

Beam sizes for the BTM dump

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LIU-PSB Meeting, 13-Oct-11

Assumptions I

Summary of 17-Aug-11 BTM dump meeting by K. Hanke:

- Maximum beam size at dump defined by chamber size
- Maximum energy: 2 GeV
- Maximum intensity: 2.5×10^{13} per ring, 1×10^{14} per pulse (PSB cycle 1.2s)
- RP considerations for normal operation:
1/3 of I_{max} continuously on dump

Assumptions II

Beam size assumptions:

- Calculation of beam size:

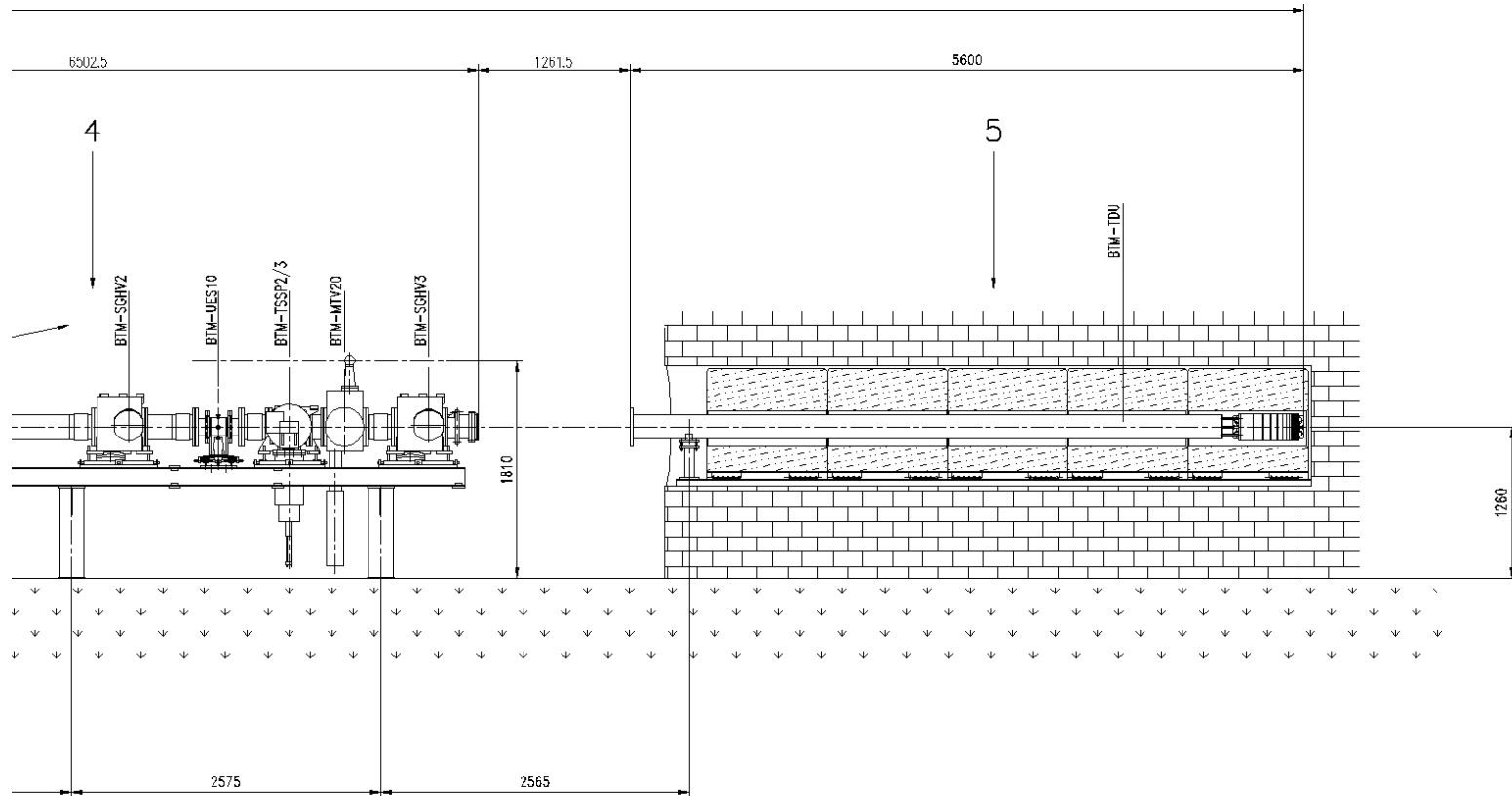
$$A_x = \pm 3 \cdot \sqrt{(\beta_x \cdot \varepsilon_x) \pm D_x \cdot \Delta p/p \pm CO \cdot \sqrt{(\beta_x / \beta_{xmax})}}$$

