error: hel.error&0x2f0f

- BPM Error: bpmavail == 1

- Event type: evtypebits&(1<<3)>0

- VDC Track: tr.n =1 and vdc.(u1/u2/v1/v2).ncluster = 1

- PID cuts from MySQL database

- DP Cut: -0.04 < rec.dp < 0.04

- Target Phi: -0.04 < tr.tg_ph < 0.04

- Target Theta: -0.04 < tr.tg_th < 0.08 (transverse)

- Target Theta: -0.06 < tr.tg_th < 0.06 (longitudinal)

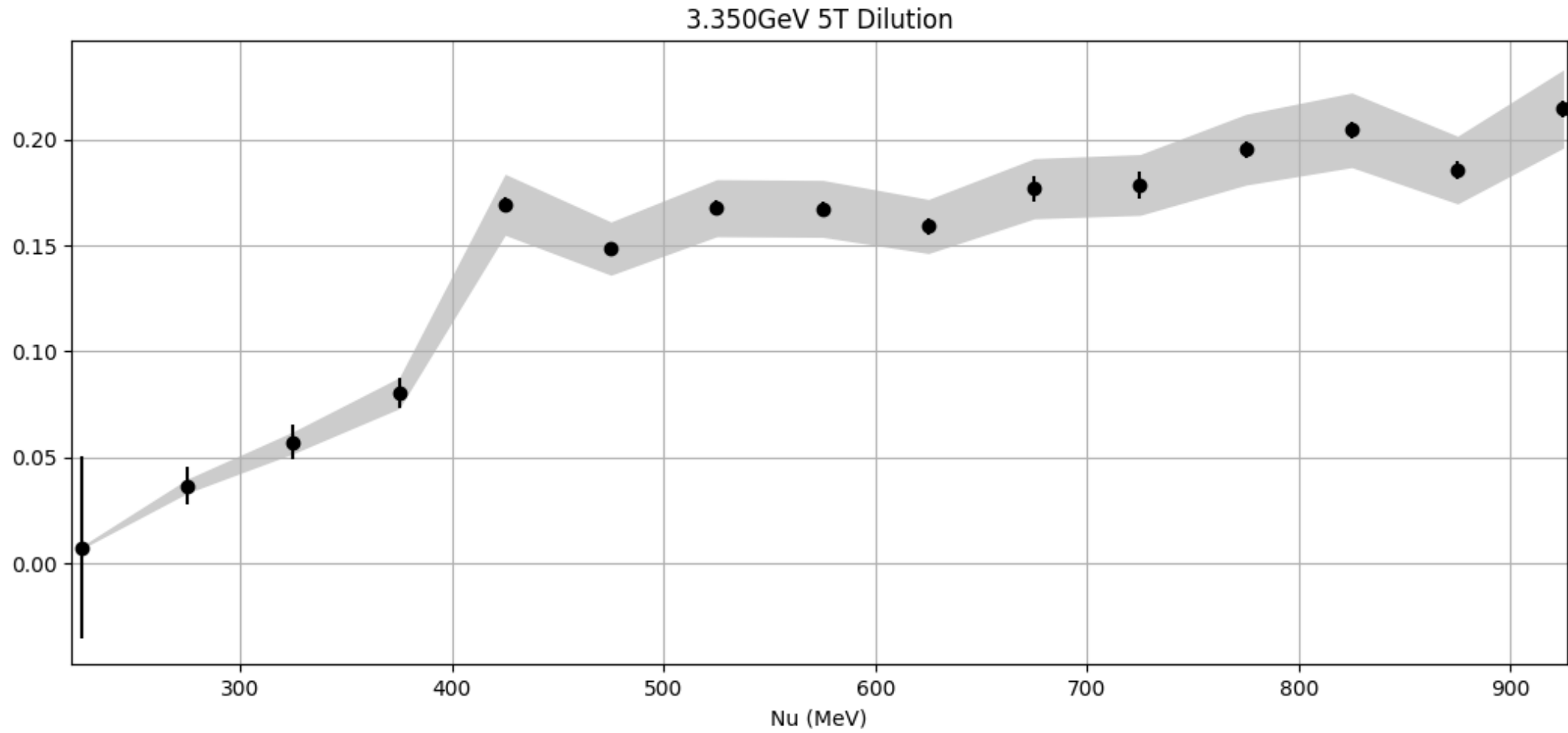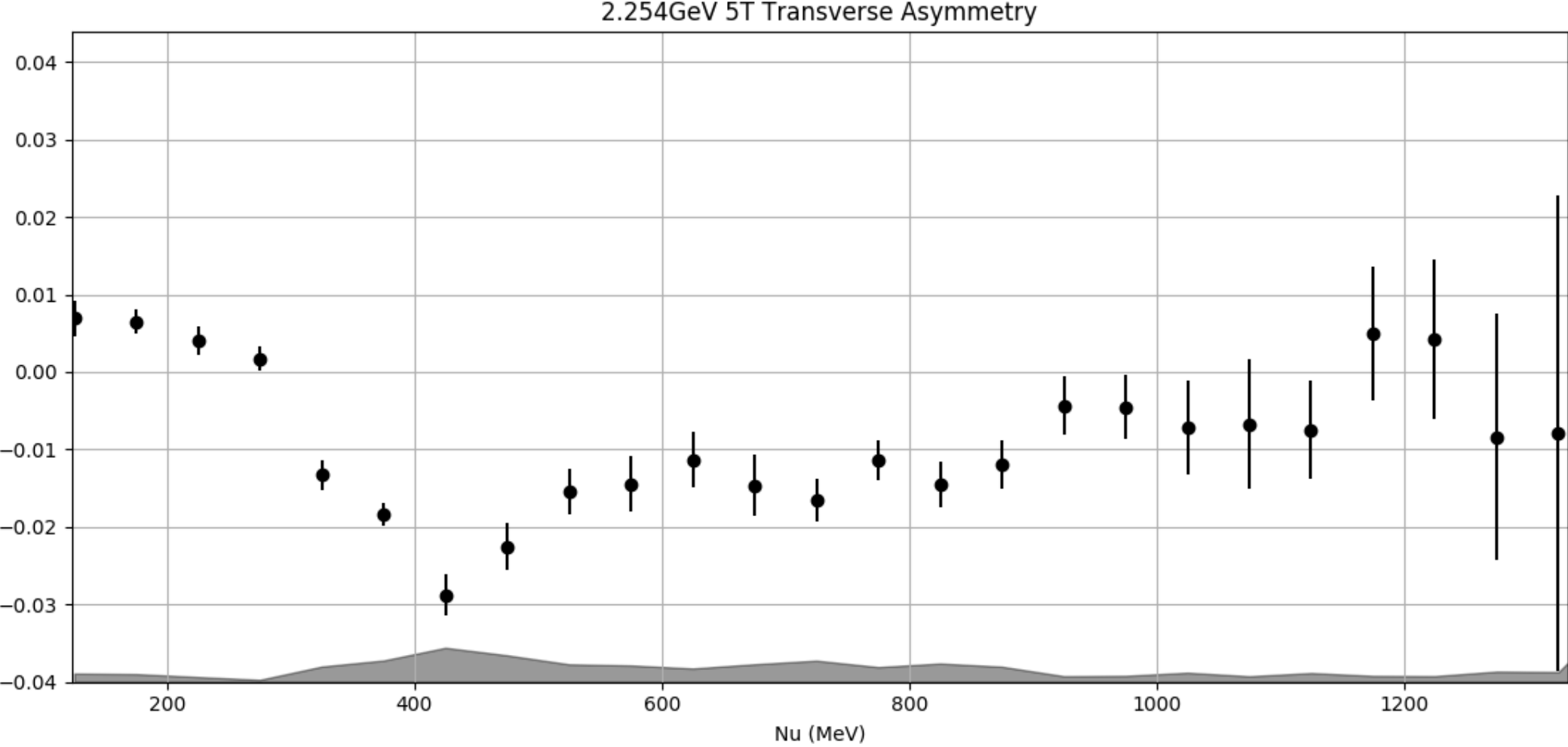- Loose Tracking Cuts: -0.08 < tr.r_y < 0.08 and -0.8 < tr.r_x < 0.8

