

Dilution Analysis Update

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Background contributions

$$Y_A = \frac{PS * N_A}{Q * LT}$$

$$Y_{BG} = N_o \frac{\rho_{14} Z_{tg} PF \sigma_{14}}{M_{14}} + N_o \frac{\rho_{27} Z_{27} \sigma_{27}}{M_{27}} + N_o \frac{\rho_4 Z_{tg} (1 - PF) \sigma_4}{M_4} + N_o \frac{\rho_4 Z'_4 \sigma_4}{M_4}$$

$=$ Y_N $+$ Y_{foil} $+$ $Y_{He_{in}}$ $+$ $Y_{He_{out}}$

$$Y_N = \frac{\rho_{14} Z_{tg} PF}{\rho_{12} Z_{12}} Y_C + \left(\frac{Z_{12}}{Z_{tg}} - 1 \right) \frac{\rho_{14} Z_{tg} PF}{\rho_{12} Z_{12}} Y_{Empty} - PF \frac{\rho_{14}}{\rho_{12}} Y_{He_{out}}$$

$$Y_{foil} = Y_{Dummy} - Y_{Empty}$$

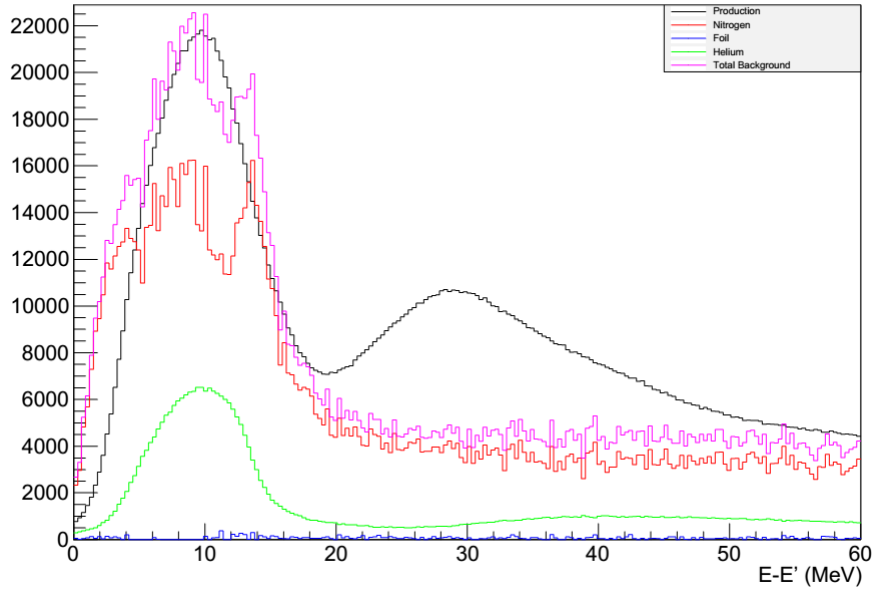
$$Y_{He_{in}} = (1 - PF) Y_{Empty} - (1 - PF) Y_{He_{out}}$$

