

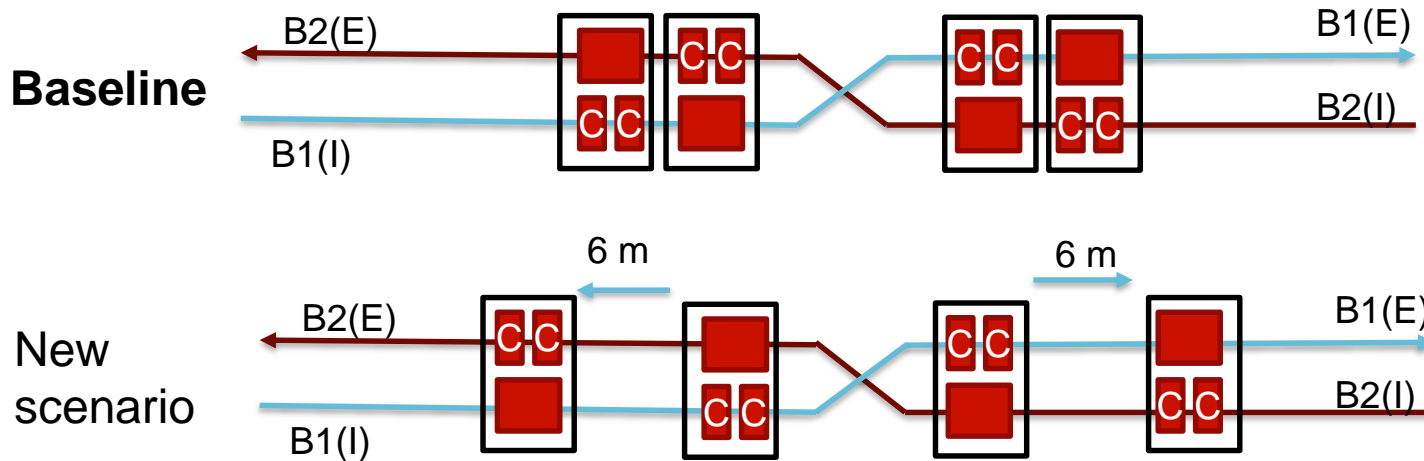


Crab layout options

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WP2 meeting 2/12/2018

Crab Layout: distance options



One spare per plane => cryomodule needs to fit when rotated.

