Study PiO Yield of Carbon Target

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Empty target background subtraction:

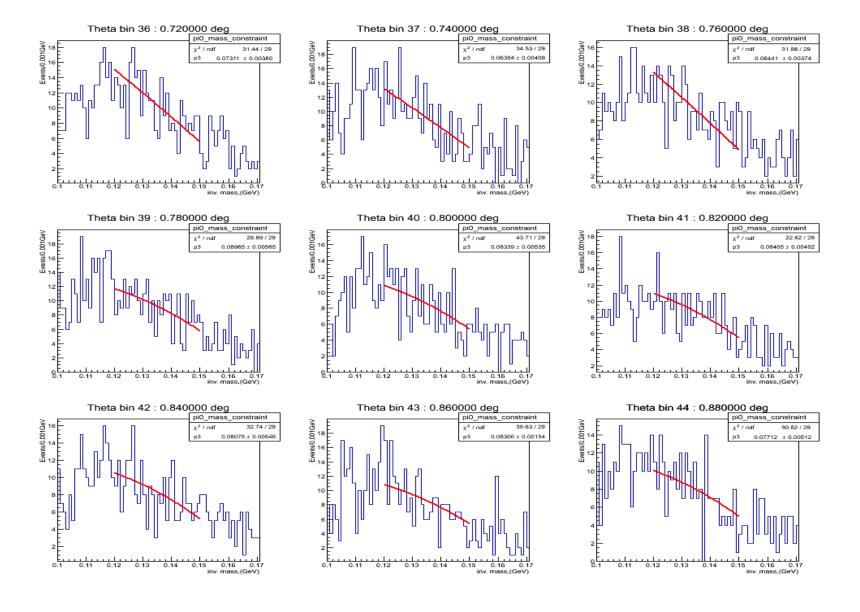
1) For each angular θ bin, the beam background is estimated by fitting the invariant mass distribution of empty target data .

fitting function: 2nd polynomial

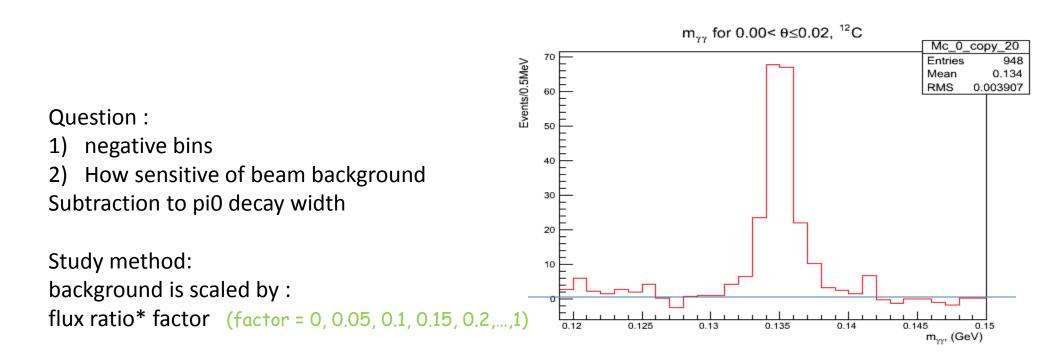
fitting range: [0.12,0.15], the same fit range as piO data events

Invariant mass in primakoff region (Empty target data) Theta bin 1:0.020000 deg Theta bin 2:0.040000 deg Theta bin 0:0.000000 deg pi0 mass constraint pi0 mass constraint pi0_mass_constraint x² / odf 28.32/29 25.82/29 x² / ndf 49.39/29 8 35 0.02046 ± 0.00161 0.0619 ± 0.0028 0.09031 ± 0.00338 Theta bin 4:0.080000 deg Theta bin 5:0.100000 deg Theta bin 3: 0.060000 deg pi0 mass constraint pi0 mass constraint pi0 mass constraint 38.06/29 24.17/29 21.91/29 0.1037 ± 0.0003 0.09761 ± 0.00331 0.1015 ± 0.003 Theta bin 6: 0.120000 deg Theta bin 7:0.140000 deg Theta bin 8:0.160000 deg pi0 mass constraint pi0 mass constraint pi0 mass constraint 23.13/29 32.92/29 26.96/29 0.00057 + 0.0034 0.08615 + 0.00426

