

Bubble Chamber Planning Meeting

07 August 2013

Agenda

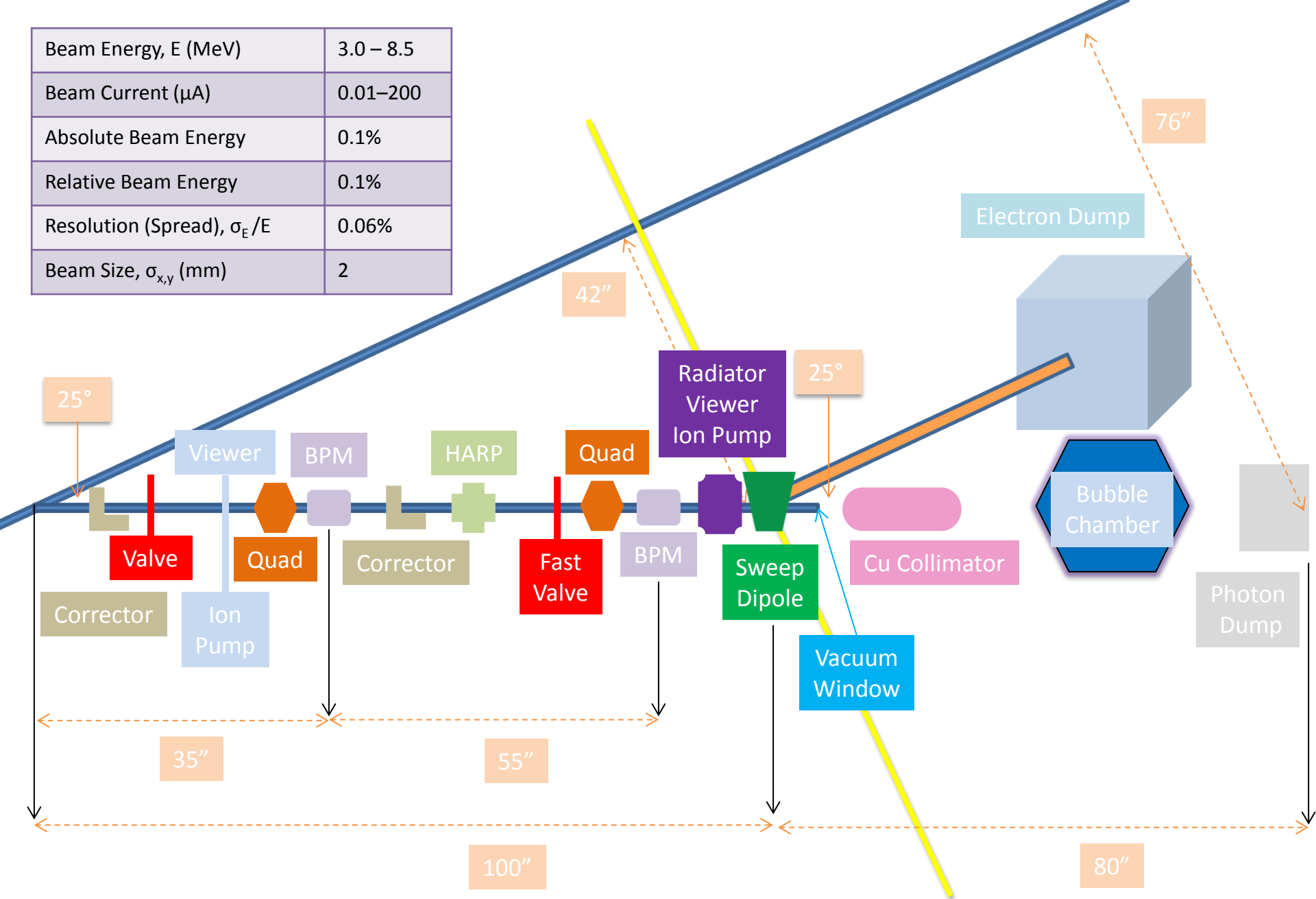
1. Bubble Chamber progress at Argonne
2. Beamline Layout
3. Bubble Chamber cost estimate: procurement and labor
4. Background from $^{17}\text{O}(\gamma, n)^{16}\text{O}$ and subsequent neutron elastic scattering with ^{16}O and ^{14}N nuclei
5. Background from $^{13}\text{C}(\gamma, n)^{12}\text{C}$ (in case we decide to use CO_2 instead of N_2O)