Dilution - Results

2.254GeV 5T Transverse Dilution

Dilution - Results

2.254GeV 5T Longitudinal Dilution

Dilution - Results

3.350GeV 5T Dilution

Asymmetry - Results

2.254GeV 5T Transverse Asymmetry

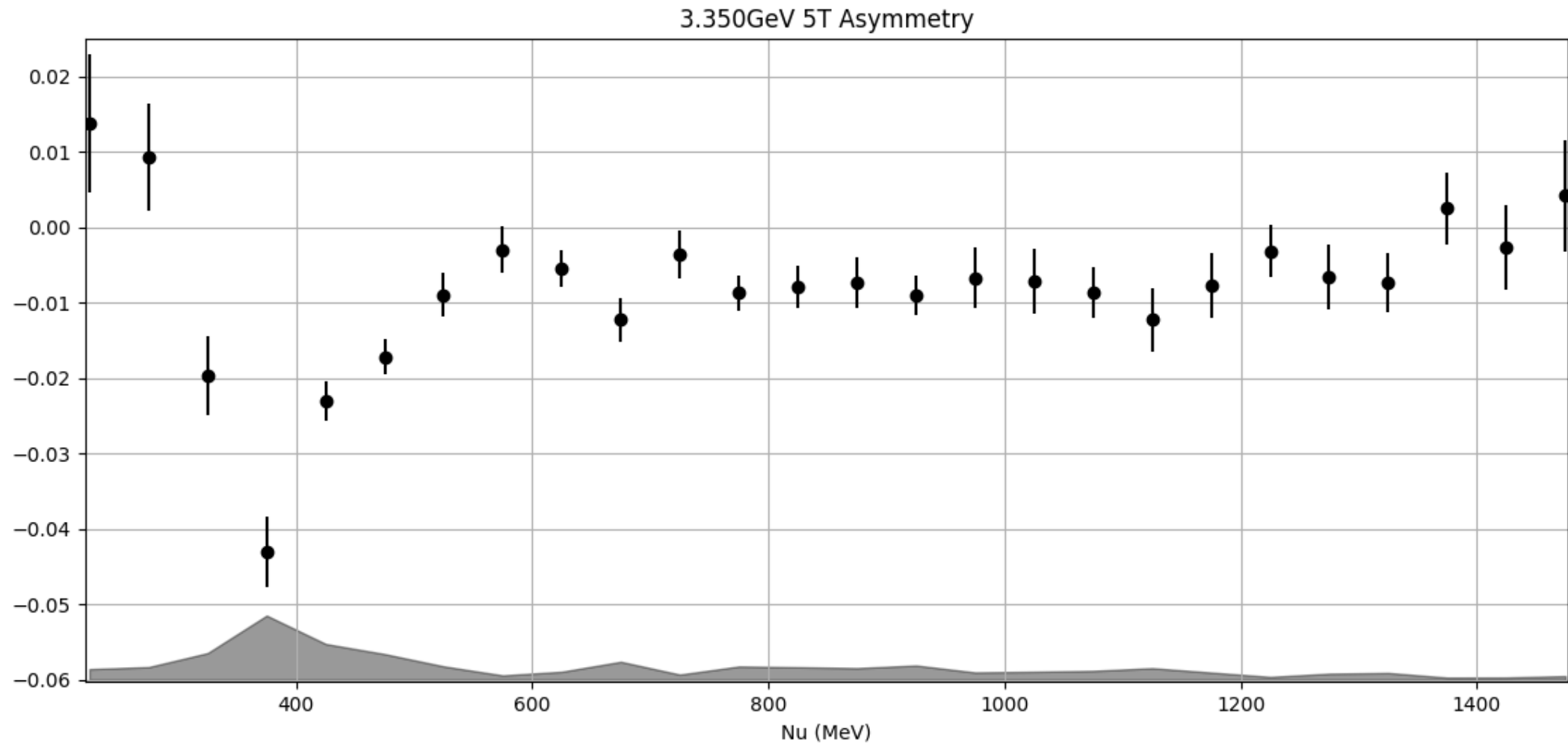# Asymmetry - Results

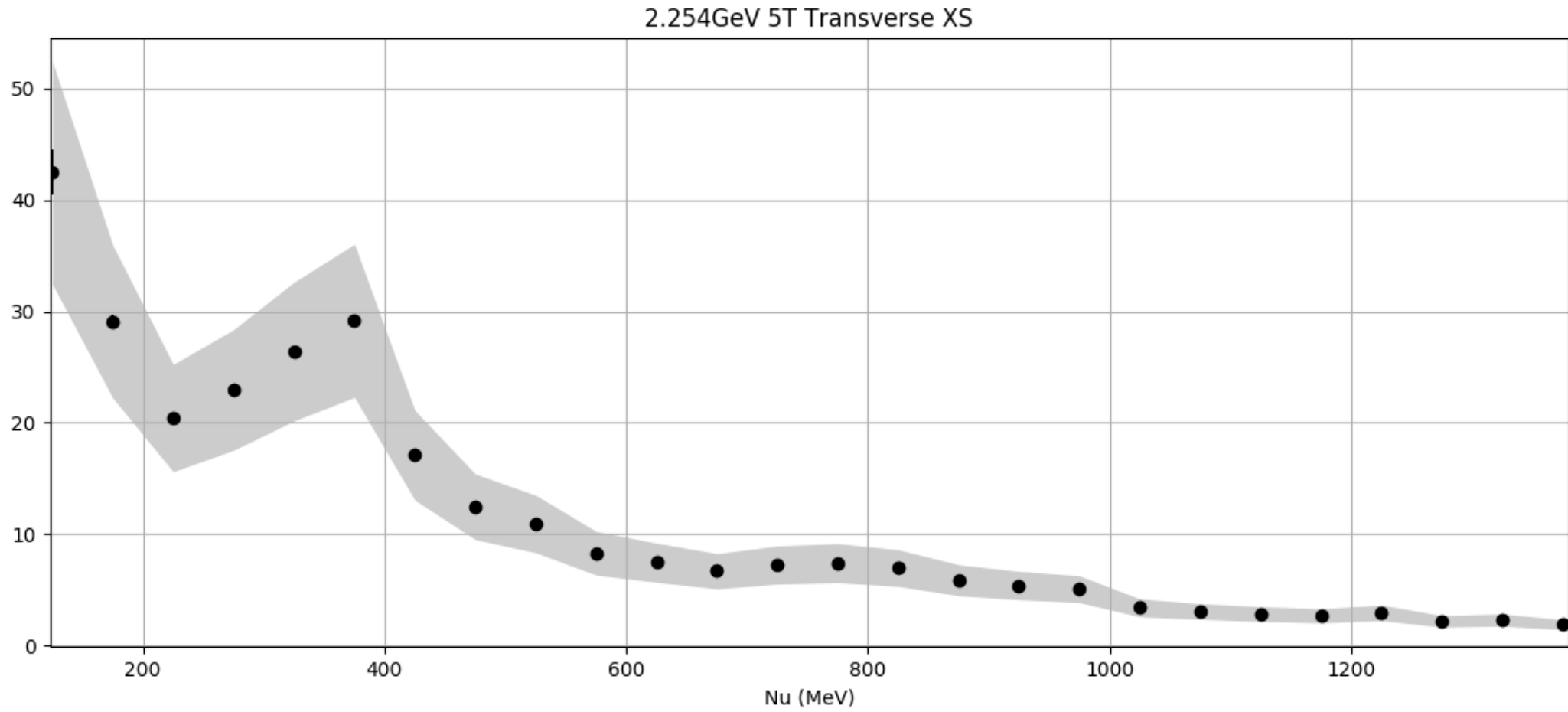2.254GeV 5T Longitudinal Asymmetry
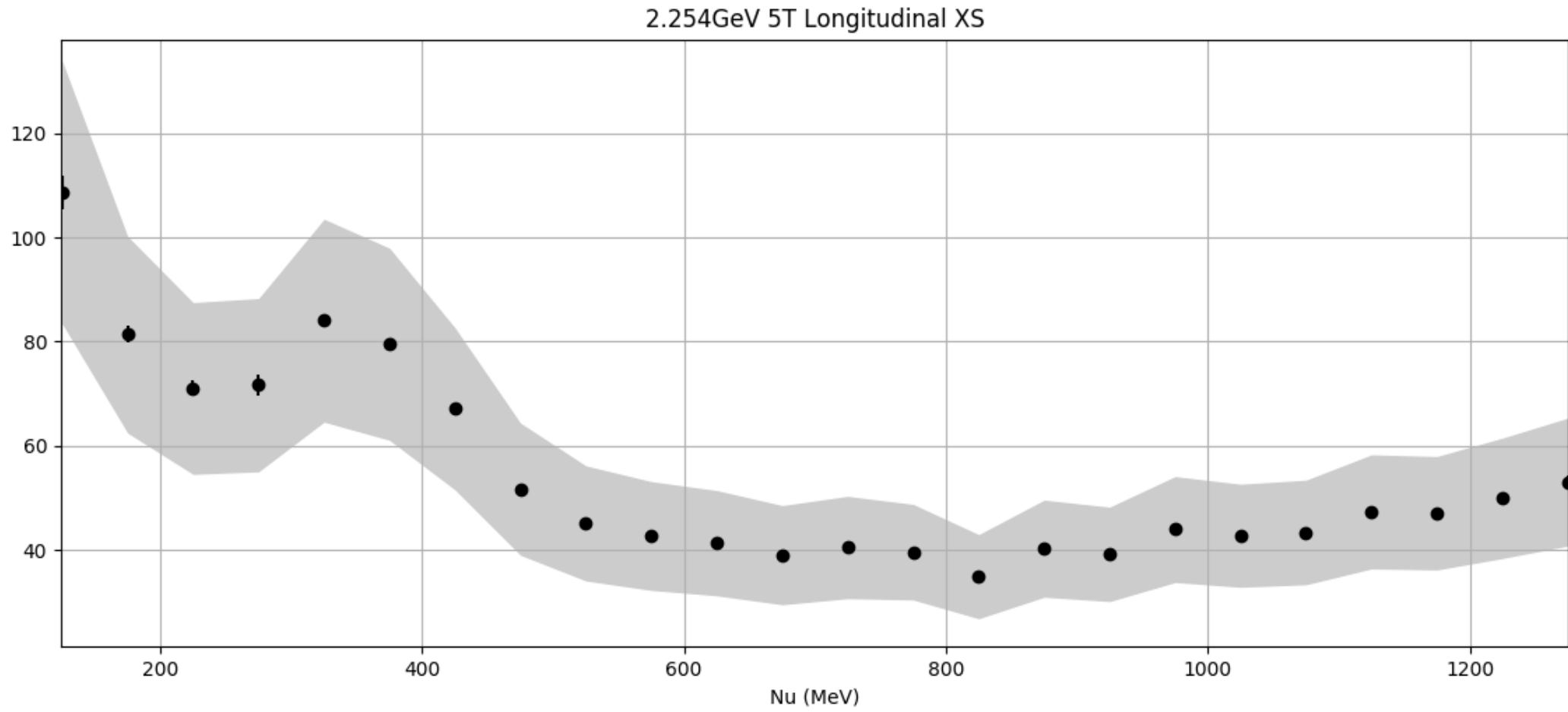
Asymmetry - Results

