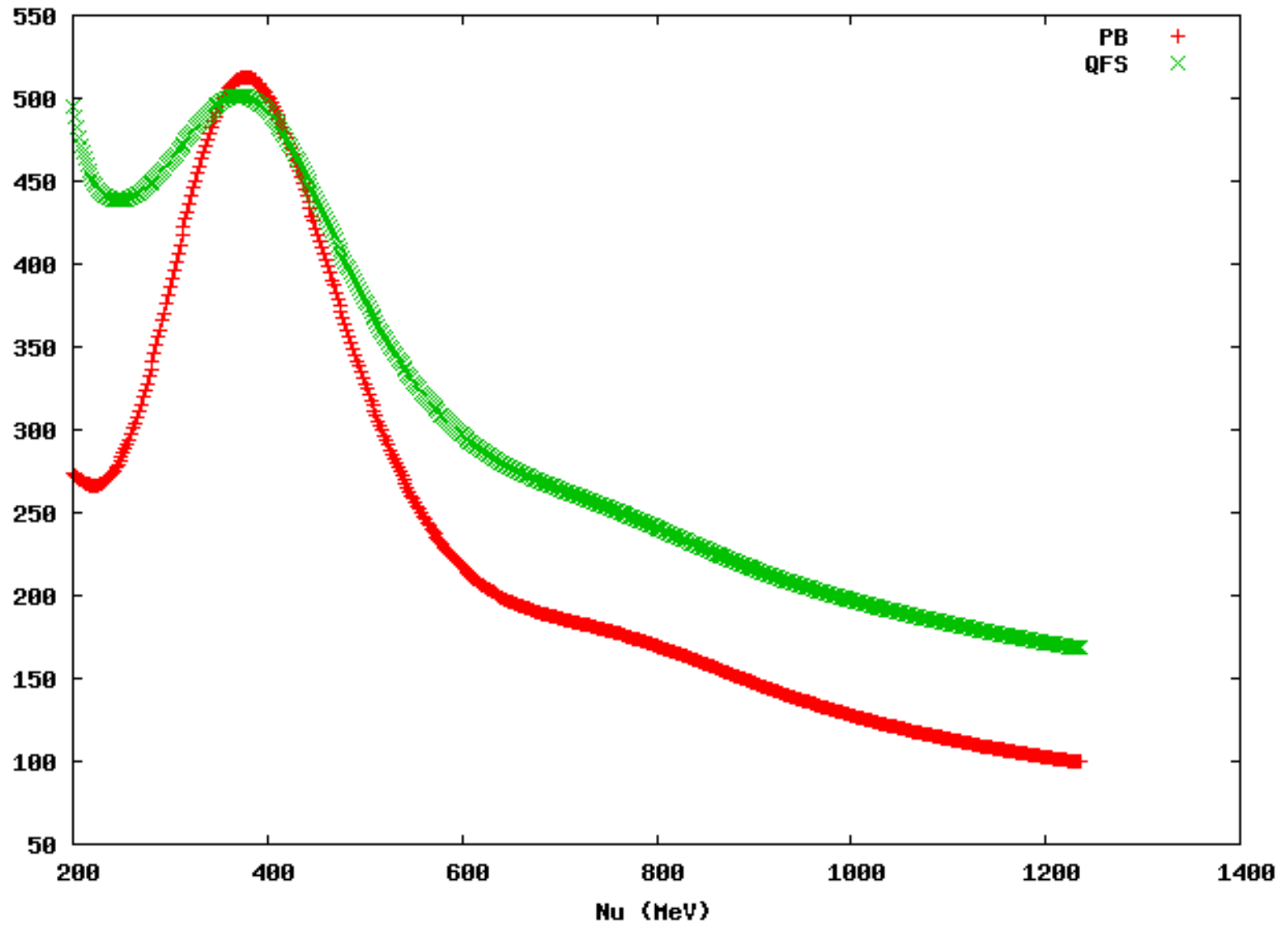


Dilution Update

5/28/14

Carbon Simulation Comparison



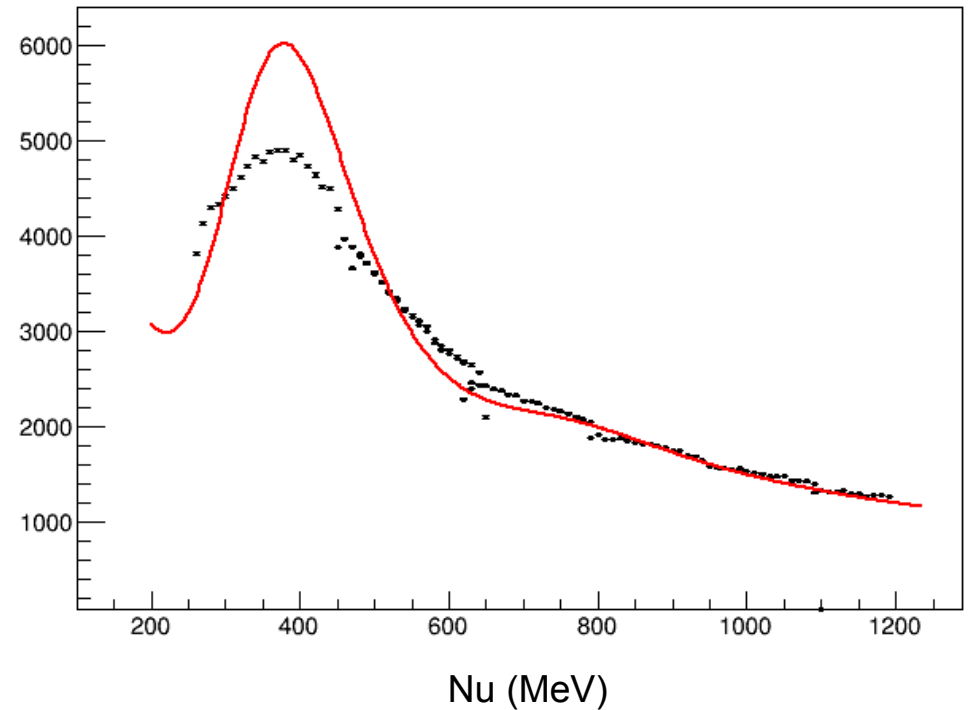
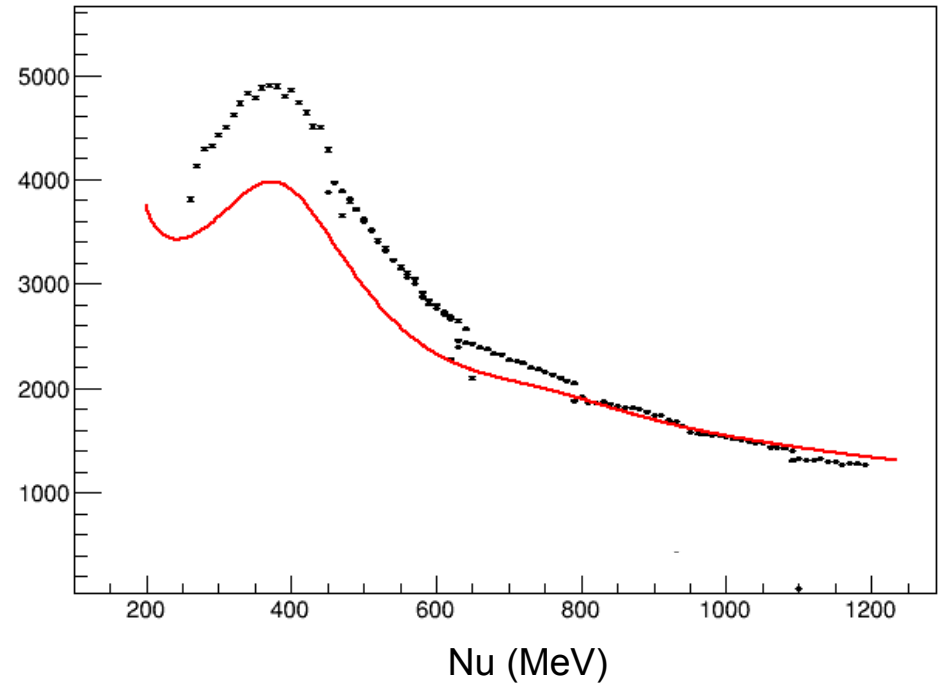
- Comparison of QFS simulation (top) to PB (bottom) against 3.350GeV Carbon dilution data.
- PB seems to have more agreement at high nu, but there is still disagreement at the delta.
- Simulation is constructed using:

$$\alpha(\sigma_C + \sigma_{He}) = \frac{PS}{\epsilon QLT} N_{C, dil}$$

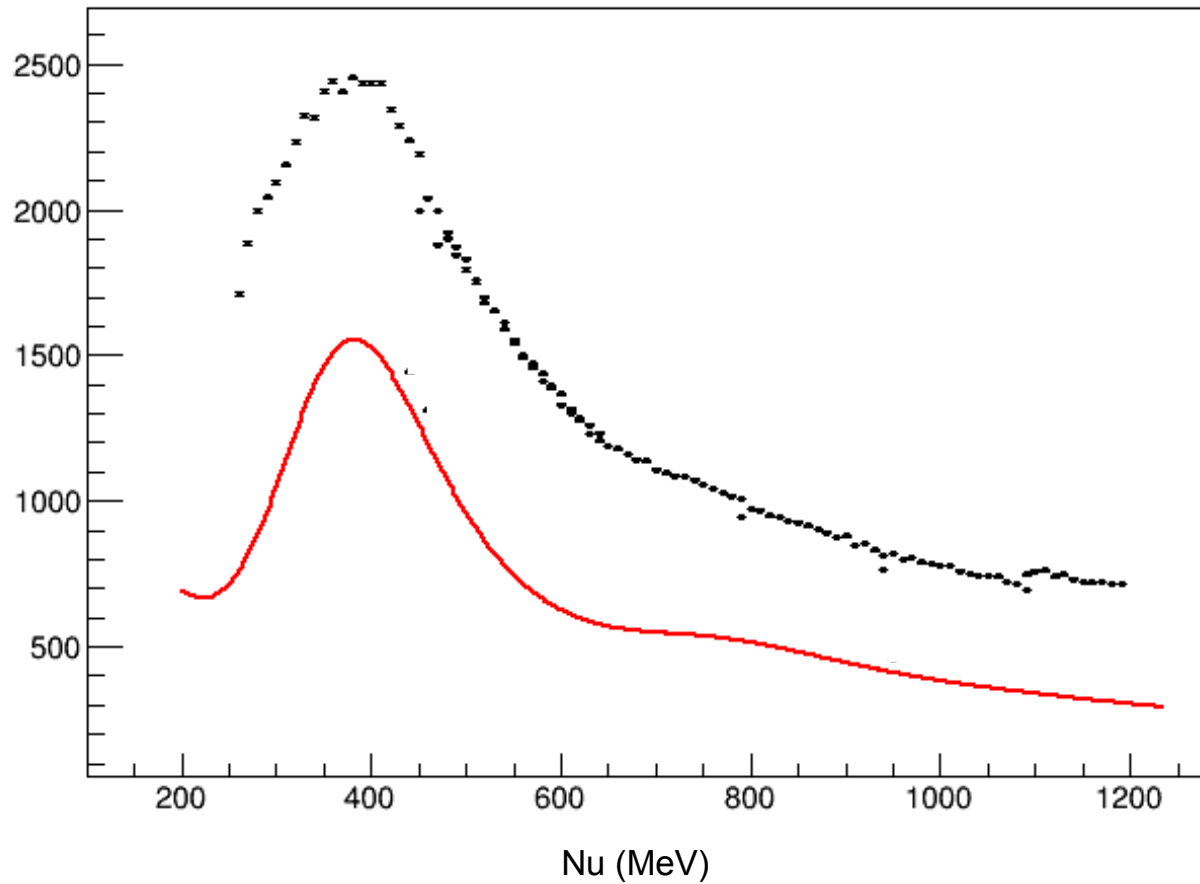
- Here alpha is some scaling constant dependent on acceptance.
- Using PB simulation:

$$\alpha = 8.7$$

3.350GeV Carbon Dilution



3.350GeV Helium Dilution

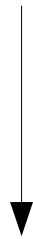


$$8.7(\sigma'_{He}) \neq \frac{PS}{\epsilon_{QLT}} N_{Empty, dil}$$

- The same alpha scaling factor does not accurately scale helium simulation from PB to the empty dilution runs!
- For the remainder of the analysis I assume $\alpha=8.7$

I can now find the Nitrogen scaling factor, 'x':