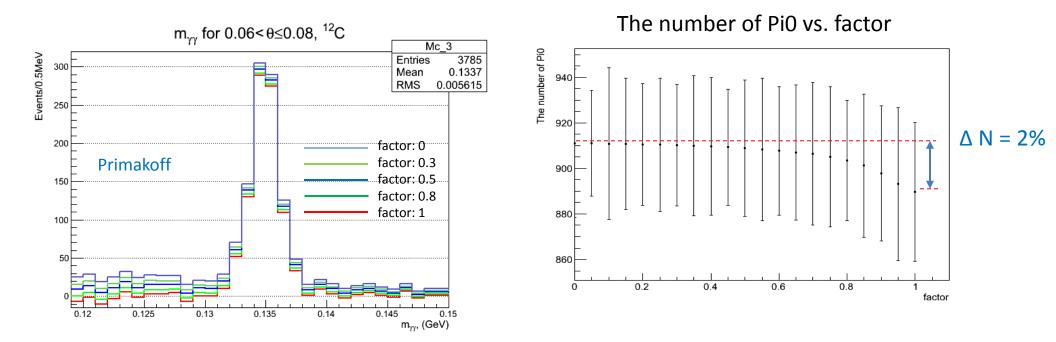
Invariant mass in nuclear coherent region (Empty target data)

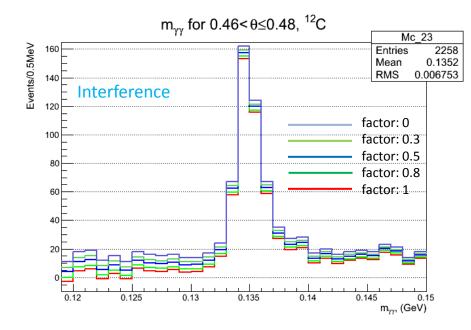


2) For each angular theta bin, the beam background scaled by flux ratio is subtracted from invariant mass of pi0 data.

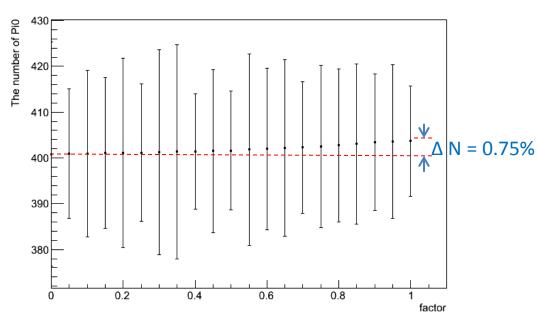


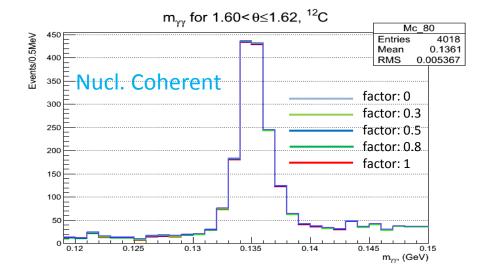
background is scaled by : (flux_C/flux_empty)* factor (factor = 0, 0.05, 0.1, 0.15, 0.2,...,1)



