

Absorbers and Step IV Run Plan

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Step IV planning

Ultimate Goal

Turn

Parameters				Step IV Configurations						
Field flip	Beta [cm]	Momentum [MeV/c]	Emittance [mm rad]	Empty channel	Liquid Hydrogen	LiH disk	Al disk	PE disk	LiH 90° wedge	LiH 45° wedge
Yes	42	240	10		+	+	+		+	+
Yes	42	240	6	+	+	+	+	+	+	+
Yes	42	240	3		+	+		+	+	+
Yes	42	200	10	+	+	+	+		+	+
Yes	42	200	6	+	+	+	+	+	+	+
Yes	42	200	3	+	+	+		+	+	+

into

Beam	Beam Momentum (MeV/c)		Current (A)																	Complete	Run No.
	Q1-6	Q7-9	P @ Tgt	P @ D1	P @ D2	Prot Absorber	Q1	Q2	Q3	D1	Sol	D2	Q4	Q5	Q6	Q7	Q8	Q9			
pion	140	off	202.4	197.89	194.57	15	50.14	62.58	43.50	149.00	326.14	77.66	128.79	172.71	114.36	0.0	0.0	0.0	Yes	4099	
pion	140	200	202.4	197.89	194.57	15	50.14	62.58	43.50	149.00	326.14	77.66	128.79	172.71	114.36	141.64	214.27	182.92	Yes	4100	
pion	140	140	202.4	197.89	194.57	15	50.14	62.58	43.50	149.00	326.14	77.66	128.79	172.71	114.36	106.03	160.21	136.50	Yes	4101	
muon	140	off	327.6	324.11	188.86	29	81.92	102.33	71.18	248.44	534.62	75.47	125.19	167.89	111.22	0.0	0.0	0.0	Yes	4087	
muon	140	200	327.6	324.11	188.86	29	81.92	102.33	71.18	248.44	534.62	75.47	125.19	167.89	111.22	138.67	209.82	179.18	Yes	4088	
muon	140	140	327.6	324.11	188.86	29	81.92	102.33	71.18	248.44	534.62	75.47	125.19	167.89	111.22	104.22	157.56	134.37	Yes	4089	

- Limit the number of configurations and turn them into sets of run parameters.
- Further simulations are needed.
- Not going to be final until we run.
- Online reconstruction + global online reconstruction are the tools to help (talks by Chris Rogers, Linda Coney, Peter Lane).

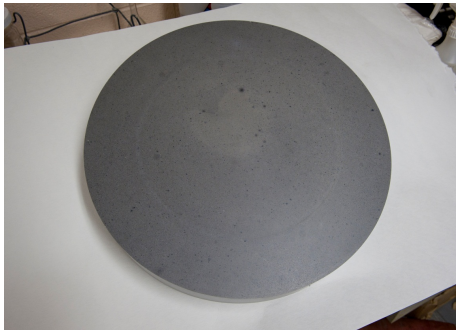
Chris Rogers: “

- 1 Step IV MICE “As-designed” (e.g. legacy/FILES/.../Step4.dat) set up needs to be checked and fixed - are the coil geometries correct? Can we get a reasonable beam through? What are the design absorber settings? Are they the same as what we have in Step4.dat?
- 2 Infrastructure - need to have central store of datacards, field maps, geometry, etc.

”

- The tools are there (MAUS); however, people mainly use something else to do their analysis (G4beamline, ICOOL, own tools).
- Geometry – not quite:
 - Step IV in /maus/legacy is badly outdated, I am updating it based on the information I have:
 - A full channel geometry in G4beamline, complete with Step IV geometry from 2009 (we used it for wedge simulations and the beam was getting through just fine).
 - Maria Leonova handed me the current G4beamline beamline geometry (2010), I checked it against my version, and the only change is in the position of TOF0.
 - M0/M1 issue has been mentioned multiple times, magnet currents have to be sorted out.
 - We also have AutoCAD based geometry (Matt Littlefield's talk), but it is somewhat limited so far + we do not have Step IV experiment layout.