$$8.7(x\sigma_N + \sigma_{He}) = \frac{PS}{\epsilon QLT} N_{C,dil}$$

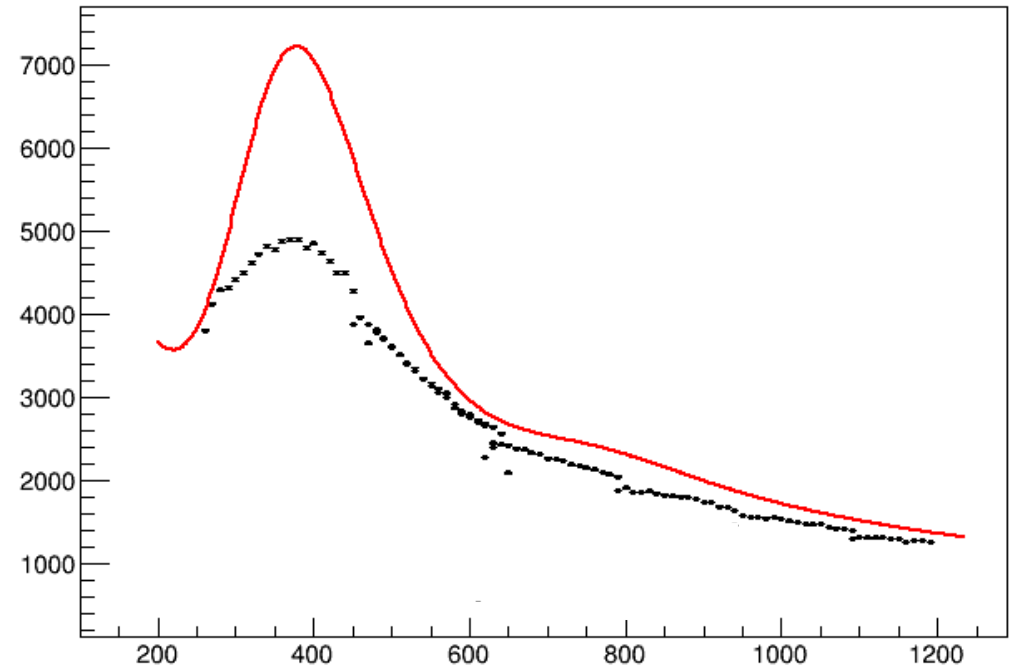


$$8.7(0.857\sigma_N + \sigma_{He}) = \frac{PS}{\epsilon QLT} N_{C,dil}$$

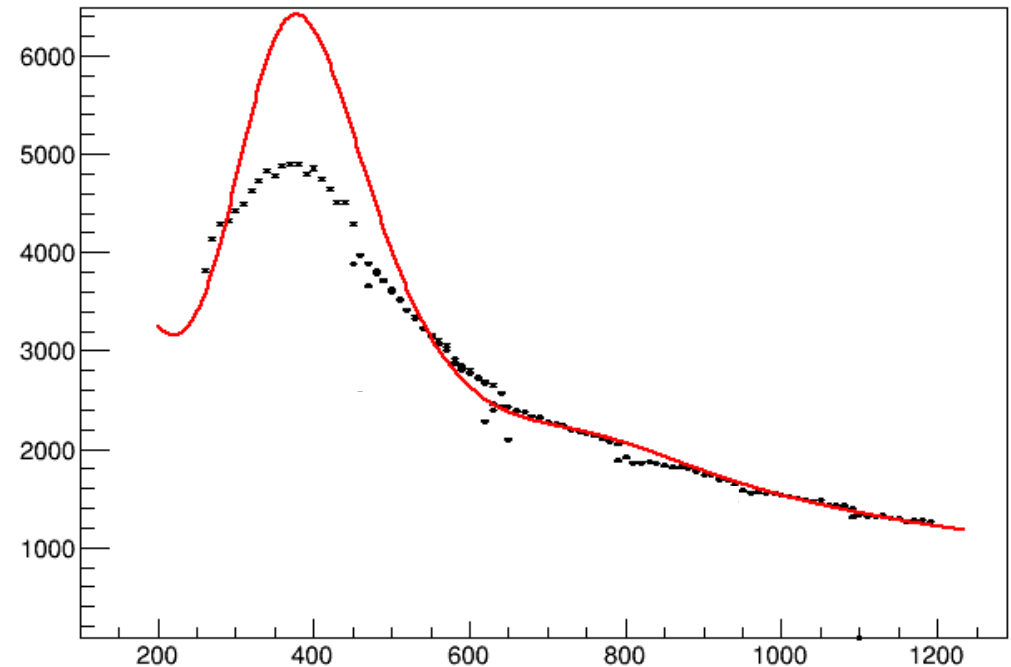
So to scale carbon dilution data to nitrogen we need to scale it by:

$$1/0.857 = 1.167$$

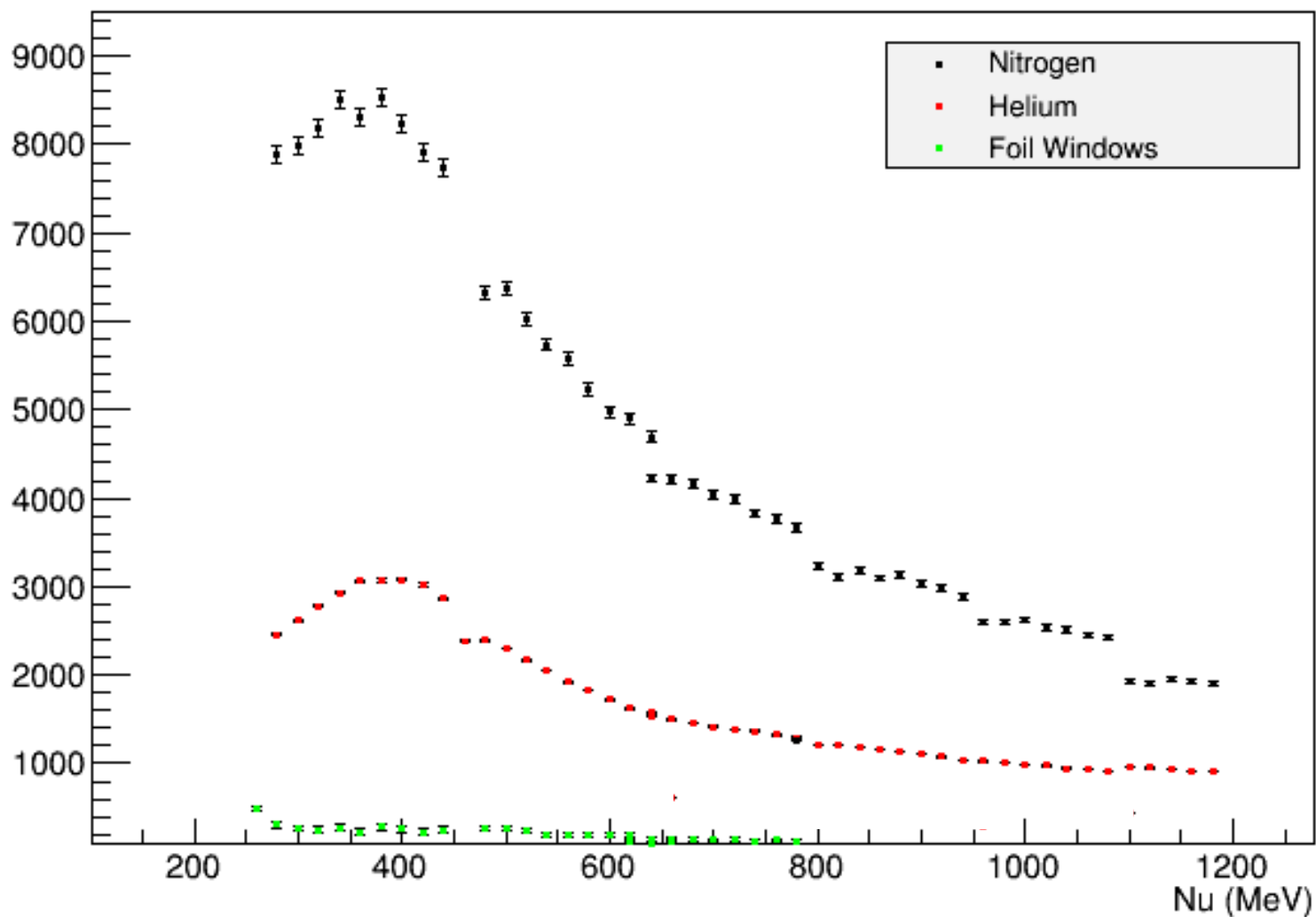
3.350GeV Carbon Dilution (unscaled)