3.350GeV 5T Asymmetry
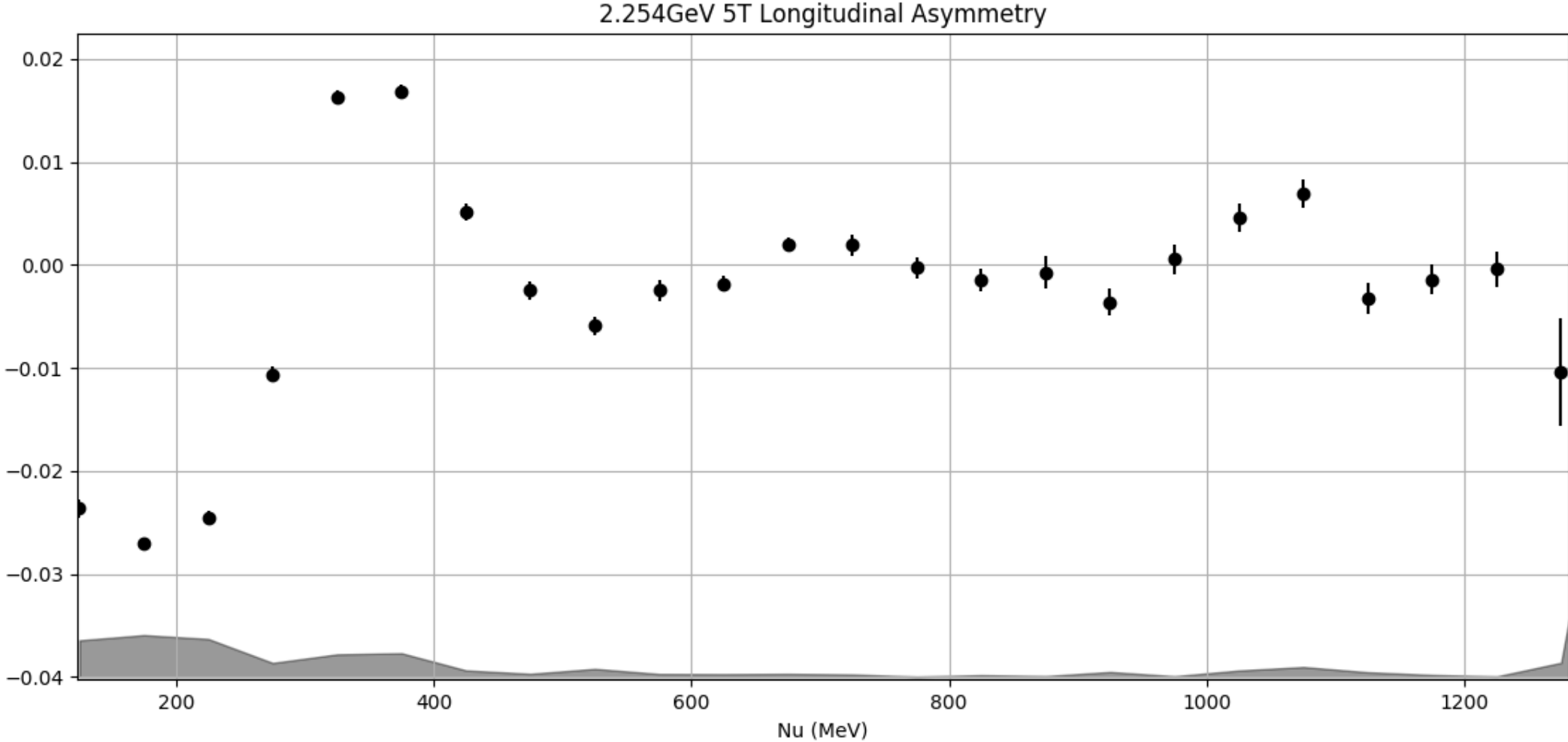
Cross Section Cut Summary