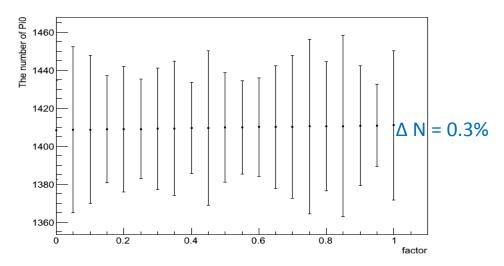


The number of Pi0 vs. factor

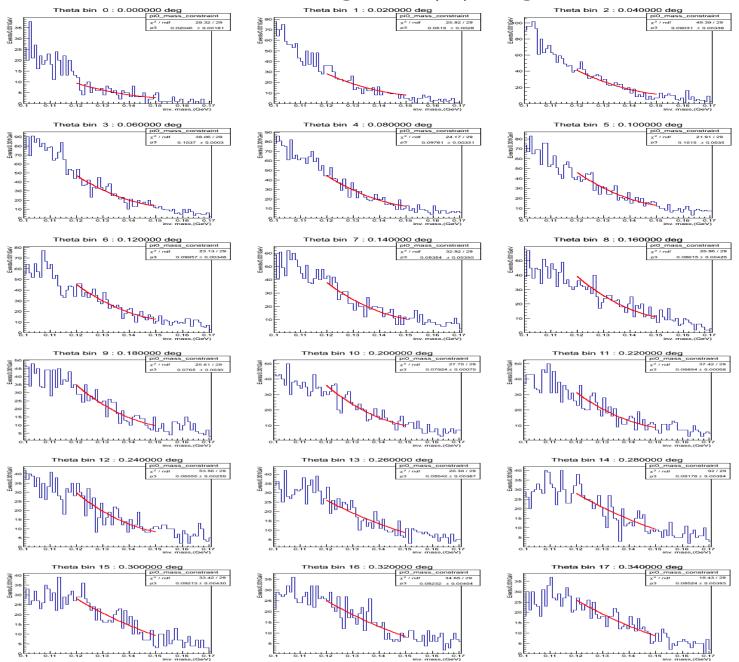


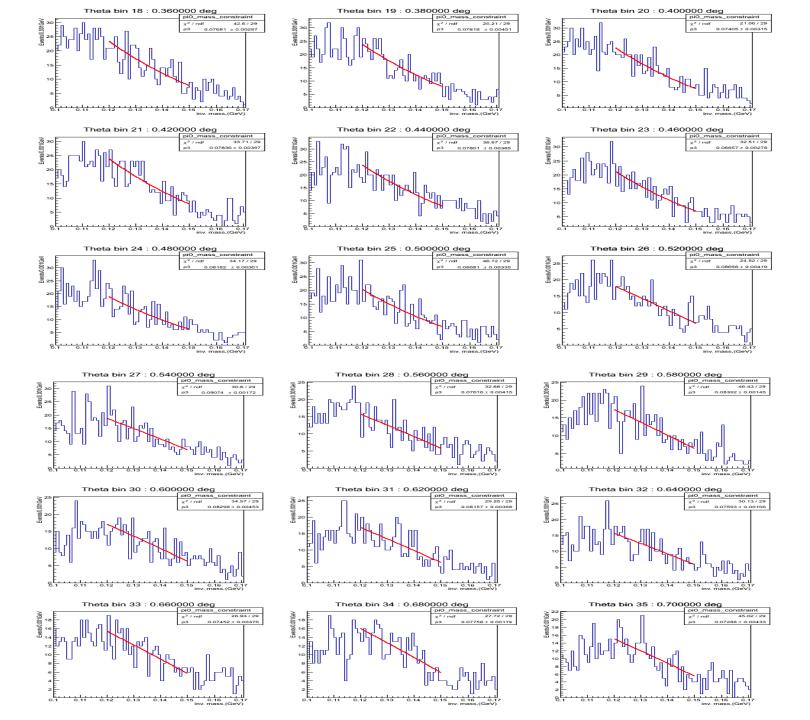