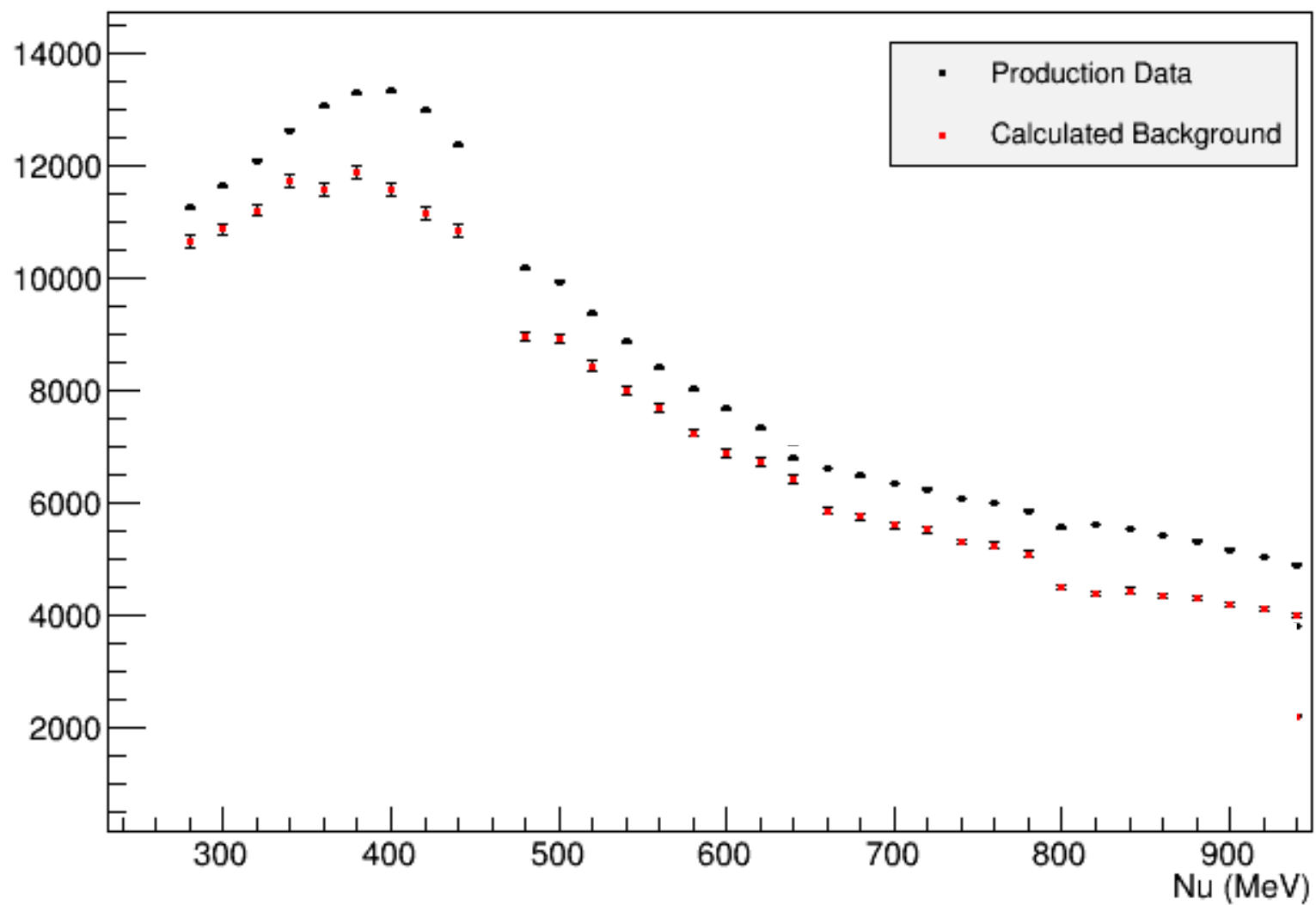
3.350GeV Carbon Dilution (scaled)