- Helicity Error: hel.error&0x2f0f

- BPM Error: bpmavail == 1

- Event type: evtypebits&(1<<3)>0

- VDC Track: tr.n =1 and vdc.(u1/u2/v1/v2).ncluster = 1

- PID cuts from MySQL database

- DP Cut: -0.04 < rec.dp < 0.04

- Target Phi: -0.005 < tr.tg_ph < 0.005

- Target Theta: -0.01 < tr.tg_th < 0.01

- Loose Tracking Cuts: -0.08 < tr.r_y < 0.08 and -0.8 < tr.r_x < 0.8

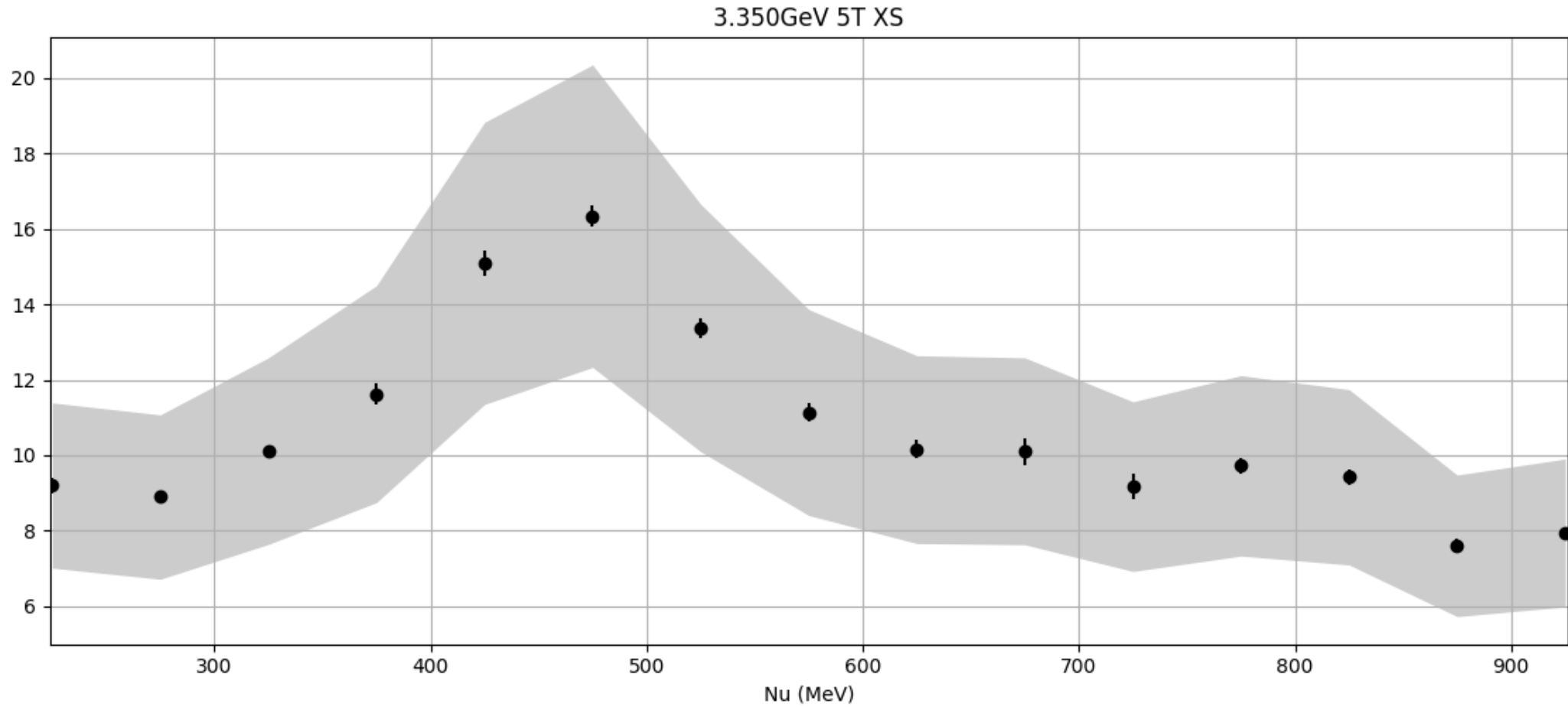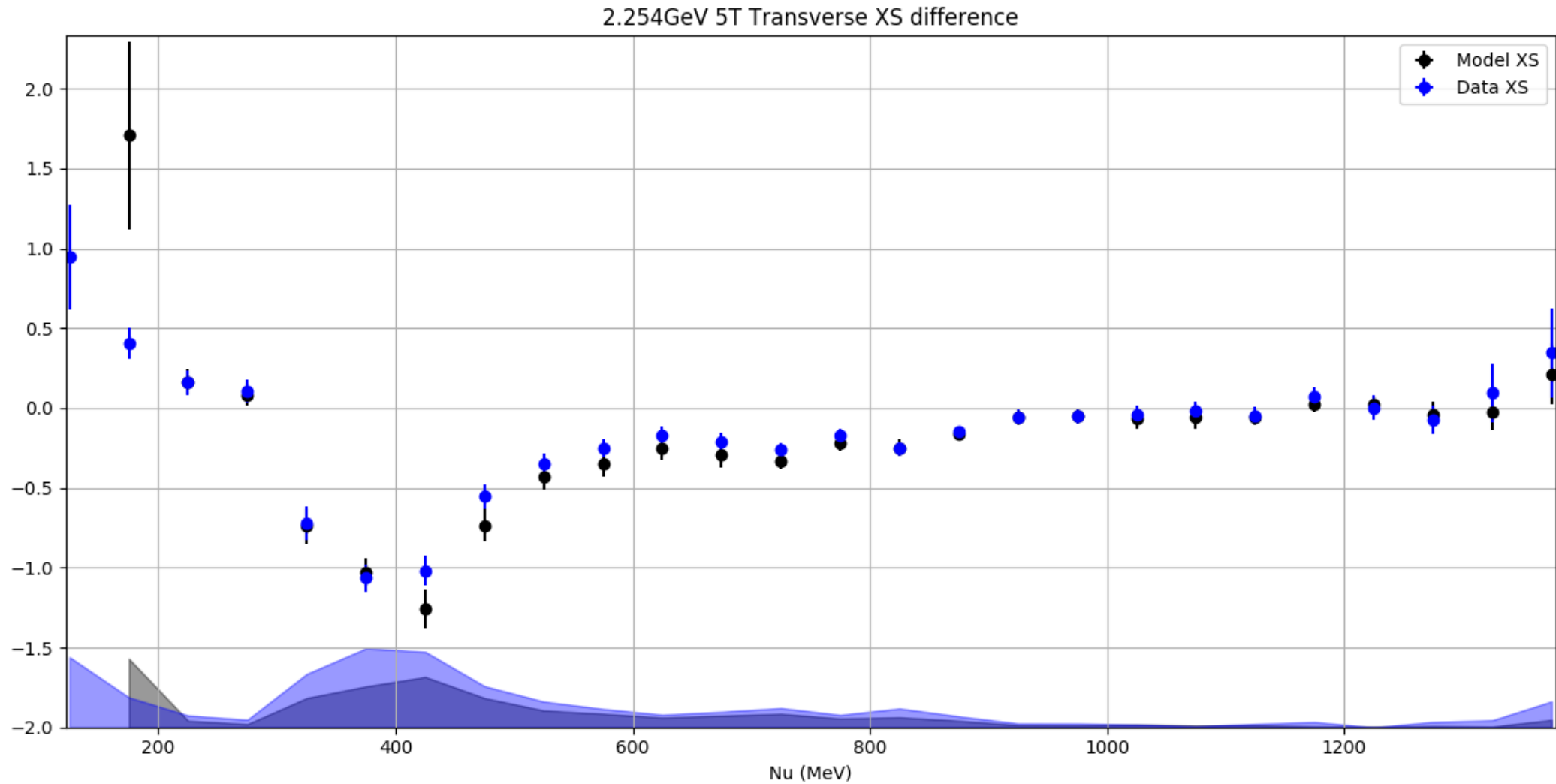# Cross Section - Results

