

Bubble Chamber Planning Meeting

04 September 2013

Agenda

1. Bubble Chamber progress at Argonne
2. Superheated Liquids to be used in the experiment
3. Computer Center support: mailing list, group disk, wiki page
4. Beamline Layout
5. Bubble Chamber cost estimate: procurement and labor
6. Error Analysis

Superheated Liquids

- I. List of superheated liquids to be used in the experiment:

N₂O Targets	¹⁶O	¹⁷O	¹⁸O
Natural Target	99.757%	0.038%	0.205%
¹⁶ O Target		Depleted > 5,000	Depleted > 5,000
¹⁷ O Target		Enriched > 10%	Depleted > 5,000
¹⁸ O Target		Depleted > 5,000	Enriched > 10%

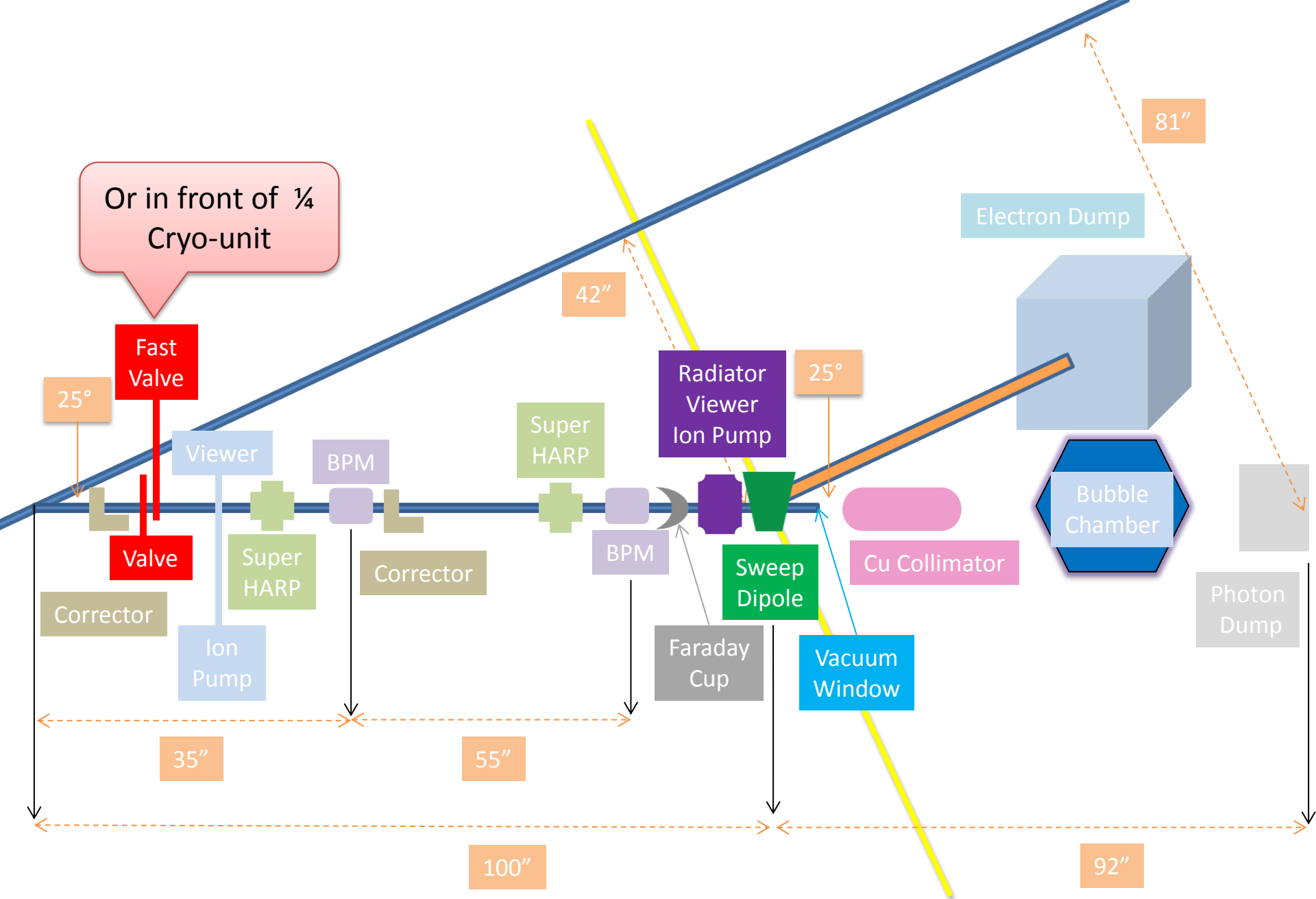
- II. Readout:

- I. Digital Camera
- II. Need Acoustic Signal to discriminate between (γ, α) and (γ, n) events

Beamline Layout

- I. Will not install BPM on Spectrometer line
- II. 2 Super Harps to measure beam profile and absolute beam position (no need for Quads)
- III. Fast Valve to protect from vacuum failure: on our beamline or just in front of $\frac{1}{4}$ Cryo-unit
- IV. Do we want vacuum pipe to connect vacuum window to chamber?
- V. Beam Properties at Radiator:

Beam Kinetic Energy, (MeV)	3.0 – 8.5
Beam Current (μA)	0.01 – 100
Absolute Beam Energy	0.1%
Relative Beam Energy	0.1%
Energy Resolution (Spread), σ_T/T	0.06%
Beam Size, $\sigma_{x,y}$ (mm)	1 – 2



Cost Estimate

- I. Radiator motion and Sweep Dipole must be in FSD
- II. BCM0L02 and Electron Dump in Beam Loss Accounting (BLA)
- III. New beamline components: 2 Super Harps + Fast Valve

- IV. Summary of labor cost by group:

Group	Labor
Survey & Alignment	3 wks x 2
Magnet Test	1 wk x 2
Engineering Design	12 wks
Software	3 wks x 2
EES	6 wk x 2
EH&Q	4 wks

Item	Material Procurement	Shop	Labor
New Dipole Magnet	Dipole Magnet (\$8,000) Hall Probe (\$2,000)		Mapping (1 week) EESDC (1 week) Alignment (2 days)
New Power Supply	Power Supply (\$5,000)		Software (2 weeks)
New Beamline	2 Super Harps and Fast Valve (\$30,000)	Pipes + Pedestals (\$20,000)	Design (6 weeks) Alignment (1 week) Software (4 weeks) EES (5 weeks)
Radiator (cooled ladder, FSD)	0.02 and 0.10 mm Cu foils (\$2,000)	\$4,000	Design (2 week) Alignment (2 days)
Sweep Dipole			
Electron Dump	Pure Cu (\$5,000)	Dump + Pipes (\$15,000)	Design (2 week) Alignment (1 day)
Cu Collimator	Pure Cu (\$5,000)	Collimator + Stand (\$5,000)	Design (1 week) Alignment (1 day)
Photon Dump & Stand	Pure Al (\$3,000)	\$4,000	Design (1 week) Alignment (1 day)
Safety Review			4 weeks
Install			6 weeks
Bubble Chamber			Alignment (1 week)
Total	\$60,000	\$48,000	\$60,000
Total (with overhead)	\$75,000	\$60,000	\$90,000