Bubble Chamber Planning Meeting

04 September 2013

Agenda

1. Bubble Chamber progress at Argonne
2. Superheated Liquids to be used in the experiment
3. Beamline Layout
4. Bubble Chamber cost estimate: procurement and labor
5. Error Analysis

Superheated Liquids

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

N_2O Targets	^{16}O	^{17}O	^{18}O
Natural Target	99.757%	0.038%	0.205%
^{16}O Target		Depleted > 5,000	Depleted > 5,000
^{17}O Target		Enriched > 80%	<1.0%
^{18}O Target		<1.0%	Enriched > 80%

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

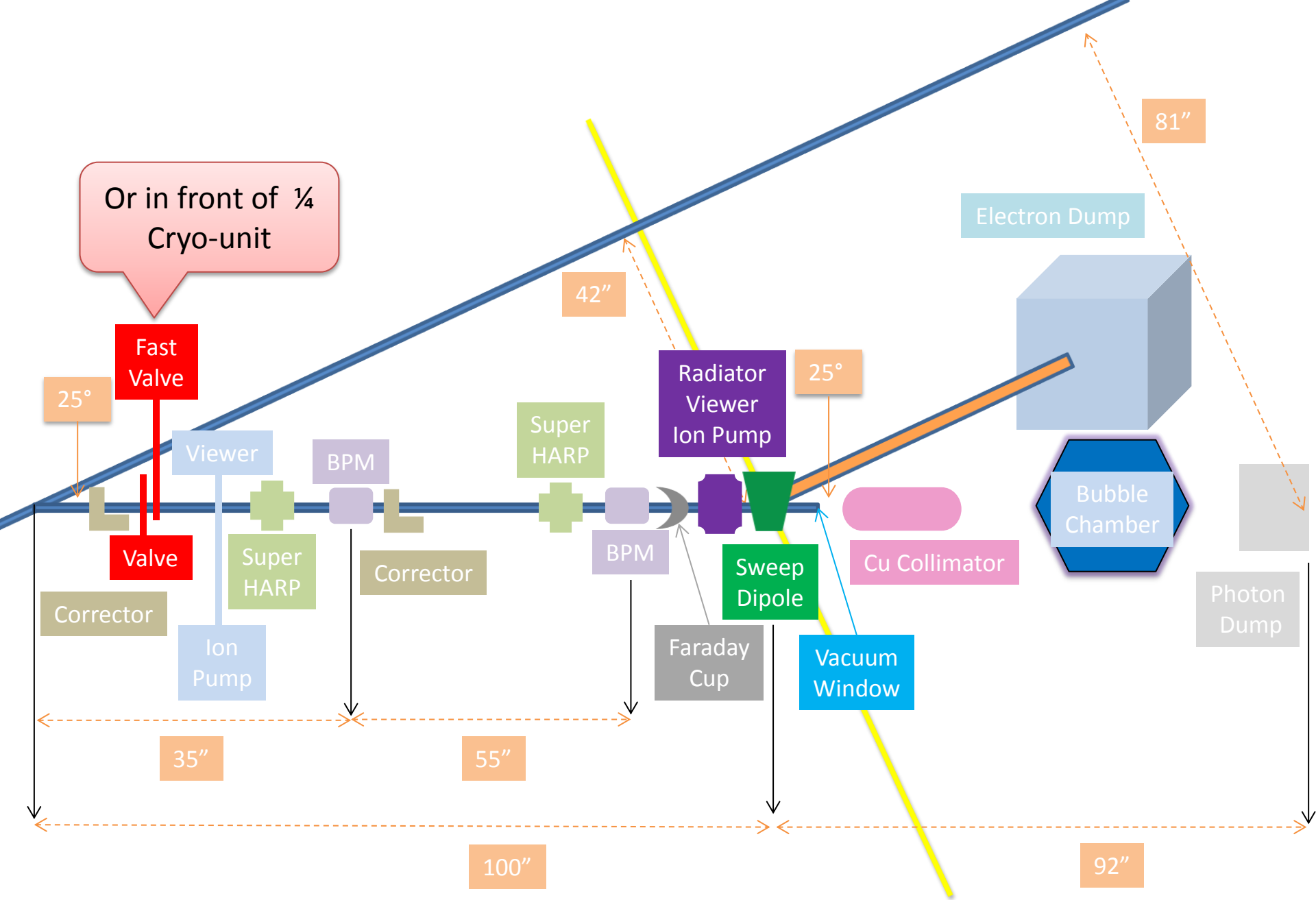
II. 2 Super Harps to measure beam profile and absolute beam position (no need for Quads)

III. Fast Valve to protect from vacuum failure: on our beamline or just in front of ¼ 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


Or in front of ¼ Cryo-unit
Fast Valve
25°
Valve
Viewer
Ion Pump
Corrector
Super HARP
BPM
Corrector
Super HARP
BPM
Radiator Viewer Ion Pump
Sweep Dipole
Faraday Cup
42"
25°
Cu Collimator
Vacuum Window
Electron Dump
Bubble Chamber
81"
Photon Dump
35"
55"
100"
92"

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