$$Y_{He_{out}} = ? \quad \leftarrow \text{Need model for } \sigma_4?$$

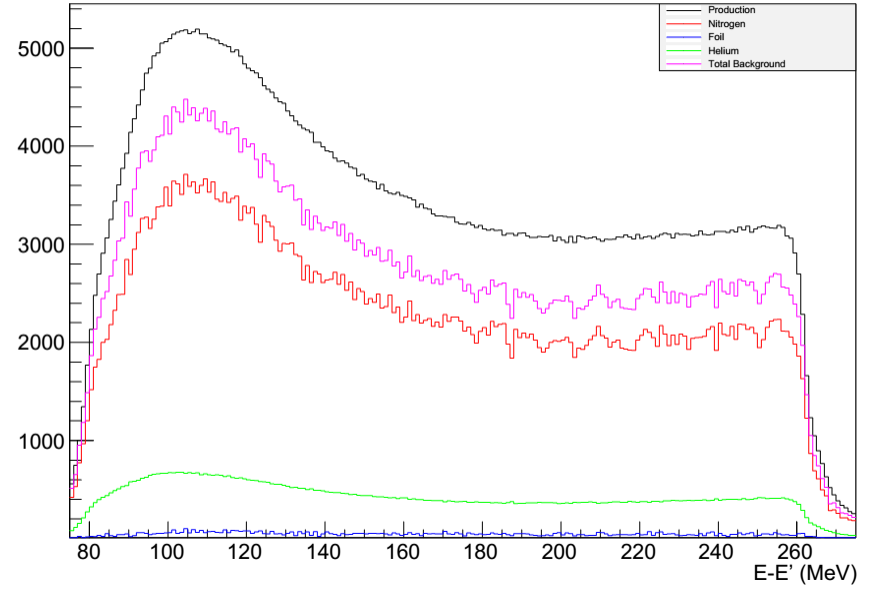
Analysis so far...

- Looking at 2.254GeV 2.5T Transverse
- Assumptions:
 - PF = 0.55
 - $\sigma_N = \frac{7}{6} \sigma_C$
 - $Y_{He_{out}} = 0$
- $f(\text{dilution}) = 1 - \frac{Y_{bg}}{Y_{production}}$
- No cuts used yet!