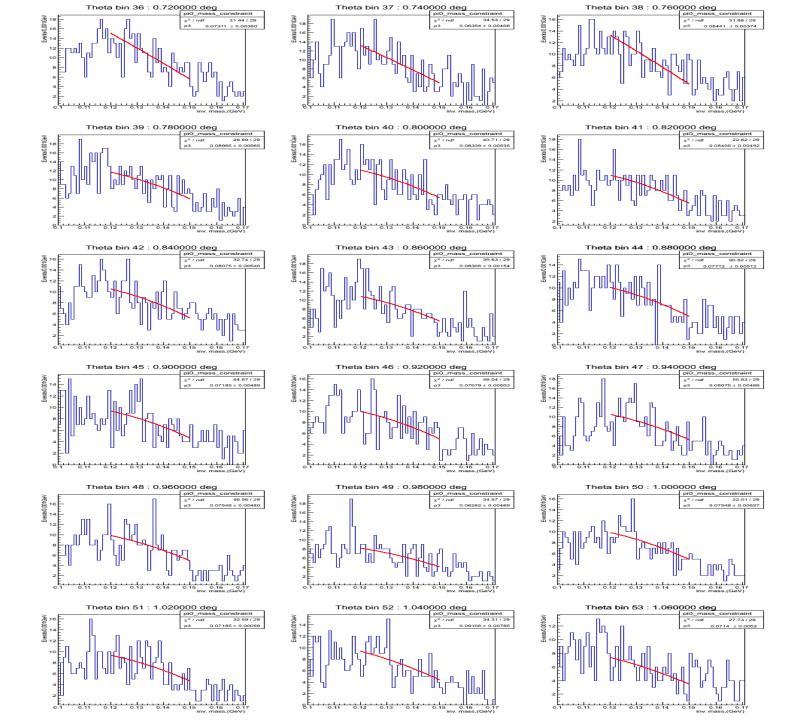
The number of Pi0 vs. factor



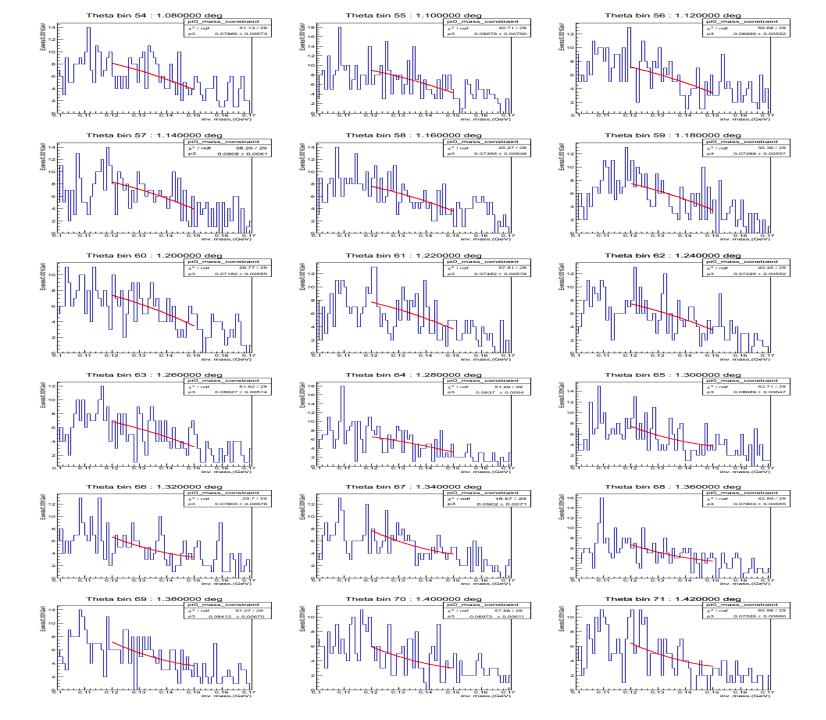
Invariant mass fitting of empty target run

