



# Collimation Settings Strategy and Updated Loss Maps List

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# Collimator Settings

- Very similar settings compared to 2022, except:
  - TCT.8 tightens from  $18\sigma$  to  $11.5\sigma$  during rotation in LHCb
  - TCL6 always IN ( $20\sigma$  at  $\beta^*=30$  cm)
  - During anti-telescopic levelling ( $\beta^* = 120 \rightarrow 60$  cm), TCT.1/5 tighten from  $9.35\sigma$  to  $8.5\sigma$   
*See talk at [CoIWIWG #260](#)*
  - During second part of levelling ( $\beta^* = 60 \rightarrow 30$  cm), TCT.1/5 stay at constant  $8.5\sigma$
- TCL gaps are defined at  $\beta^* = 30$ cm, constant in mm during levelling
- TCL5 moves OUT when XRP move IN, and vice-versa

# Collimator Settings

		IR7 [ $\sigma$ ]			IR3 [ $\sigma$ ]			Dump [ $\sigma$ ]		TCT [ $\sigma$ ]				TCL [ $\sigma$ ]		
		TCP	TCSG	TCLA	TCP	TCSG	TCLA	TCDQ	TCSP	1	2	5	8	4	5	6
Injection		5.7	6.7	10	8	9.3	12	8	7.5	13	13	13	13	-	-	-
Ramp		↓	↓	10	↓	↓	↓	↓	↓	↓	↓	↓	↓	-	-	-
Flat Top		5	6.5	10	15	18	20	7.3	7.3	18	37	18	18	-	-	-
Squeeze		5	6.5	10	15	18	20	7.3	7.3	↓	37	↓	18	-	-	-
LHCb Rotation		5	6.5	10	15	18	20	7.3	7.3	9.35	37	9.35	↓	-	-	-
Tune Change		5	6.5	10	15	18	20	7.3	7.3	9.35	37	9.35	11.5	-	-	-
Adjust		5	6.5	10	15	18	20	7.3	7.3	9.35	37	9.35	11.5	-	-	-
Levelling	120	5	6.5	10	15	18	20	7.3	7.3	↓	37	↓	11.5	↓	↓	↓
	60	5	6.5	10	15	18	20	7.3	7.3	8.5	37	8.5	11.5	↓	↓	↓
	30	5	6.5	10	15	18	20	7.3	7.3	8.5	37	8.5	11.5	17	42	20
XRP OUT															17	

# Loss Maps Matrix

- Many more steps in levelling compared to 2022 (21 vs 10)
- Propose to not perform all steps, to gain time
- Can do ~5 configurations in one fill
- Need 6 fills at top energy
- Fill that ends at  $\beta^* = 60$  cm can optionally do off-momentum and ASD (in case enough beam is left) for comparison to 2022
  - *discussed during the meeting: not optional, include them in validation*

# Loss Maps Matrix

450 GeV			6.8 TeV																										
	Injection		Non colliding			Colliding XRP IN																				Colliding XRP OUT			
	Prot. IN	Prot. OUT	FT	EoS / EoR	QC	120 cm	112.5 cm	105.5 cm	99 cm	93 cm	87.5 cm	82.5 cm	77.5 cm	72.5 cm	68 cm	64 cm	60 cm	56 cm	52 cm	48.5 cm	45 cm	41.5 cm	38.5 cm	35.5 cm	32.5 cm	30 cm	120 cm	60 cm	30 cm
B1H	✓	✓	✓	✓	✓	✓		✓		✓		✓		✓			✓		✓		✓			✓		✓	✓	✓	✓
B1V	✓	✓	✓	✓	✓	✓		✓		✓		✓		✓			✓		✓		✓			✓		✓	✓	✓	✓
B2H	✓	✓	✓	✓	✓	✓		✓		✓		✓		✓			✓		✓		✓			✓		✓	✓	✓	✓
B2V	✓	✓	✓	✓	✓	✓		✓		✓		✓		✓			✓		✓		✓			✓		✓	✓	✓	✓
+dp/p	✓	✓	✓		✓	✓											✓									✓			
-dp/p	✓	✓	✓		✓	✓											✓									✓			
ASD	✓	✓	✓		✓	✓											✓									✓			

# Loss Maps Matrix

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B1H	✓	✓	✓	✓	✓	✓		✓		✓		✓		✓			✓		✓		✓			✓		✓	✓	✓	✓
B1V	✓	✓	✓	✓	✓	✓		✓		✓		✓		✓			✓		✓		✓			✓		✓	✓	✓	✓
B2H	✓	✓	✓	✓	✓	✓		✓		✓		✓		✓			✓		✓		✓			✓		✓	✓	✓	✓
B2V	✓	✓	✓	✓	✓	✓		✓		✓		✓		✓			✓		✓		✓			✓		✓	✓	✓	✓
+dp/p	✓	✓	✓		✓	✓											✓									✓			
-dp/p	✓	✓	✓		✓	✓											✓									✓			
ASD	✓	✓	✓		✓	✓											✓									✓			

# Loss Maps Requests

- We would like to do a few loss maps with strong non-linearities:
  - For different values of octupoles and chroma
  - With the electron-cloud tunes
  - At different processes:
    - Injection (Inj.Prot IN): betatron + DP
    - Injection (Inj.Prot OUT): betatron + DP
    - Flat Top: betatron + DP
    - Colliding  $\beta^* = 30\text{cm}$ : betatron only
- We also would like to do quick loss maps with the new optics at injection vs the existing optics

		Octupole knob		
		1	2	3
Chromaticity	25		✓	✓
	20		✓	✓
	15			✓
	10			



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