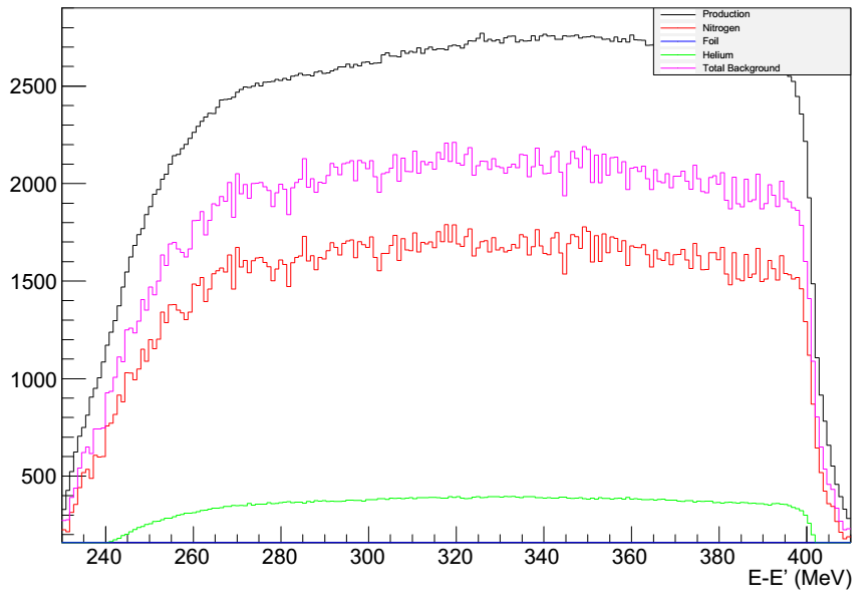
Normalized Yield



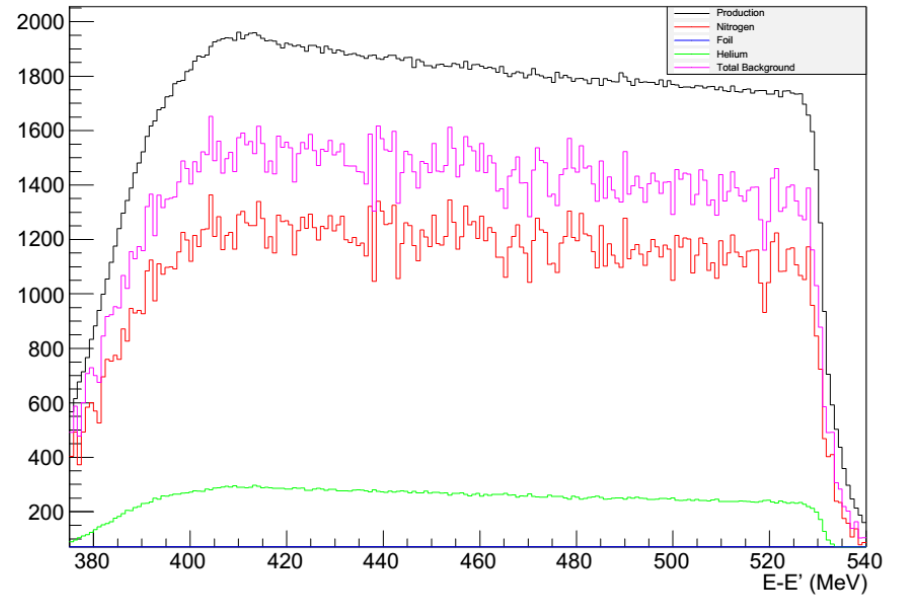
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