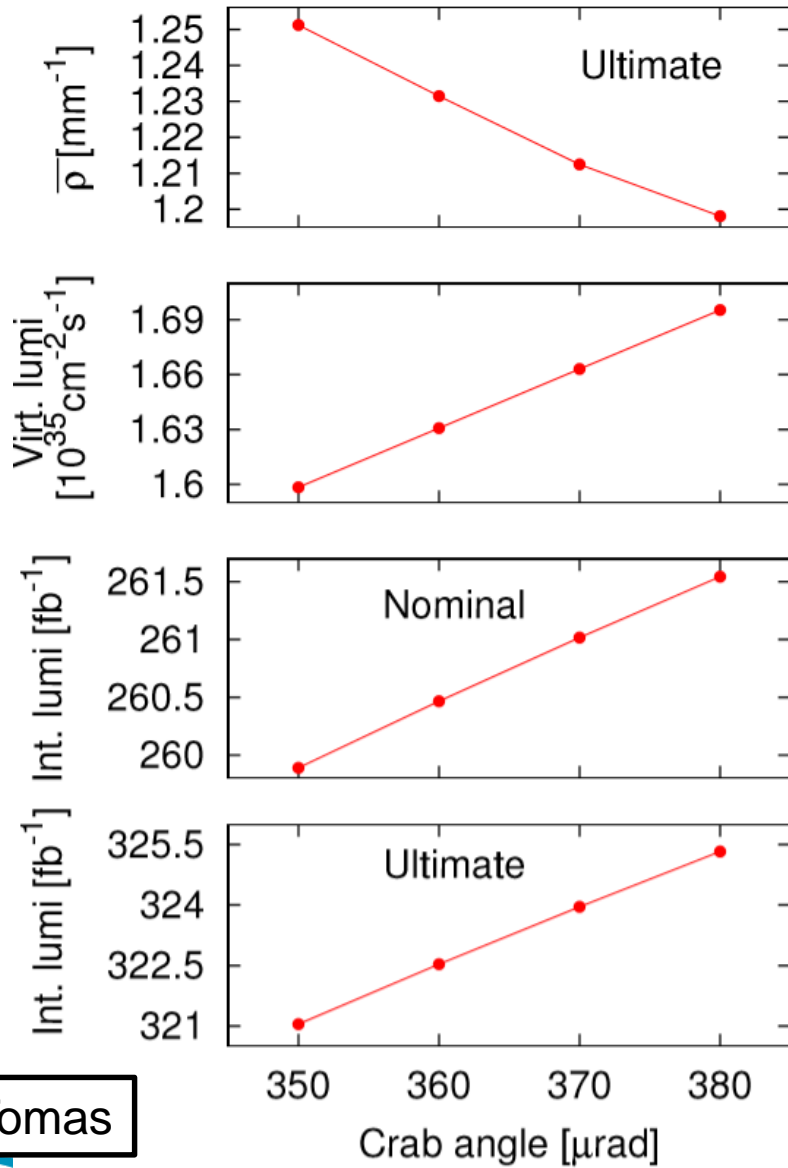
Layout	Crab H	Crab V	1==5	1!=5	HLB1	HRB1	HLB2	HRB2	VLB1	VRB1	VLB2	VRB2
	[μ rad]	[μ rad]	[μ rad]	[μ rad]	[MV]	[MV]	[MV]	[MV]	[MV]	[MV]	[MV]	[MV]
Baseline	379.4	384.2	379.4	384.2	3.40	3.19	3.19	3.40	3.40	3.38	3.38	3.40
New scenario	349.5	349.6	349.5	349.6	3.07	2.93	3.40	3.24	2.93	3.07	3.24	3.40

Voltage based on baseline optics.

With the new scenario there is no advantage in differentiating Point 1 and 5.

Further optimization of new scenario might mitigate a bit the loss.

Luminosity vs Crabbing Angle



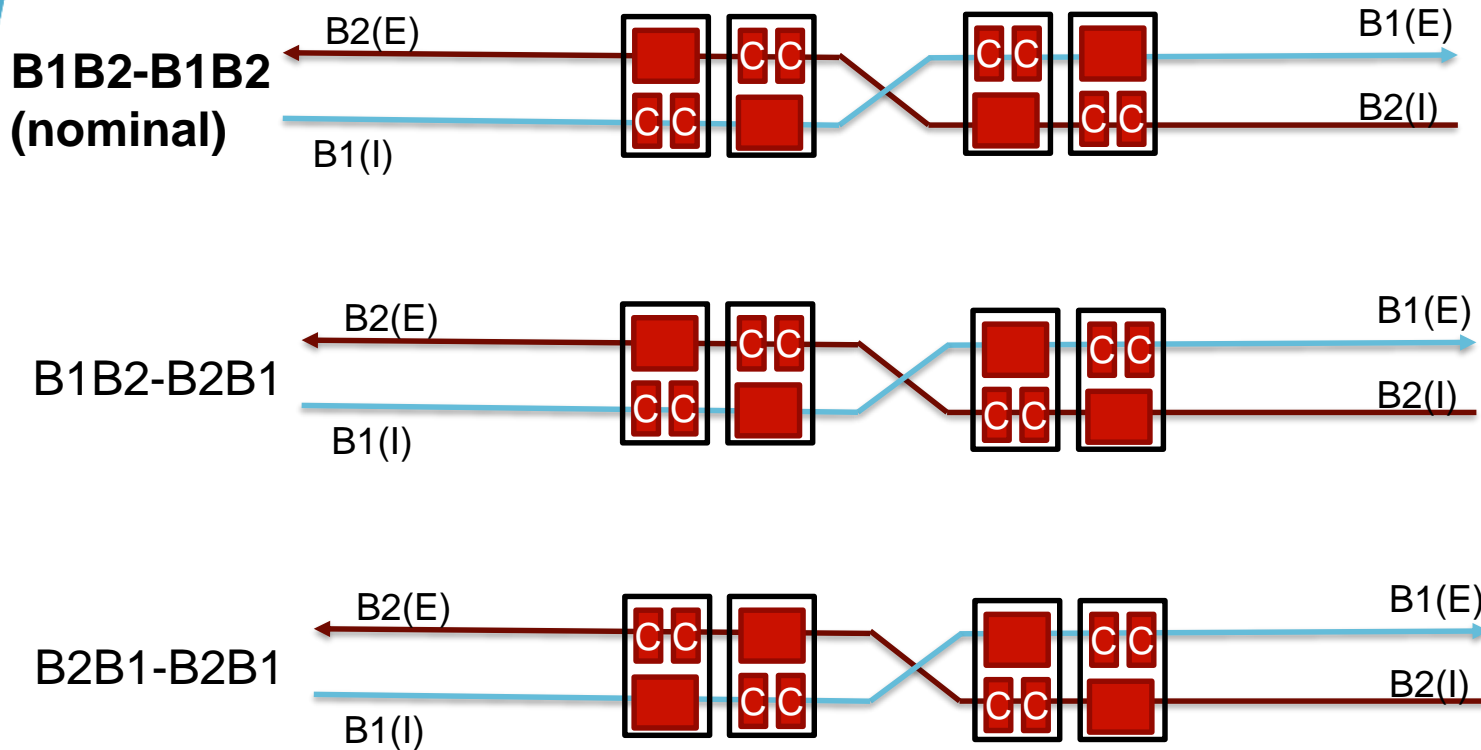
Crab angle	-8.6% (350 μrad)
Virt. Lumi	-5.6%
Int. Lumi [N]	-0.61%
Int. Lumi [U]	-1.4%
Pile-up d.[U]	+4.2%