Flat absorber status

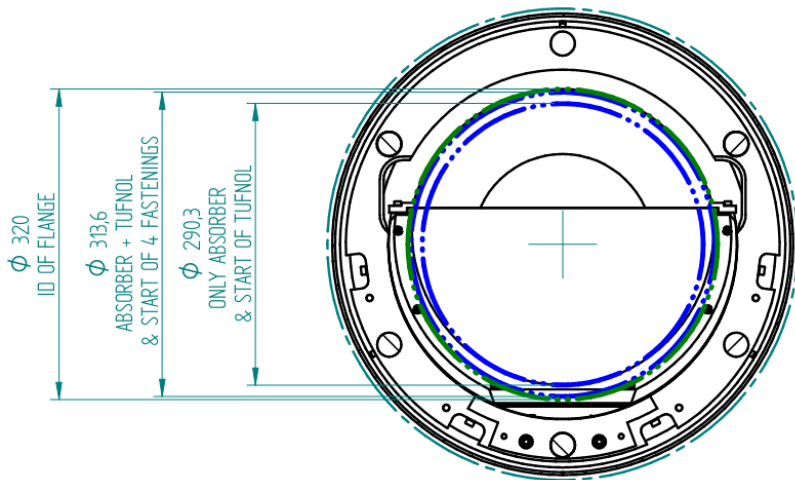


- Flat LiH absorber is complete.
- It is at Fermilab now.
- Shipping to UK is an outstanding issue.
- Engineering drawings for the support parts are finalized and at Fermilab.
- Tufnol is a UK only material, we are using Delrin.
- Fabrication is underway.

Wedge absorber status

Half-wedge elevated position issue I

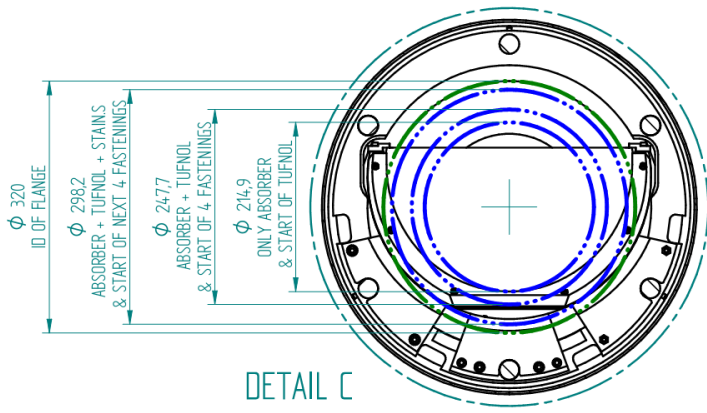
See MICE note 369 for details.



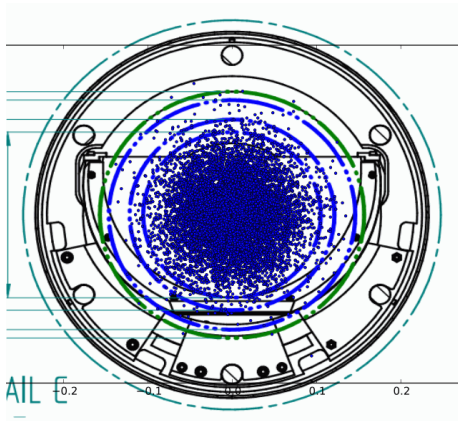
The full 90 degree wedge positioning is not an issue.

Half-wedge elevated position issue II

See MICE note 369 for details.



The half 45 degree wedge position is elevated 37.7 mm to get the same material length on axis. That creates issues: SS screws in the way of the beam.



- Replace four “inner” screws with plastic.
- That increases the “safe” radius to 149.1 mm.
- Outside that radius we get 0.045% hits in the half-plane where the support is.
- In the region where the second set of screws is there are no particles.
- ...or leave the absorber in the “non-elevated” position.

Liquid Hydrogen absorber

- Alain Blondel mentioned liquid hydrogen density issue.
- I haven't been involved with liquid hydrogen; so, need to look into it.

Thank you!