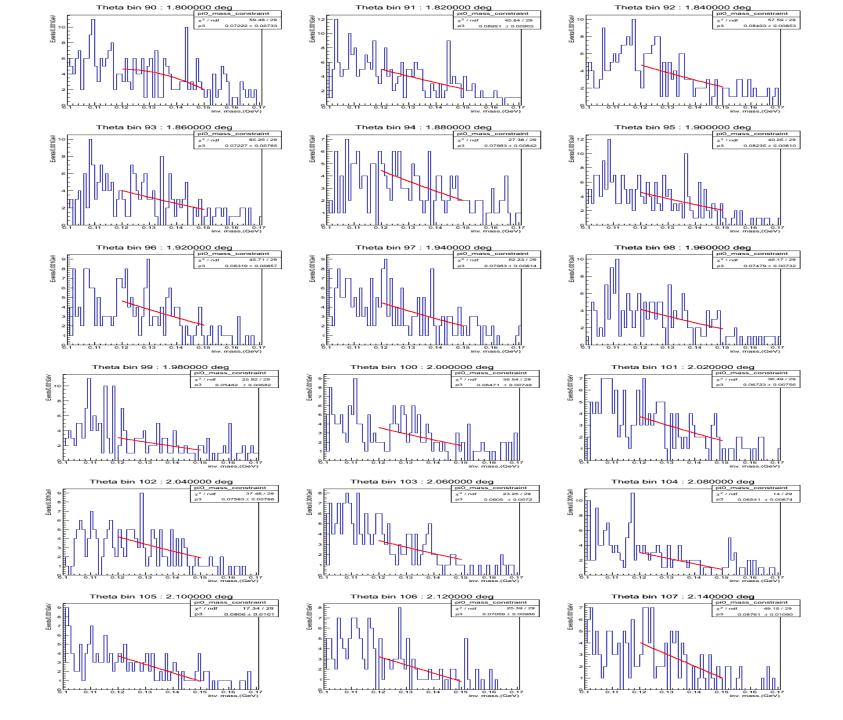




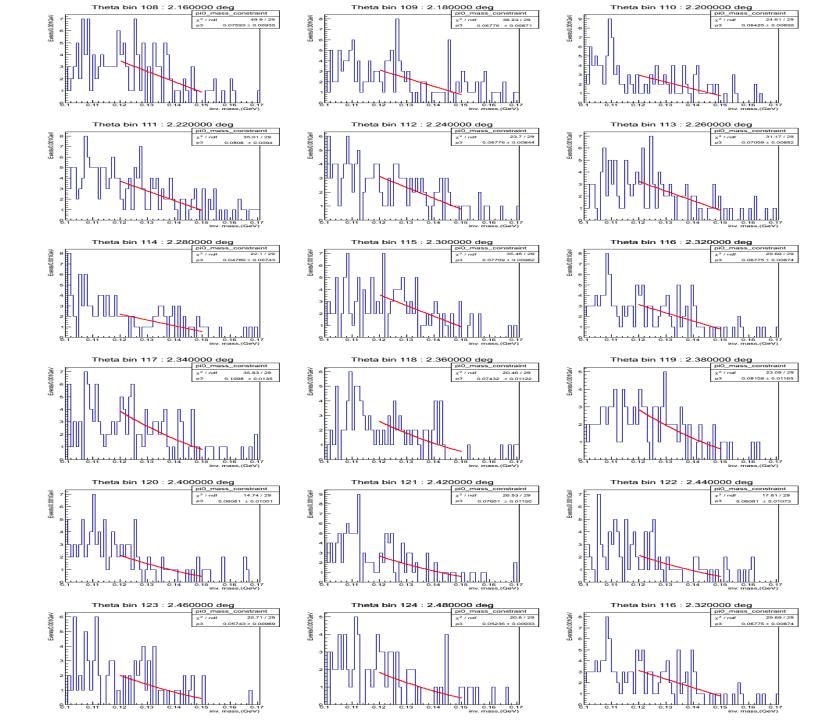


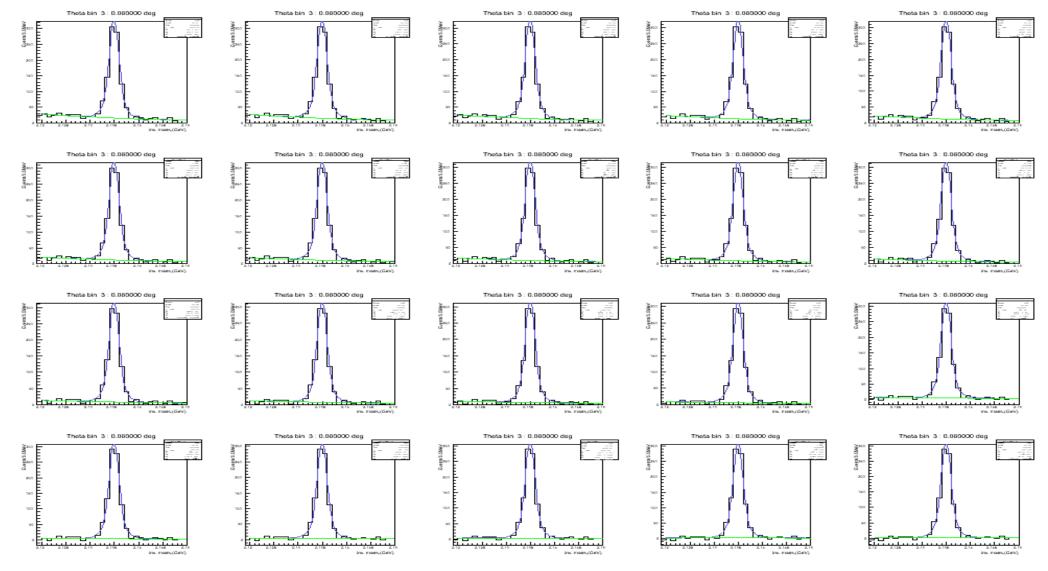


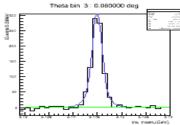