Beamline Layout

- I. HARP to measure beam profile
- II. Fast Valve to protect from vacuum failure
- III. Distance between two BMPs = 55" (was 18" for PEPPo)
- IV. Camera for OTR light from Cu foils
- V. Beam Properties at Radiator:

Beam Energy, E (MeV)	3.0 – 8.5
Beam Current (μA)	0.01–200
Absolute Beam Energy	0.1%
Relative Beam Energy	0.1%
Energy Resolution (Spread), σ_E / E	0.06%
Beam Size, $\sigma_{x,y}$ (mm)	2

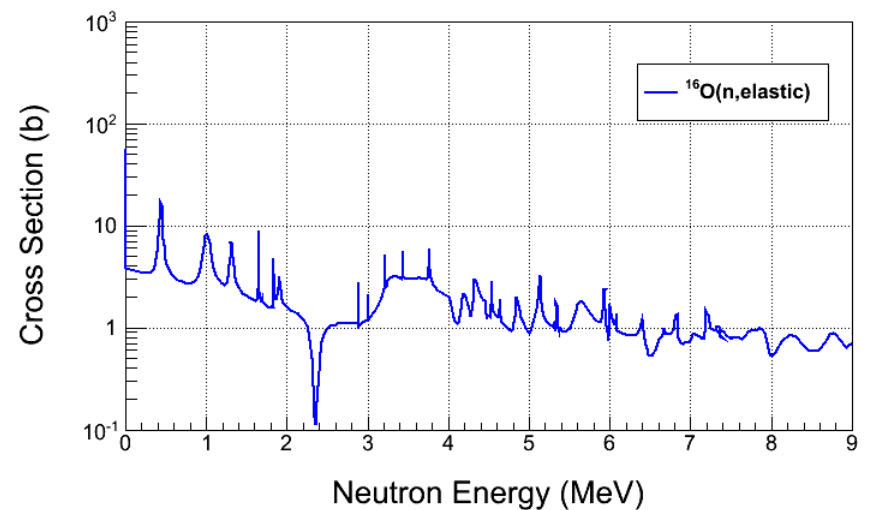
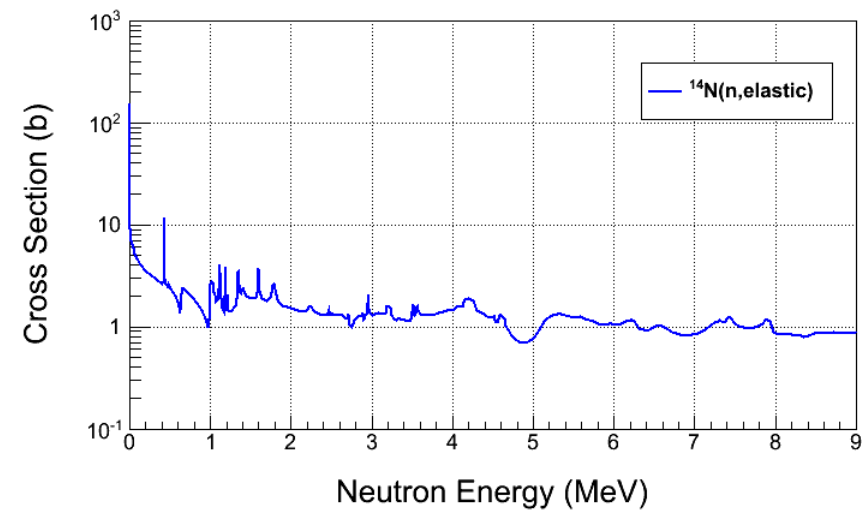
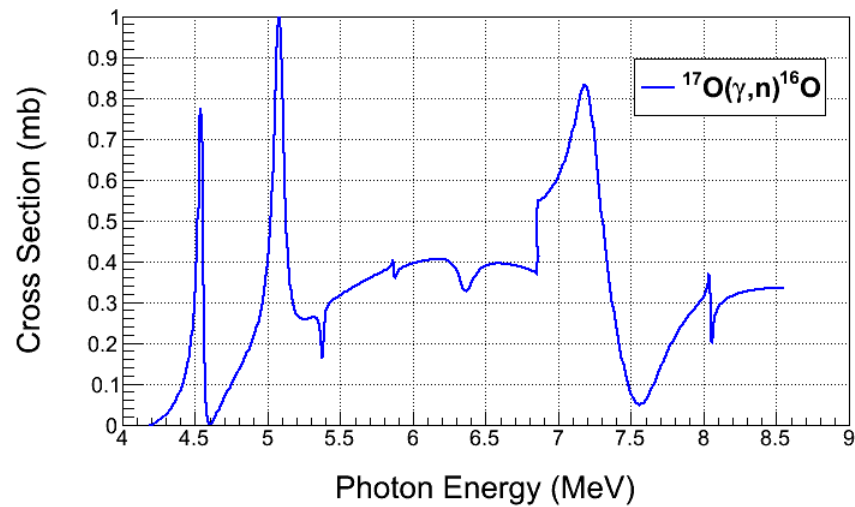
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Cost Estimate

