

Baffle Update

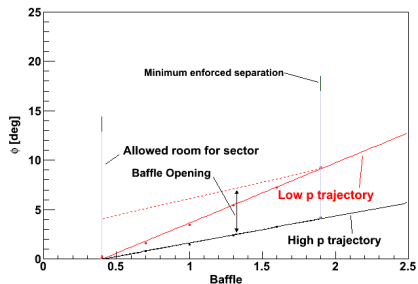
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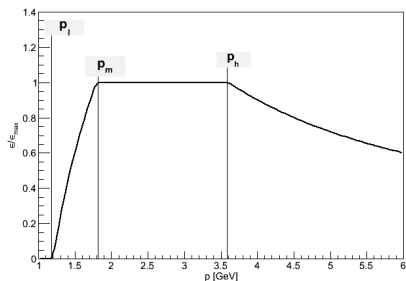
October 13, 2017

Acceptance Basics

Block 0

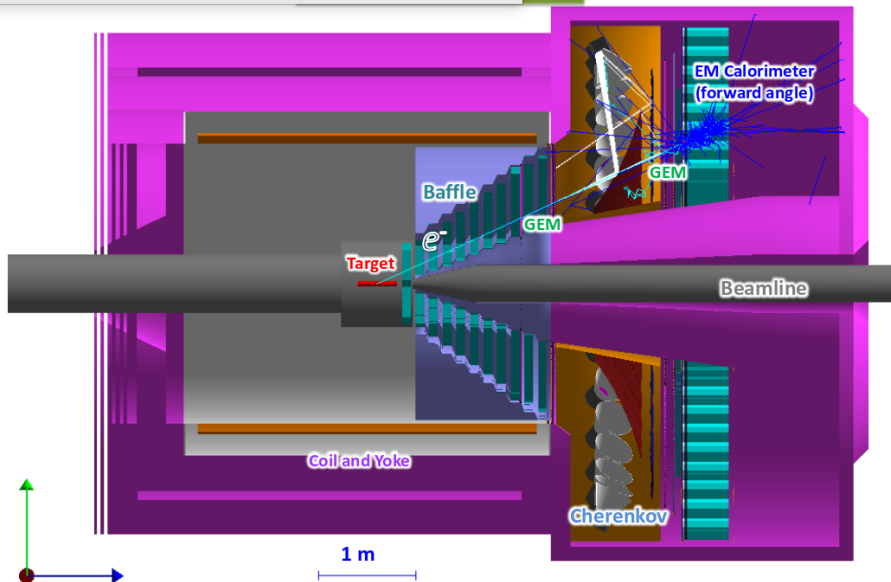


Sample Naive Efficiency Curve

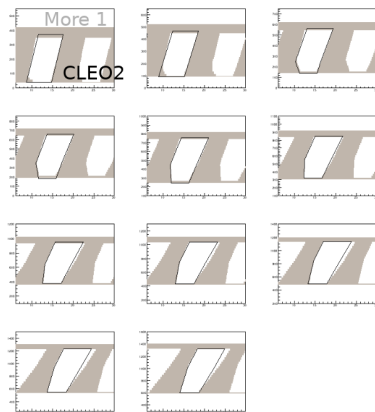


- Have been working with tweaks based on Eugene BaBar
- First principles approaches can be fruitful - need to consider
- Early attempts were good for acceptance, but did not account for backgrounds, nonuniform fields

Present Layout



Baffles comparison

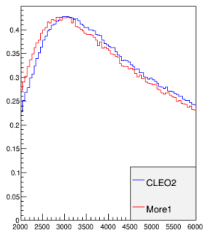


- Tweaks made to baffles by Rich
 - Upstream baffle inner rings reduced
 - Increase outer ring
 - Use raytracing to account for trajectory differences - expand at small angle upstream, eliminate "gaps"
- Parametrization up to date by Rich - documented in generating perl

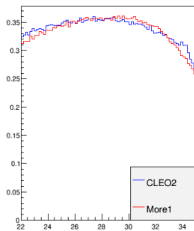
https://jlabsvn.jlab.org/svnroot/solid/solid_gemc2/geometry/baffle/solid_PVDIS_baffle_CLEO2_geometry.pl