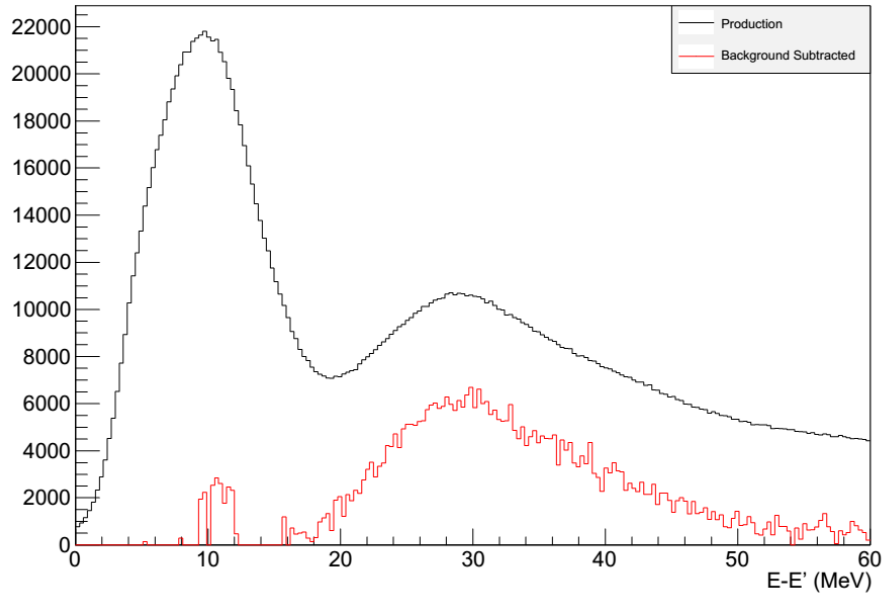
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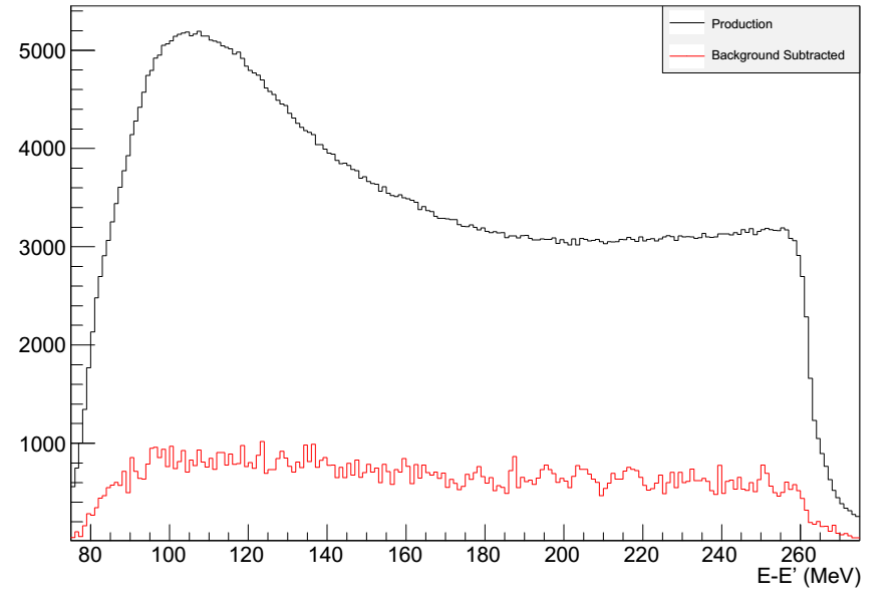
Normalized Yield