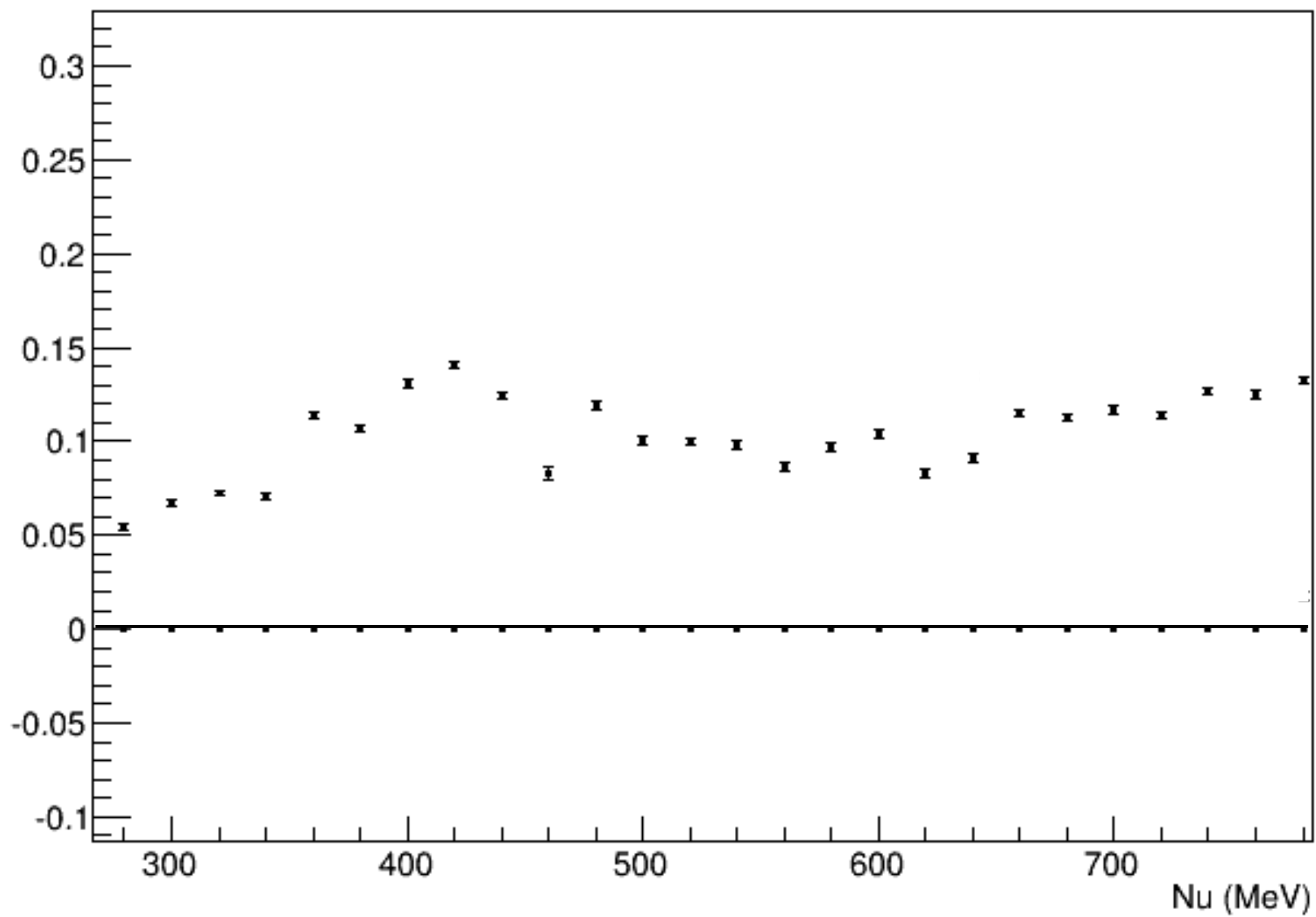
3.350GeV Calculated Background by Material



3.350GeV Total Calculated Background



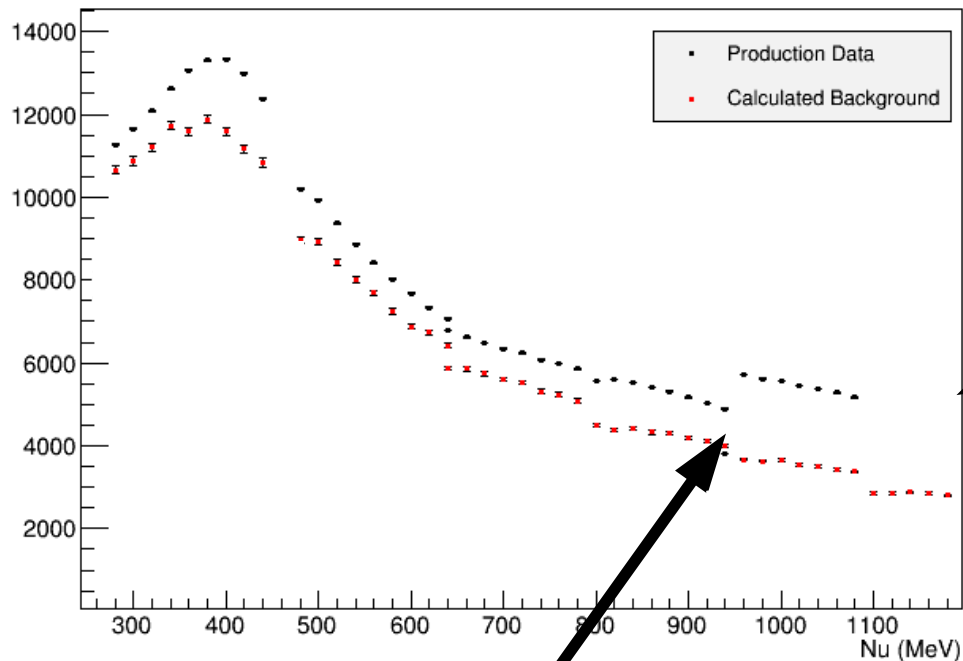
3.350GeV Dilution



To do:

- Work on alpha scaling constant discrepancy.
 - Suggestions from meeting?
- Complete analysis at other beam settings.
- Add dilution to mySQL (Rootfiles at replay stage?) per run.
- Yield discrepancy study (next slide)

3.350GeV Production



No left arm data at lowest p0 setting!