Present Acceptance

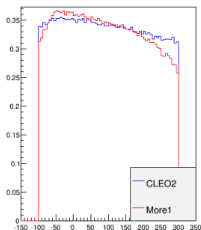
Acceptance vs p



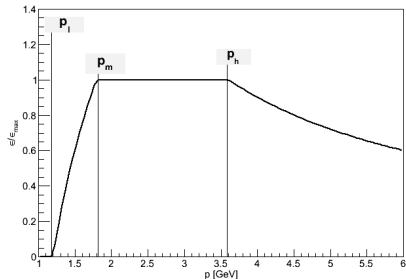
Acceptance vs theta



Acceptance vs z_v



Sample Naive Efficiency Curve



- Acceptance form plausibly described by first order
- Z and θ variations relatively small
- Love to take ideas on tweaking for physics

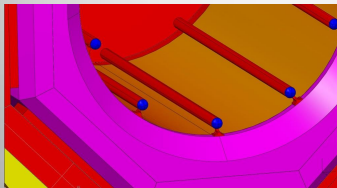
Weight with Pb and Shielding

Baffle	Inner (kg)	Blocks (kg)	Outer (kg)	Poly (kg)	Total (kg)
1	0.00	216.20	190.29	876.19	1282.67
2	0.00	326.65	242.64	834.59	1403.87
3	16.67	464.81	289.29	785.71	1556.49
4	22.44	622.30	358.85	726.61	1730.20
5	29.50	794.73	434.70	658.88	1917.80
6	35.57	961.91	487.57	585.35	2070.39
7	47.33	1171.77	540.44	503.78	2263.32
8	57.72	1391.28	627.35	413.22	2489.57
9	40.47	1628.95	681.02	319.70	2670.15
10	84.87	1885.59	734.41	219.37	2924.24
11	61.15	2163.12	697.69	123.72	3045.69
Total Lead	395.73	11627.29	5284.24	6047.13	23354.38
Grand Total					23354.38

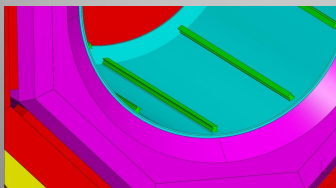
	Copper	Lead	Tungsten powder	Solid tungsten
Radiation length (cm)	1.436	0.5612	0.583	0.3504
Nuclear interaction length (cm)	15.32	17.59	16.58	9.946
Machinability	Easy	Soft, needs support	Easy to mold and glue	Hard
Cost	Low	Low	High	High
EC trigger rate (kHz)	4.78×10^3	5.45×10^3	5.25×10^3	4.59×10^3
Neutron rate in EC (kHz)	3.35×10^7	4.7×10^7	4.0×10^7	2.9×10^7
Photon rate in last GEM (GHz/sector)	2.98	2.59	—	—

- Like better first principles intuition on materials
- Likely will have supports (rebar, cladding. etc) - possible issues in high flux areas?
- Neutrons need to be considered for electronics, PMTs

Exploring new concept for supporting the items inside the bore of the magnet



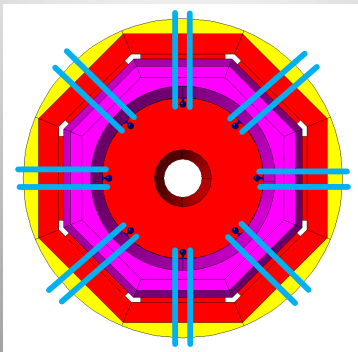
The old design used large SS pipes to bridge across the cryostat. Deflections were a concern. Custom, yet to be designed, rollers required.



The new concept employs a rolled SS cylinder inserted in the bore. Attached to the same locations as previous design. Allows the use of "Off The Shelf" rails and rollers. More compact and smaller deflections.

Cable Routing Continued

Looking upstream towards the target at the rear of the magnet steel. The endcap and detectors are hiding for clarity.



Eight sectors for cable exit were chosen because of ease to replicate in powerpoint. It seems logical the number of routes and the paths taken would be dictated by the total volume of bundles and the location of DAQ interfaces.

- Need better cost estimation and R&D path
 - Begun discussions with ANL engineer
 - Should have soon
- Does continuity rather than discrete form help?
- Considerations for cable routing
- Are there first principles ideas to be applied and learned from?
 - Acceptance and background suppression
 - Comprehensive materials
 - Optimization using minimizer?
- Still not seen changing number of sectors analysis