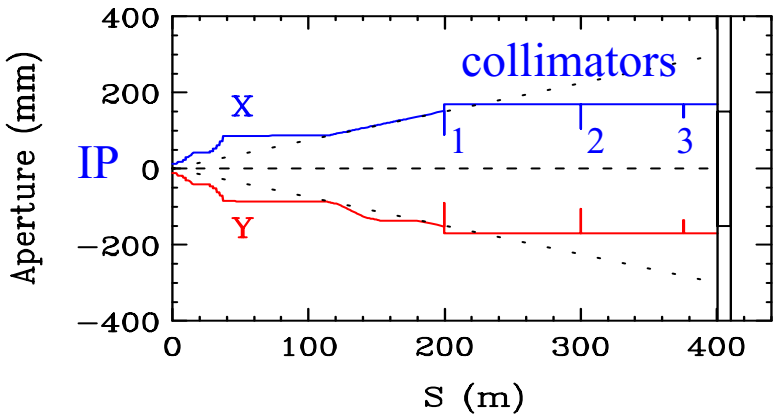
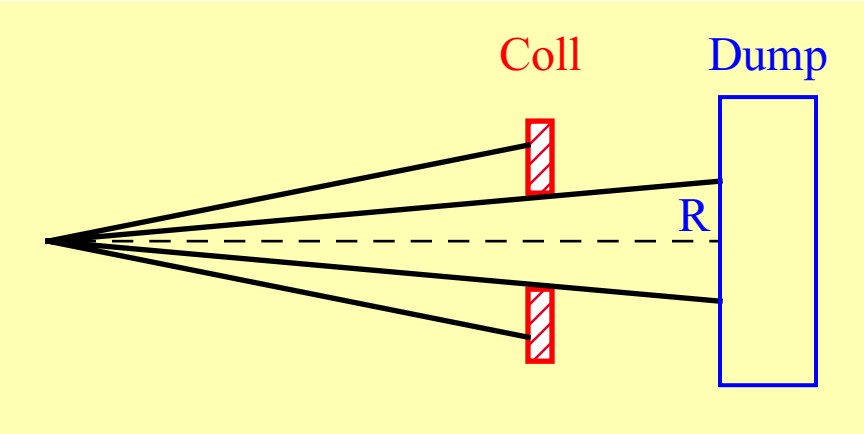
Beam power loss on the final collimators in the 14 mrad extraction line can be large in high-L and low-P options for 150 mm radius dump window.

Table 1: Disrupted beam power loss in the 14 mrad extraction line for 0.75 mrad photon aperture model.

CM energy	x/y offset [nm]	Total electron loss (kW)				Total BS photon loss (kW)				Electron loss on SC quads [kW]
		Prior to collim.	Collimators			Prior to collim.	Collimators			
			1	2	3		1	2	3	
0.5 TeV nominal (c11)	0 / 0	0	0	1.4	0.77	0	0	0.002	0	0
	0 / 200	0.0009	3.8	25	2.7	0	0.09	13	0	0
0.5 TeV low-P (c14)	0 / 0	0.27	11	88	18					0
	400 / 0	0.21	13	83	18					0
	0 / 120	1.2	131	232	22	0.06	53	79	0	0
0.5 TeV high-L (c15)	0 / 0	2.0	39	230	46	0	1.8	28	0	0.002
	0 / 120	15.5	477	584	53	0.48	136	195	0	0
1.0 TeV nominal (c21)	0 / 0	0.25	0.46	0.39	0	0	0	0	0	0
	0 / 100	2.3	1.1	14	2.1	0	0	0.17	0	0
1.0 TeV large-Y (c23)	0 / 0	1.4	4.3	87	20					0
	200 / 0	1.2	5.6	87	21					0
1.0 TeV low-P (c24)	0 / 0	18.0	6.9	74	17					0.010
	200 / 0	17.7	5.9	87	19					0.013
	0 / 120	46	114	499	19	0.06	4.9	40	0	0.005
1.0 TeV high-L (c25)	0 / 0	105	32	376	60	0.013	1.2	7.2	0	0.55
	0 / 80	256	587	1404	69	0.99	47	276	0	0.58
1.0 TeV high-L (c26)	0 / 0	1.8	1.5	1.4	1.4	0	0	0	0	0
	0 / 100	10.2	4.2	203	17	0	0.07	2.1	0	0
1.0 TeV high-L (c27)	0 / 0	1.3	0.84	0.94	0.15	0	0	0.003	0	0
	0 / 100	6.7	4.3	119	8.4	0	0.04	0.90	0	0





- The last 3 collimators protect the dump from the halo particles reaching outside of the dump window.
- The beam loss on the collimators can be reduced by increasing the radius of the dump window and increasing and optimizing the apertures of the 3 collimators.

Table 1: Dump window and collimator aperture (mm).

	Initial	Optimized		
R_{window}	150	150	200	250
R_{coll-1}	90	97	116	128
R_{coll-2}	105	125	160	190
R_{coll-3}	135	135	180	225

Table 1: Loss on collimators for 0.5 TeV CM high-L option with Δy=120 nm offset.

R_{window} (mm)	Electron loss (kW)			BS photon loss (kW)			Total (kW)	Max. per coll. (kW)
	Coll-1	Coll-2	Coll-3	Coll-1	Coll-1	Coll-3		
150 (initial)	477	584	53	136	195	0	1445	779
150 (optimize)	388	369	356	88	107	117	1425	476
200	206	203	207	12	25	59	712	266
250	108	111	102	3.0	0.5	3.7	328	112

Table 2: Loss on collimators for 0.5 TeV CM low-P option with Δy=120 nm offset.

R_{window} (mm)	Electron loss (kW)			BS photon loss (kW)			Total (kW)	Max. per coll. (kW)
	Coll-1	Coll-2	Coll-3	Coll-1	Coll-1	Coll-3		
150 (initial)	131	232	22	53	79	0	517	311
150 (optimize)	100	138	147	32	45	46	508	193
200	41	67	73	2.8	8.8	24	217	97
250	17	27	31	0.6	0.1	0.9	77	32

Table 3: Loss on collimators for 1 TeV CM low-P option with Δy=120 nm offset.

R_{window} (mm)	Electron loss (kW)			BS photon loss (kW)			Total (kW)	Max. per coll. (kW)
	Coll-1	Coll-2	Coll-3	Coll-1	Coll-1	Coll-3		
150 (initial)	114	499	19	4.9	40	0	677	539
150 (optimize)	48	292	291	2.9	6.4	26	666	317
200	5.2	40	139	0.6	0.8	1.9	188	141
250	3.2	2.4	6.7	0.2	0.03	0.2	13	7

Total electron and BS photon power loss on three collimators versus dump window radius for the worst options with Δy=120 nm offset:

cs15 - 0.5 TeV CM high-L

cs14 - 0.5 TeV CM low-P

cs24 - 1 TeV CM low-P.