Item	Material Procurement	Shop	Labor
New BPM on Spectrometer line		Pipe + BPM (\$5,000)	P. Francis (1 week)
New Dipole Magnet	Dipole Magnet (\$10,000)		Mapping (2 week) + Alignment (2 weeks)
New Power Supply	Power Supply (\$5,000)		Software (2 days)
New Beamline		Pipes + Pedestals (\$20,000)	Design (6 weeks) Alignment (2 weeks) Software (4 weeks)
Radiator	0.02 and 0.10 mm Cu foils (\$1,000)	\$2,500	Design (1 week) Alignment (1 week)
Sweep Dipole			
Electron Dump	Pure Cu (\$5,000)	Dump + Pipes (\$10,000)	Design (2 week) Alignment (1 day)
Cu Collimator	Pure Cu (\$3,000)	Collimator + Stand (\$5,000)	
Photon Dump & Stand	Pure Al (\$1,000)	\$2,500	Design (4 days) Alignment (1 day)
Safety Review			4 weeks
Install			6 weeks
Total	\$25,000	\$45,000	\$80,000

$^{17}\text{O}(\gamma, n)^{16}\text{O}$ Background



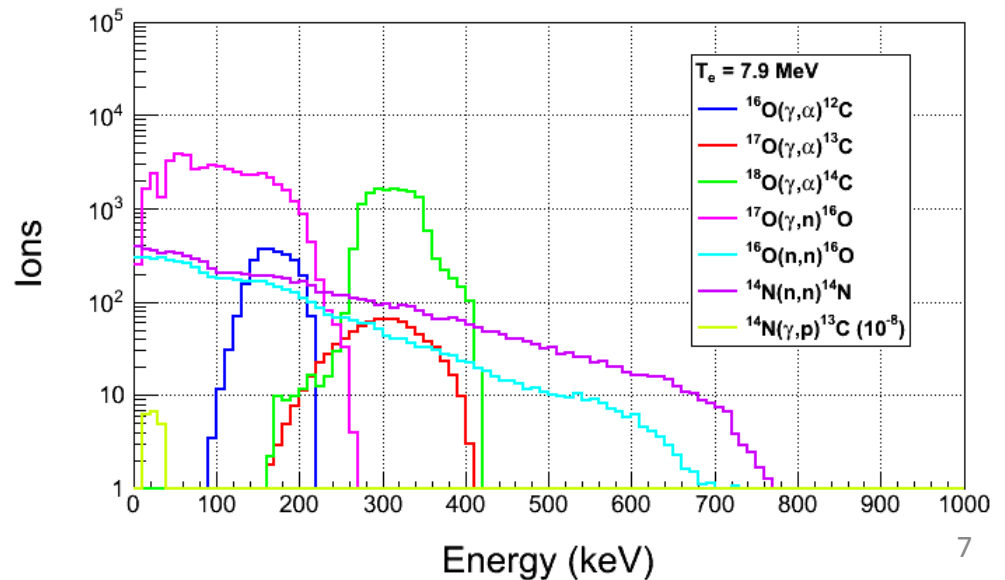
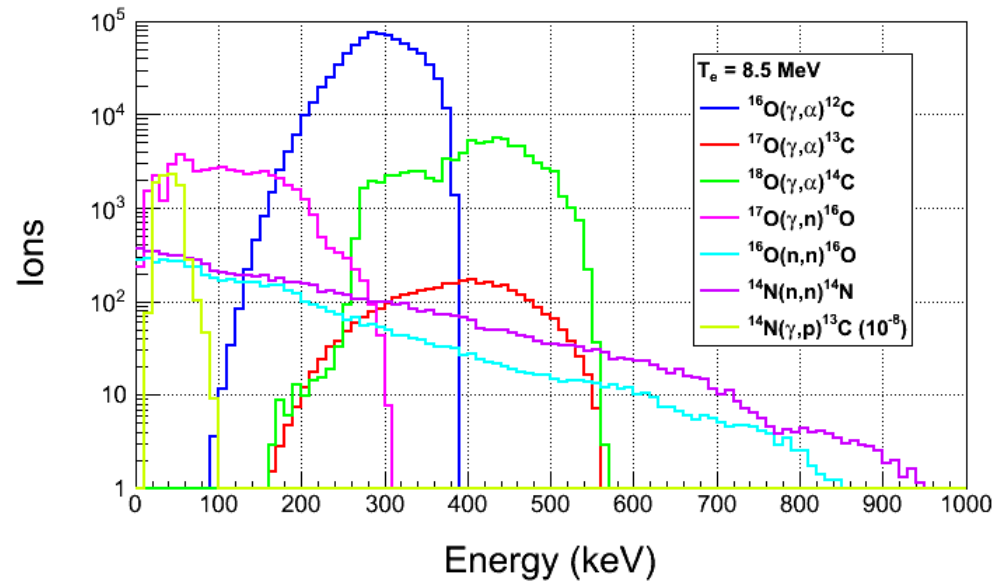
Ion Energy Distribution