2.254GeV 5T Transverse XS

Cross Section - Results

2.254GeV 5T Longitudinal XS

Cross Section - Results

3.350GeV 5T XS

Polarized Cross Section – Data vs. Model Results

2.254GeV 5T Transverse XS difference

Polarized Cross Section – Data vs. Model Results

2.254GeV 5T Longitudinal XS difference
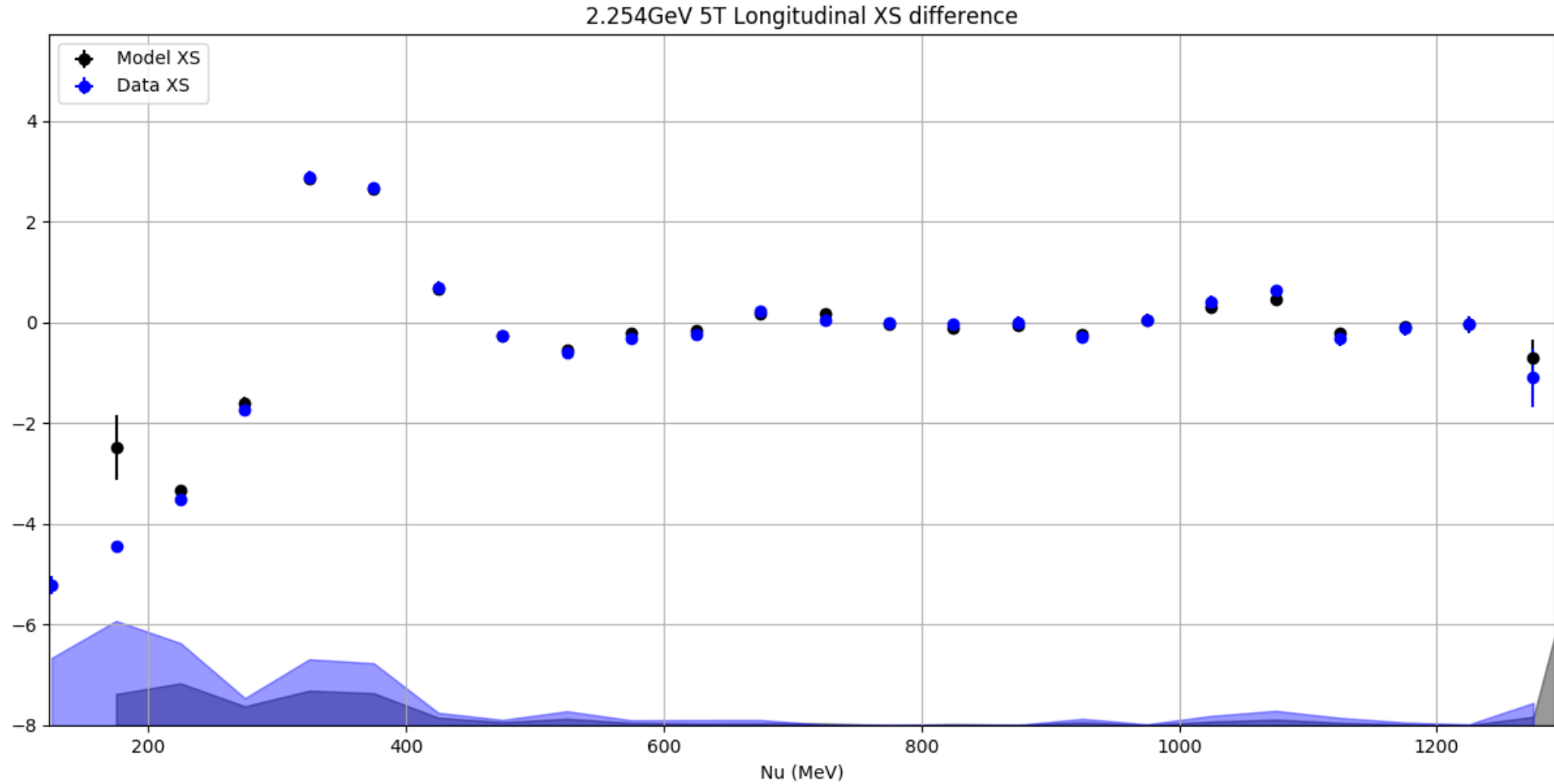
Polarized Cross Section – Data vs. Model Results
