Culled on from Arne's 12 GeV Commissioning Proposal
(http://opsweb.acc.jlab.org/TJ3/12GeV_CEBAF/)
on Jan 22, 2013

Time	CEBAF Plan	Mott Plans
Now + 8 months	No beam ops planned	Tunnel work + keV beam during summer for spin rotators?
Aug, 2013	Accelerator Readiness Review for MeV beam	All tunnel work wrapped up by 8/30
Sept 2 + 3 weeks	System Checkout (no beam)	Mott re-commissioning (Need X shifts)
Sep 23 + 6 weeks	System Hot Checkout	Mott Production on Au + (Ag or Cu) (Need X shifts)
Nov 4 + 1 week	Recover beam to 5 MeV	Parasitic Mott Au (Ag or Cu)
Nov 11 + 6 weeks	Spin up 1 pass to 2R	Parasitic Mott Au (Ag or Cu) window ends
Dec 21 – Feb 5, 2014	Holiday + Accel Down	Swap target ladder to ?
Feb 5, 2014 + 3 months	1-5.5 pass setup Hall A/D beam	Parasitic Production on ? (Need X shifts)
May 7, 2014 + 4 months	Scheduled down	All measurements for papers completed

Beam & Diagnostics Status

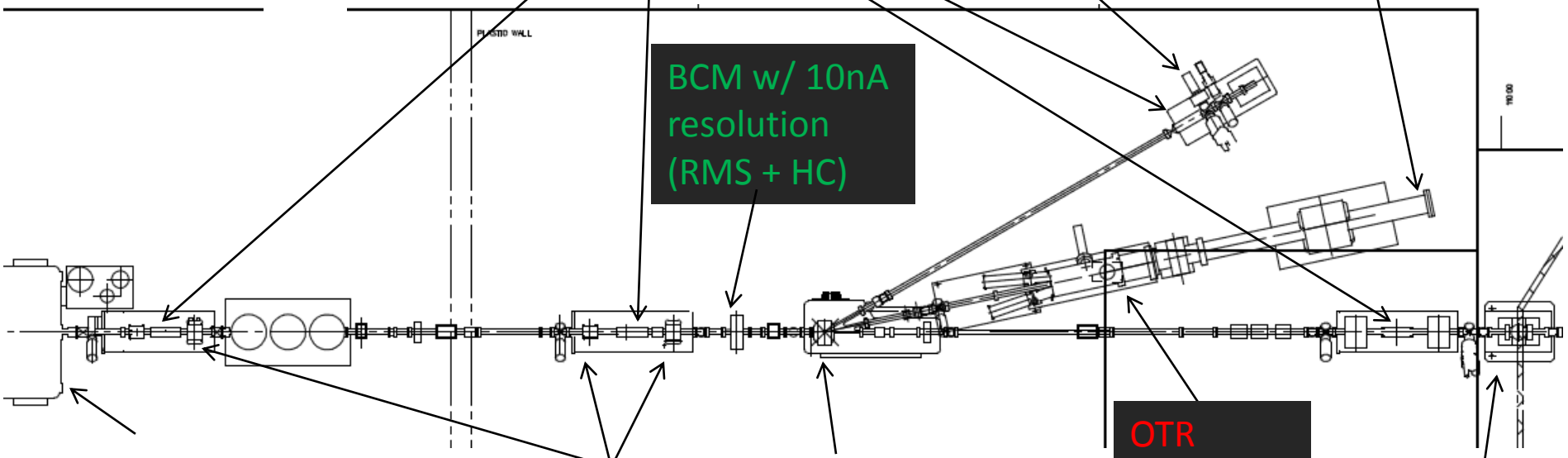
Polarized Source
1. GaAs/GaAsP SSL ~85%
2. Delayed helicity reversal 30Hz/1kHz
3. 499MHz + 31MHz BFM or Pulse Picking
4. 4pi spin rotators + reduced phase sensitivity

Mott Dump 1” Al flange
1. Backscatter
2. Current limit 1uA/5W

4 BPM + 2 PEPPo
(RMS + HC)

Harp
(dp/p + spot size)

10’



BCM w/ 10nA
resolution
(RMS + HC)

Cryounit
(<8.25 MeV KE)