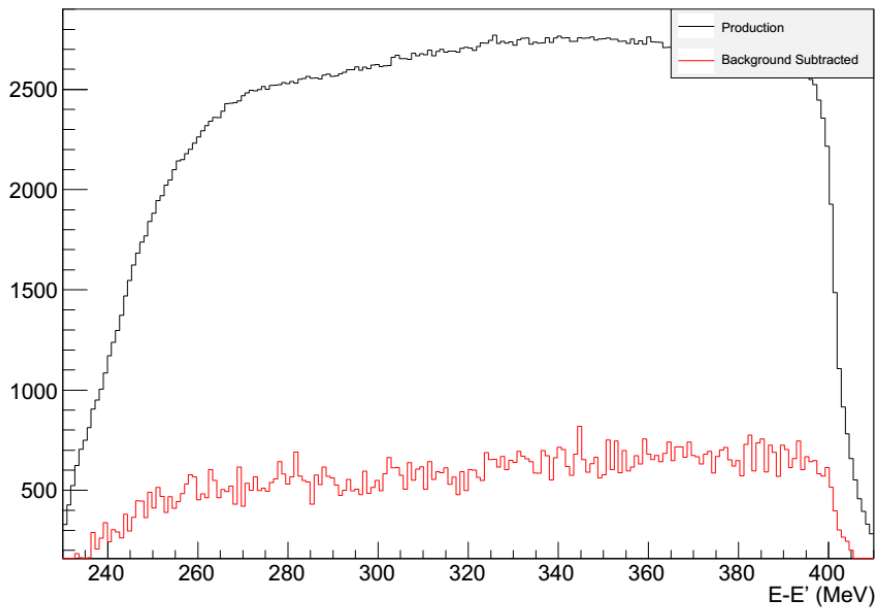
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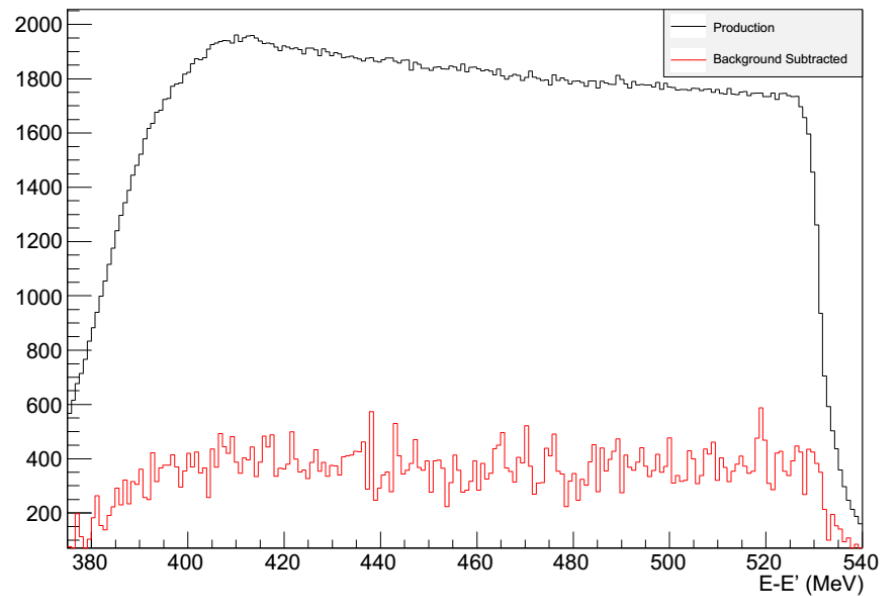
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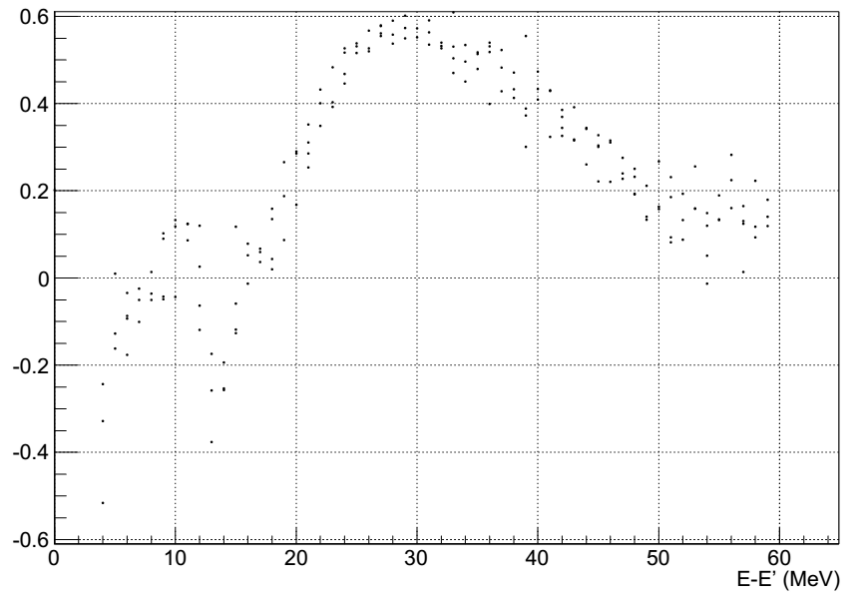
Normalized Yield