- 4 different optics settings in BTM line
- 4 different vertical dispersions from BT1-BT4
- “Critical” beams: After upgrade and with Linac4 minimum emittances (with safety margin)

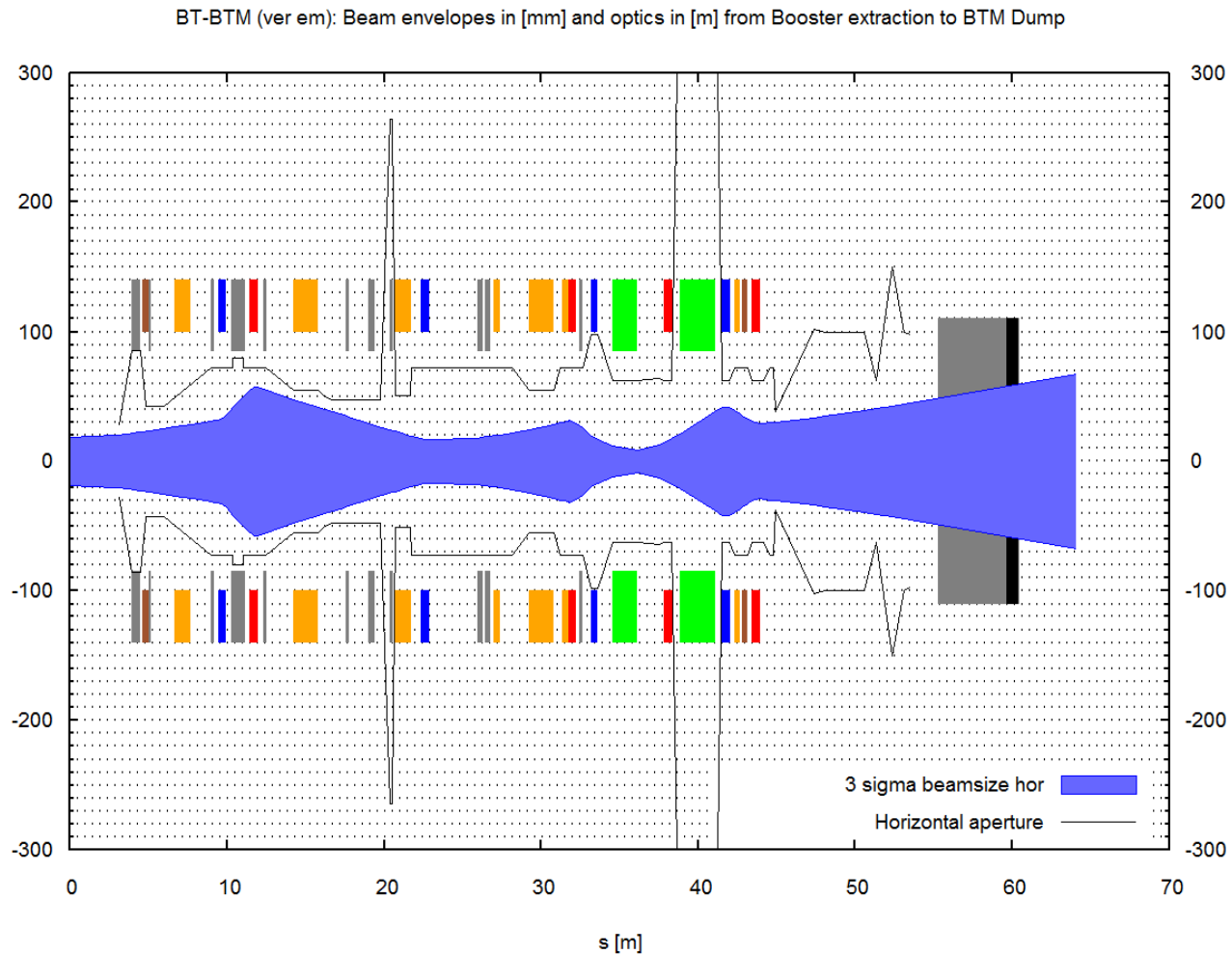
Courtesy B. Mikulec and S. Gilardoni

USER	ppb [e12]	max ppp [e12]	normalised ε_h [pi mm mrad]	normalised ε_v [pi mm mrad]	ppb [e12] / ε_{aver}
LHC25ns	3.25	13	1	1	3.25
CNGS	8	32	10	5	1.07
NORMGPS	1	4	15	9	0.08
TOF	9	36	10	10	0.90