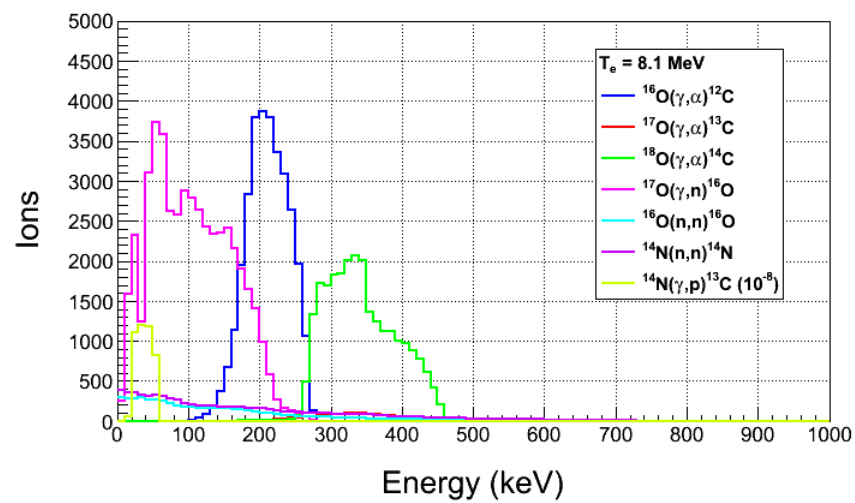
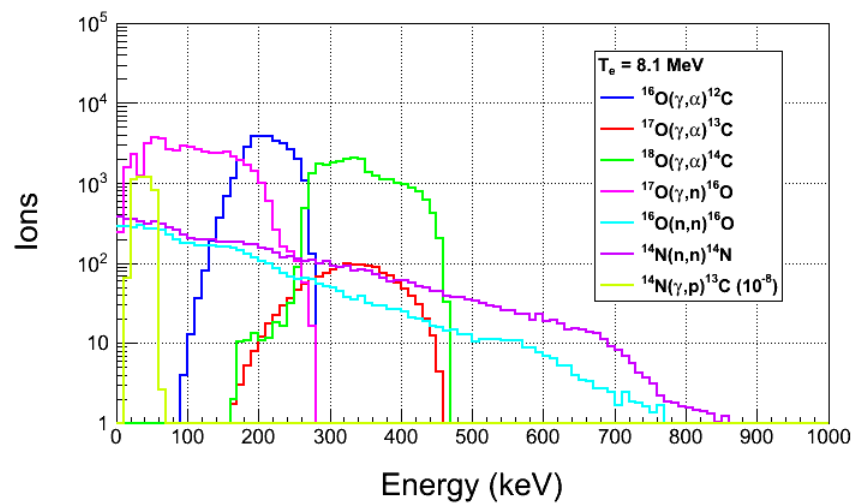
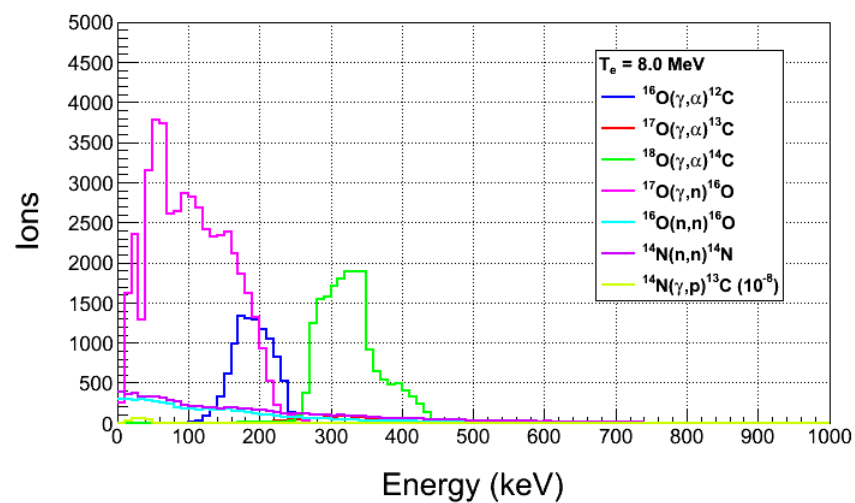
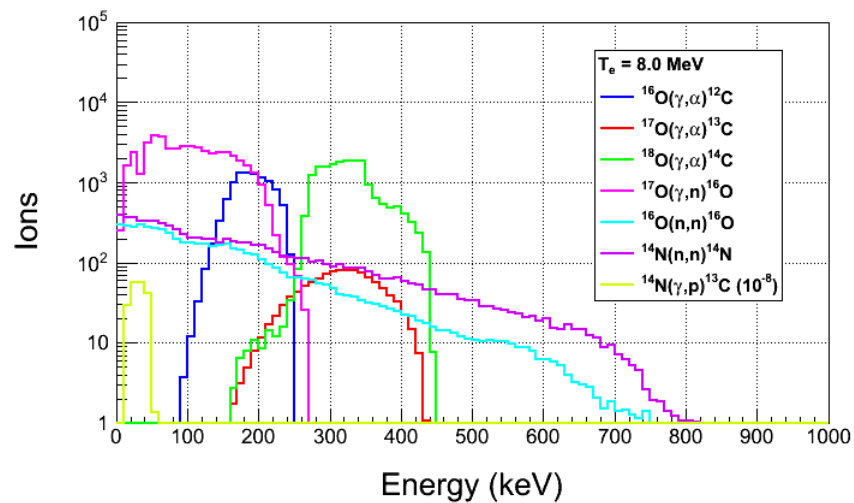
➤ Depletion:

- I. ^{17}O depletion=5,000
- II. ^{18}O depletion=5,000

➤ Natural Abundance:

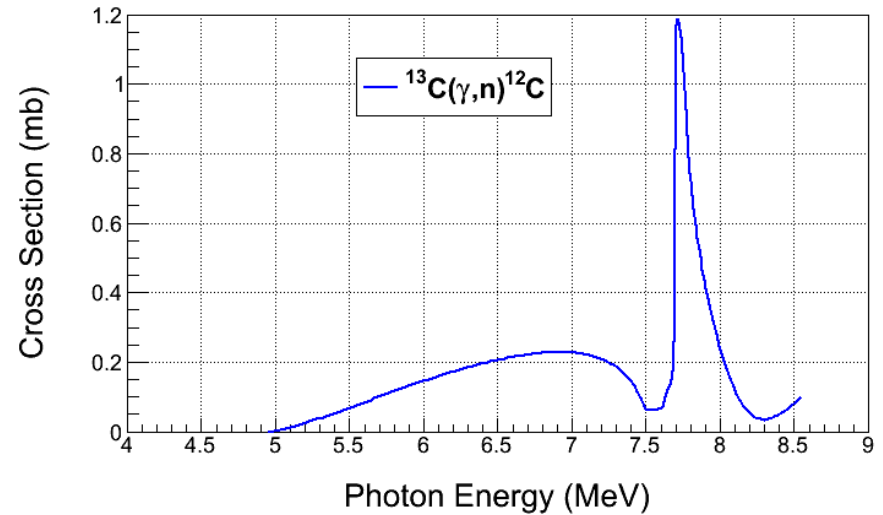
- I. ^{17}O : 0.038%
- II. ^{18}O : 0.205%





$^{13}\text{C}(\gamma, n)^{12}\text{C}$ Background

- Depletion:
 - I. ^{13}C depletion=1,000
- Natural Abundance:
 - I. ^{13}C : 1.07%



For comparison, $^{17}\text{O}(\gamma, n)^{16}\text{O}$