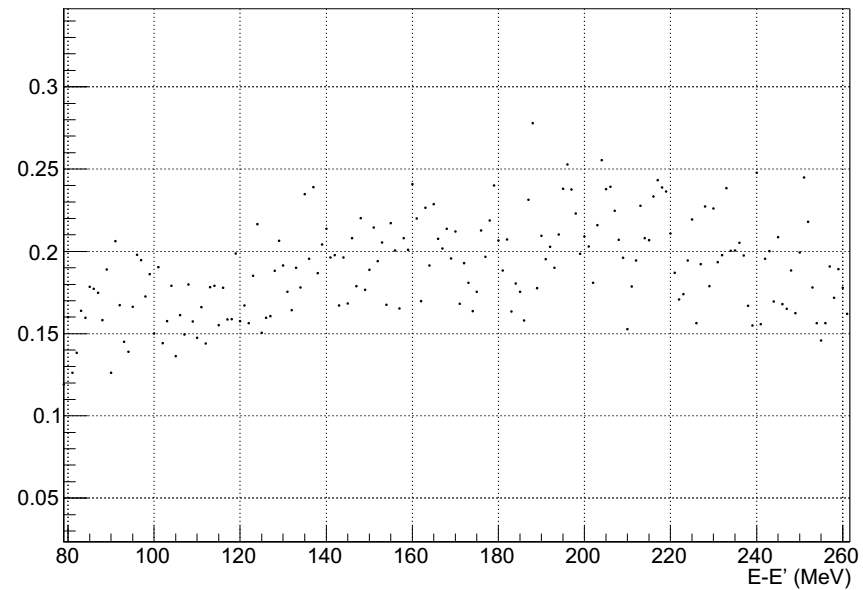
Normalized Yield



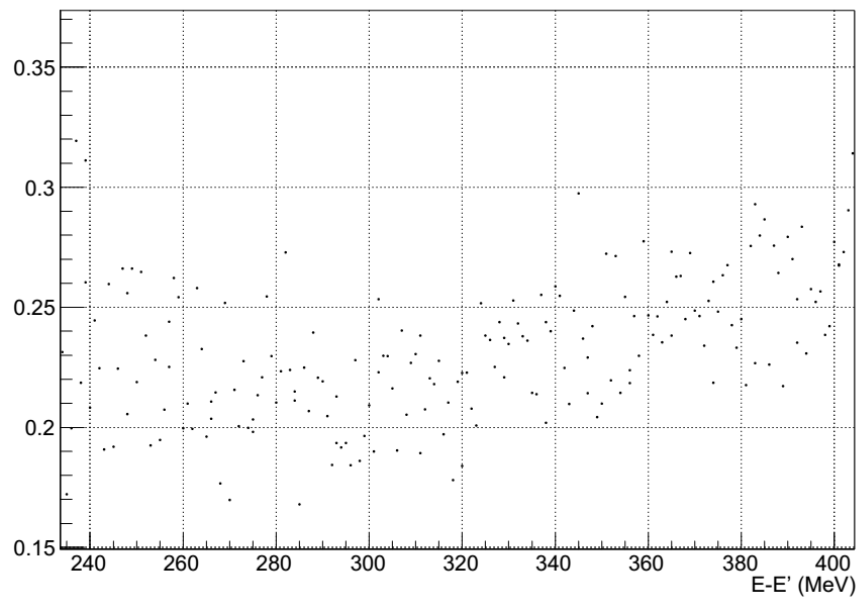
Dilution Factor



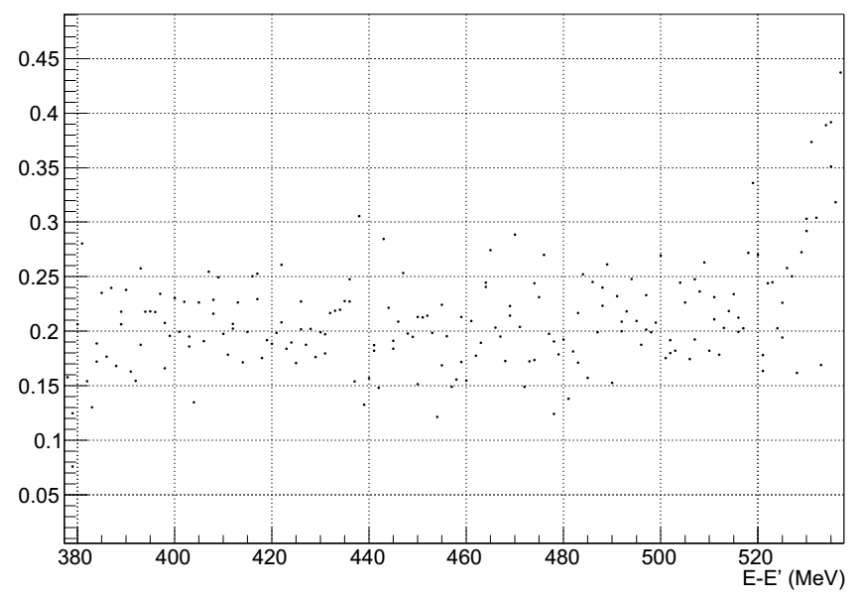
Dilution Factor



Dilution Factor



Dilution Factor



To do

- Apply PID/focal plane cuts
- Complete 2.254 GeV analysis (adjust bin sizing?)
- Correct for $Y_{He_{out}}$
- Nitrogen data from Ryan to replace $\sigma_N = \frac{7}{6} \sigma_C$
- Error analysis?