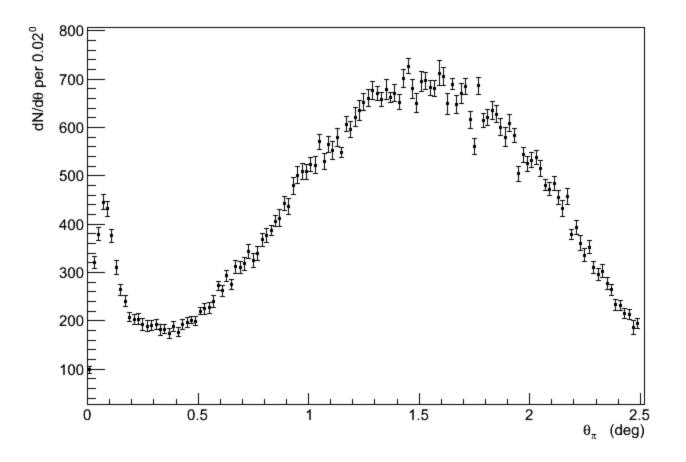




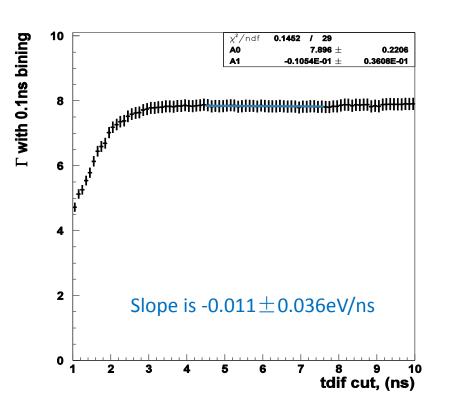




PiO Yield of carbon target



Fit parameters behavior VS tdif window



tdif cut: eff. & systematics