BTM dump

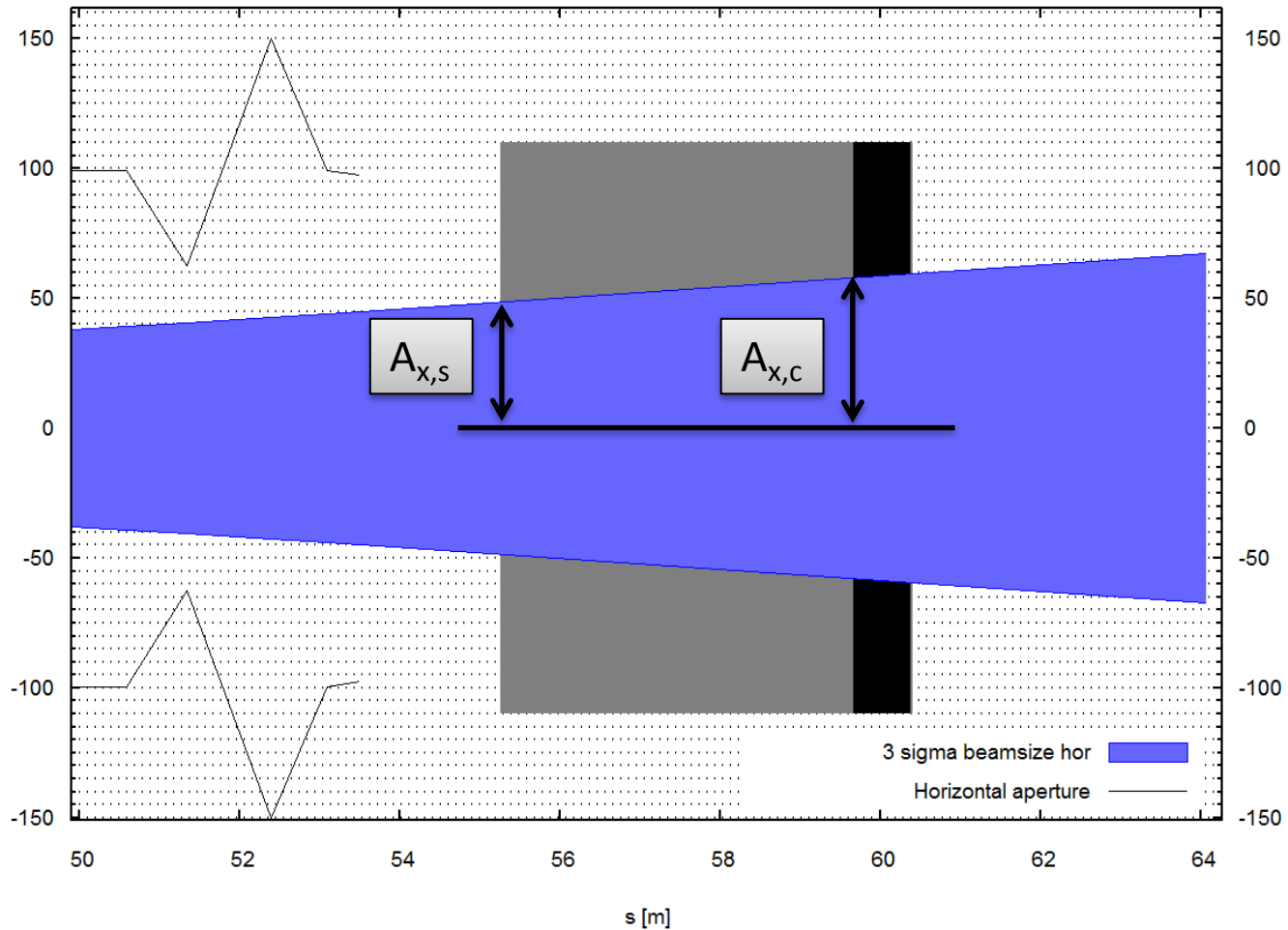


BTM line with dump



Dump channel

BT-BTM (ver em): Beam envelopes in [mm] and optics in [m] from Booster extraction to BTM Dump



Results for 3 β -sig beams

Beam	Horizontal beam size in [mm]				Vertical beam size in [mm]			
	Shielding		Core		Shielding		Core	
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
LHC	21	5	28	12	53	9	75	14
CNGS	44	17	74	34	87	20	126	32
NORMGPS	53	21	89	42	108	26	157	43
TOF	44	17	74	34	112	28	164	45
Summary	53	5	89	12	112	9	164	14

Results for 1 β -sig beams

Beam	Horizontal beam size in [mm]				Vertical beam size in [mm]			
	Shielding		Core		Shielding		Core	
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
LHC	14	2	17	5	35	3	47	5
CNGS	21	6	29	12	46	7	64	11
NORMGPS	24	7	34	15	53	9	75	14
TOF	21	6	29	12	54	9	77	15
Summary	24	2	34	5	54	3	77	5