- [385304 05/16/12 12:38 adev Start Run 42109, Run type=Production, target type=NH3 top.comment text=Production](#)
- [385303 05/16/12 12:37 a-onl Start Run 24755, Run type=Production, target type=NH3 top.comment text=Production P = 2.0696](#)
- [385302 05/16/12 12:37 a-onl Start Run 6157, Run type=Production, target type=NH3 top.comment text=Production P = 2.4918](#)
- [385301 05/16/12 12:33 J Mulholland \[target\] During beam down time, polarized to 90% on top target. screenshot attached](#)
- [385299 05/16/12 11:45 adev End of Run 42108](#)
- [385298 05/16/12 11:35 J Mulholland \[Target\] Scratch that. Polarizing Positive](#)
- [385297 05/16/12 11:27 roblin beam energy](#)
- [385296 05/16/12 11:24 jpierce \[Target\] NMR and microwave issues](#)
- [385295 05/16/12 11:19 J Mulholland \[target\] moved to the top Polarizing Negative](#)
 - [385298 05/16/12 11:35 J Mulholland \[Target\] Scratch that. Polarizing Positive](#)
- [385294 05/16/12 11:06 J Mulholland \[target\] NMR tune is being adjusted. Microwave power extremely low](#)
- [385293 05/16/12 10:29 A. Camsonne MRPC TDC V1290 resolution set to 25 ps](#)
- [385292 05/16/12 10:16 J Mulholland \[target\] Anneal finished](#)
- [385291 05/16/12 09:46 A. Camsonne MRPC shielding lowered](#)
- [385290 05/16/12 09:26 J Mulholland \[target\] Preparing for anneal. Moved to lower limit switch](#)
- [385289 05/16/12 09:17 J Mulholland \[target\] Scrap that. Reset target computer: target mover is communicating again](#)
- [385288 05/16/12 08:41 J Mulholland \[target\] Will go in during access to power cycle the target mover control box](#)
 - [385289 05/16/12 09:17 J Mulholland \[target\] Scrap that. Reset target computer: target mover is communicating again](#)
- [361475 05/16/12 08:40 auto_snap Spectrometer Magnet Settings snapshot](#)
- [361474 05/16/12 08:40 auto_snap MCC: Hall A Status snapshot](#)
- [361473 05/16/12 08:40 auto_snap IHWP Stripchart snapshot](#)
- [361472 05/16/12 08:40 auto_snap Hall A Tools snapshot](#)
- [361471 05/16/12 08:40 auto_snap Hall A Status snapshot](#)
- [361470 05/16/12 08:40 auto_snap Beam Position and Current snapshot](#)
- [361469 05/16/12 08:40 auto_snap Beam Energy snapshot](#)
- [361468 05/16/12 08:40 auto_snap Beam Currents - detailed snapshot](#)
- [385287 05/16/12 08:34 J Mulholland \[target\] rebooting PDP. Target motion not responding](#)
 - [385288 05/16/12 08:41 J Mulholland \[target\] Will go in during access to power cycle the target mover control box](#)
- [385286 05/16/12 08:29 a-onl End of Run 24754](#)
- [385285 05/16/12 08:29 a-onl End of Run 6156](#)
- [385284 05/16/12 08:10 J Mulholland \[Target\] Lost communication with target mover](#)
- [385283 05/16/12 08:07 J Mulholland \[Target\] Target Day shift note and Screenshot](#)
- [385282 05/16/12 08:05 a-onl Start Run 24754, Run type=Production, target type=NH3 top.comment text=Production P = 2.0696](#)
- [385281 05/16/12 08:04 Chao Owl Shift Summary](#)
- [385280 05/16/12 08:01 adev Start Run 42108, Run type=Production, target type=NH3 top.comment text=Production](#)
- [385279 05/16/12 07:54 a-onl Start Run 6156, Run type=Production, target type=NH3 top.comment text=Production P = 2.3422](#)
- [385278 05/16/12 07:51 a-onl End of Run 6155](#)
- [385277 05/16/12 07:41 Hainbotham Beam Energy Using Rd1 from Manner](#)

- 4 hour beam down.
- Only thing of note I could find was an anneal (red) during beam downtime.
- No evidence at any other setting that anneal is affecting yields.
- Still need to check beam position changes before/after downtime as per Melissa's study.