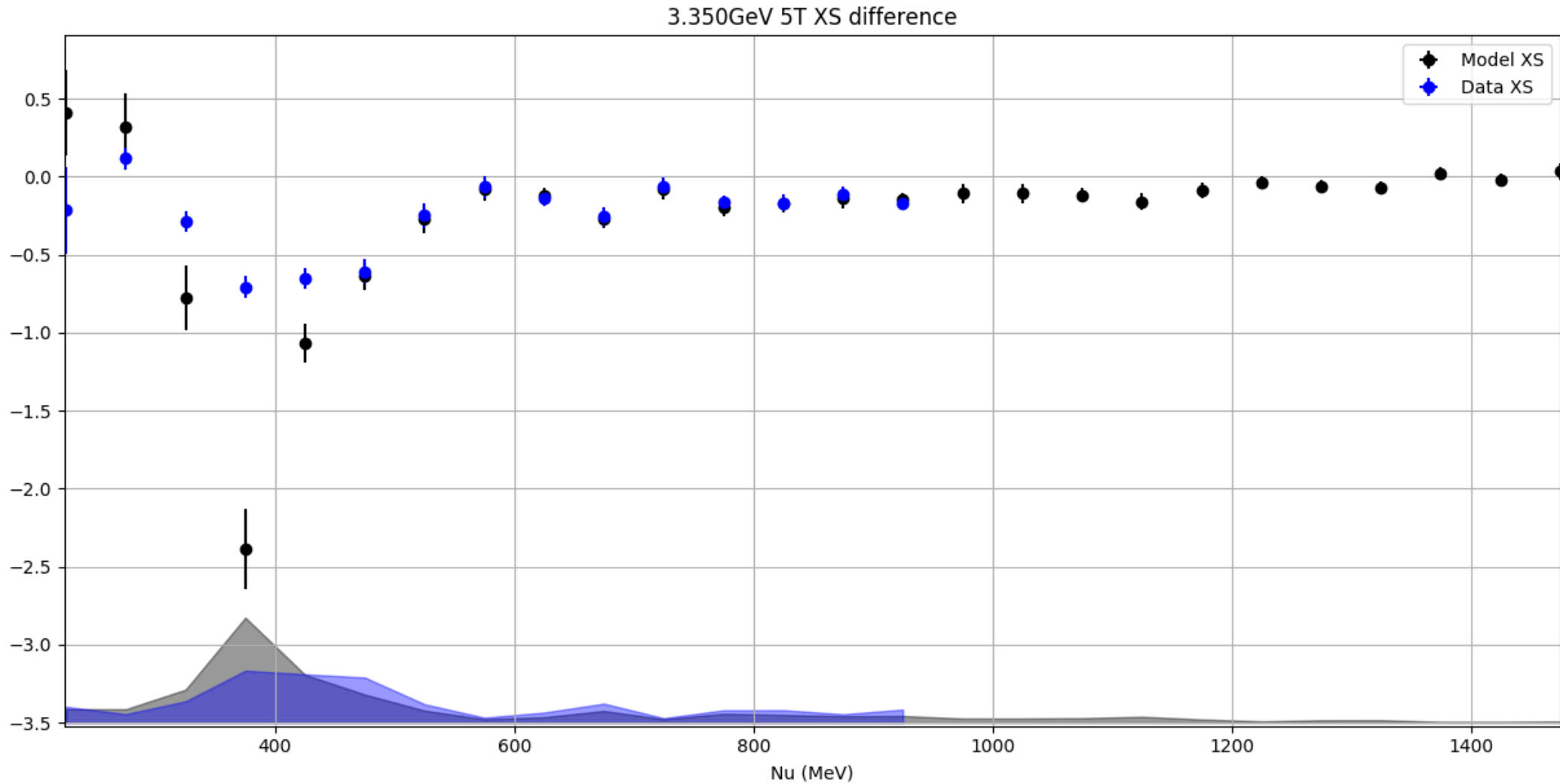
Summary

- Due to large acceptance uncertainty using a model XS results in a smaller overall systematic in delta sigma.
- Total systematics are roughly:
  - 10-12% (model XS)
  - 20-25% (data XS)
- 3.350GeV absolute yields unreliable, I think a model dilution at this setting is needed.
- Next: g1 and g2