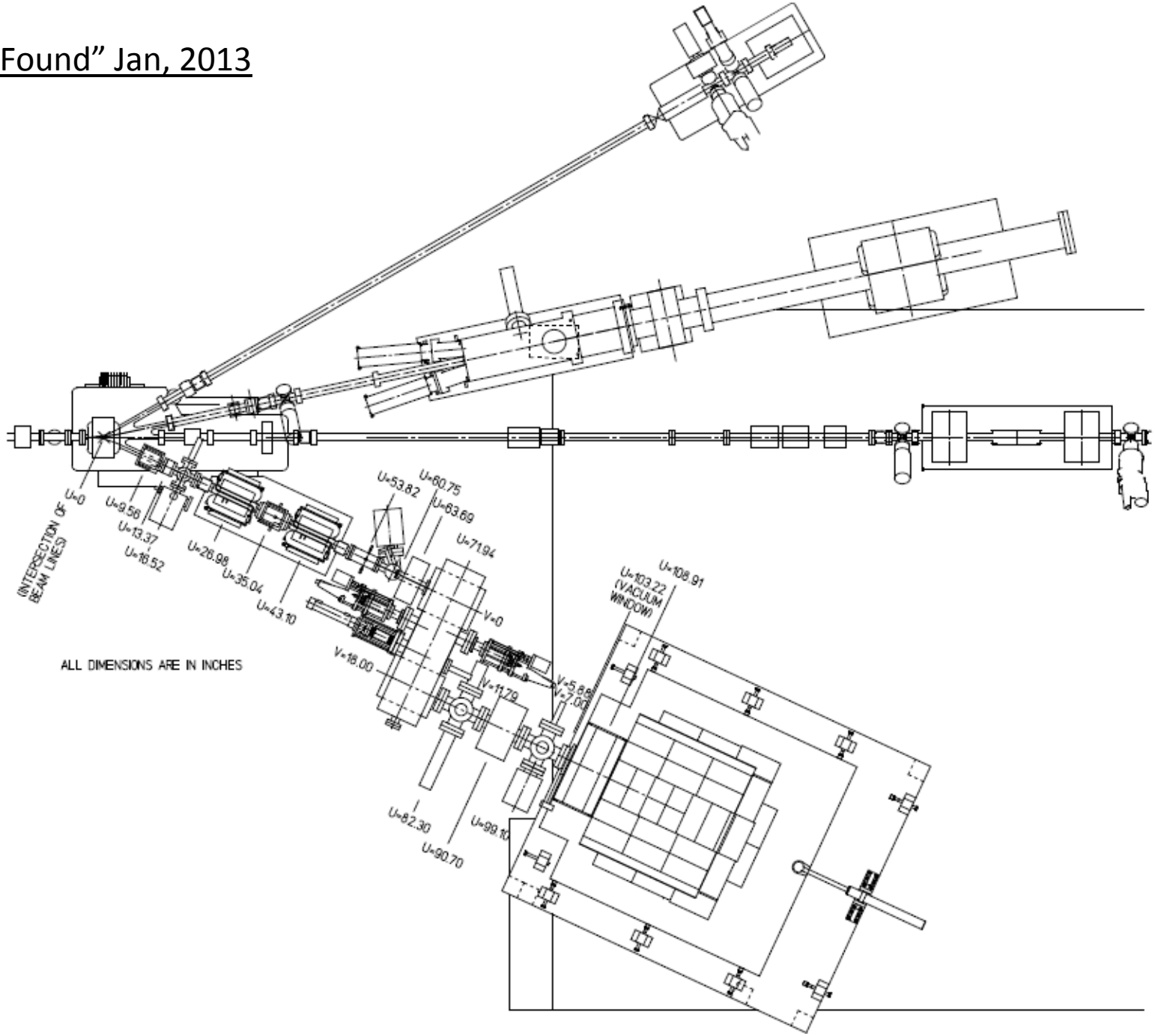
Quads
(spot size +
control dispersion)

Spectrometer
(cal via PEPPo)