New scenario brings an equivalent loss of 0.3 MV per cavity.

R. Tomas

Backup

Crab Layout: ordering option



One spare per plane => cryomodule needs to fit when rotated.

Crab Layout: crab angle

Layout	Crab H	Crab V	1==5	1!=5	HLB1	HRB1	HLB2	HRB2	VLB1	VRB1	VLB2	VRB2
	[μ rad]	[μ rad]	[μ rad]	[μ rad]	[MV]	[MV]	[MV]	[MV]	[MV]	[MV]	[MV]	[MV]
B1 B2 IP B1 B2	379.4	384.2	379.4	384.2	3.40	3.19	3.19	3.40	3.40	3.38	3.38	3.40
B1 B2 IP B2 B1	379.0	379.3	379.0	379.3	3.40	3.36	3.18	3.33	3.36	3.40	3.33	3.18
B1 3m B2 IP B1 3m B2	373.5	367.4	367.4	373.5	3.40	3.14	3.14	3.40	3.40	3.23	3.23	3.40
B1 3m B2 IP B2 3m B1	366.5	366.7	366.5	366.7	3.34	3.40	3.07	3.22	3.40	3.34	3.22	3.07
B1 6m B2 IP B1 6m B2	367.5	350.6	350.6	367.5	3.40	3.09	3.09	3.40	3.40	3.09	3.09	3.40
B1 B2 3m IP 3m B1 B2	373.2	367.1	367.1	373.2	3.40	3.27	3.27	3.40	3.40	3.28	3.28	3.40
B1 B2 3m IP 3m B2 B1	366.5	366.7	366.5	366.7	3.34	3.40	3.21	3.27	3.40	3.34	3.27	3.21
B1 B2 6m IP 6m B1 B2	366.9	350.0	350.0	366.9	3.40	3.36	3.36	3.40	3.40	3.18	3.18	3.40

Based on the same optics. Still possible optimizations for individual layouts.

Non closure (for 380 μ rad) is 0.029 σ (nominal) to 0.033 σ (worst case scenario +6m)

It is more efficient to have B2B1-B2B1 in IR1 and B1B2-B1B2 in IR5.

With 3 m shift 380 μ rad -> 366 μ rad (unless optimizing 1/5 -> 373 μ rad)

With 6 m shift 380 μ rad -> 350 μ rad (unless optimizing 1/5 -> 373 μ rad)

Moving one cavity gives the same penalty of one, but it gives it is better for sorting.