OTR
Visual
diagnostic

Faraday Cup

“As-Found” Jan, 2013



History…

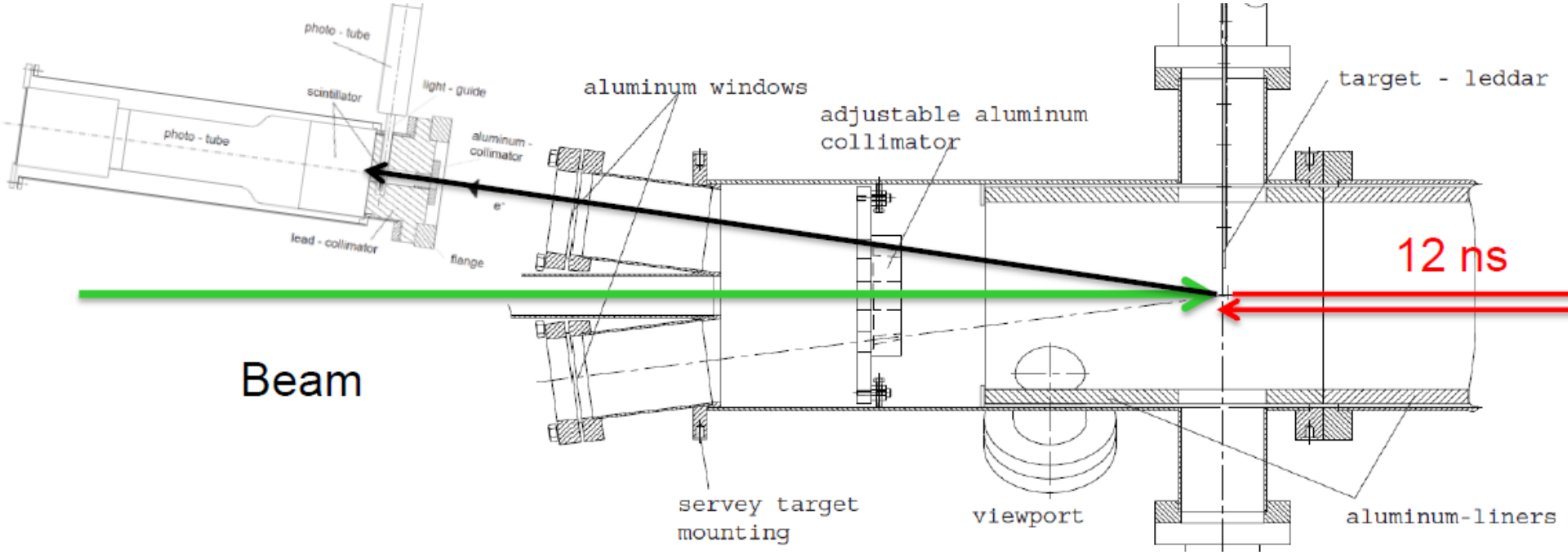
1993 – 1999 : Polarimeter (chamber + targets/ladder + collimators + detectors) varied often

1993 – 2012 : DAQ remained effectively fixed since inception

1998 – 2001 : Last major apparatus modification, characterization led by Steigerwald

2003 : Last vented to swap targets only

2010? : Riad rebuilt detectors



Going into Mott upgrade…

- Lacking single repository of verified configuration geometry + materials
  - ⇒ Collect all existing drawings and layouts for review
  - ⇒ Identify a designer to update layouts & draw parts that are not found
  - ⇒ Vent chamber to verify internal components
  - ⇒ Remove/document detector package

- Undocumented/out-of-date alignment for collimators and targets
  - ⇒ Collect existing transmittals and discuss previous alignment process
  - ⇒ Define a process w/ alignment group to install targets/ladder
  - ⇒ Determine if chamber needs to be removed for survey or alignment

- Limited DAQ functionality (histogramming, real-time helicity, no bpm or bcm)
  - ⇒ Upgrade to parity-like DAQ employing JLAB FADC + TDC (Riad update)

- Outdated/unsupported detector HV system
  - ⇒ Replacement HV system (in-house hardware/software) to be fab'd

Going into Mott upgrade…

- Revisit beam dump and target ladder (background, beam power)
  - ⇒ Study modification of dump plate to reduce backscatter
  - ⇒ Calculate/document new dump limits, ensure suitable for Mott operation
  - ⇒ Calculate/document new target limits, ensure suitable for Mott operation

- Inefficient camera/optics for OTR
  - ⇒Evaluate and document power spectrum for foils
  - ⇒ Identify suitable camera and diagnostic improvement

- Insufficient pumping
  - ⇒ Evaluate chamber load, requirements for additional pumps
  - ⇒ Fabricate new port/part
  - ⇒ Install new pump + controls

Target Foils Discussion

Target Position	2000		2003 - 2013		Comment
	Material	Thickness	Material	Thickness	
1	Cu	?	Cu	12000	likely the same
2	Cu	4100	Cu	4100	same
3	Au	50	Au	50	same
4	Ag	4500	Ag	4500	same
5	Ag	1600	Ag	1600	same
6	Ag	450	Ag	450	same
7	Au	50	Au	50	same (broken)
8	Au	100	Au	100	same
9	Au	350	Au	350	same
10	Au	1000	Au	1000	same
11	Au	5000	Au	5000	same
12	Au	225	Cu	1000	changed
13	Au	500	Cu	8000	changed
14	Au	625	Cu	18000	changed
15	Au	750	Ag	10000	changed
16	Au	875	Ag	15000	changed
17	viewer	n/a	viewer	n/a	same

500 keV Mott	
Material	Thickness
Hole	n/a
Au	70
Au	10
Au	30
viewer	n/a
Au	1000
Au	30
Au	100

identified
where ???

Material	Z	Z^2	Lebow										
Pb	82	6724	100 - 25000										
Au	79	6241	20 - 25000	50		100	225	350	500	625	750	875	1000	5000
Ag	47	2209	100 - 25000	141		450	1600	4500	10000	15000				14126
Cu	29	841	100 - 25000	371		1000	4100	8000	12000	18000		20000	25000	37105

Michael only studied gold (10 foils); we should plan to reproduce this result
We can initially load 9 foils of gold (2 of “same” thickness) + 7 foils of another Z
Stored foils of Cu/Ag may be oxidized; possibly deteriorating
Would like to find the 5 gold foils removed in 2003 !!!