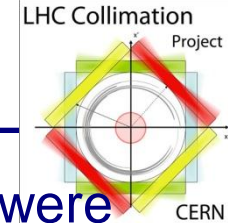
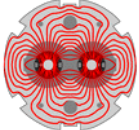


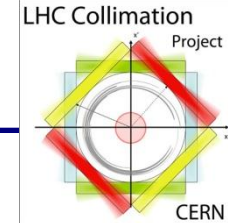
Collimator Setup MD



- ❑ Out of the original 6 hours for collimator setup, only **~3.5 hours** were available.
- ❑ **Pattern recognition of optimal loss spikes:** worked well, only a single mis-classification due to delays caused by excessive data logging. To be used as a standard technique in the next setups.
- ❑ **Automatic identification of the collimator aligned to the beam during parallel setup:** did not work due to a difference in thread behaviour between Windows (development) and Linux (deployment) environments, debugged during technical stop. Could be tested on collimation setup after power cut. OK.
- ❑ Managed to setup all IR3 collimators in B2 & B1 with **~15 mins / coll** and **~6 mins / coll** (without repeating reference TCP setup) respectively .
- ❑ The change in beam centres compared to the setup of **08/03/2011** is **< 135 μm** , except for the TCSG.5L3.B1 (243 μm difference).



IR3 combined cleaning MD

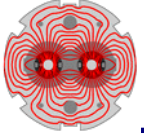


- Scope: Test cleaning efficiency when using IR3 for both momentum and betatron cleaning.
 - IR3 combined cleaning could be adopted if required for R2E.
 - Could reduce setup time.
 - Would reduce impedance.

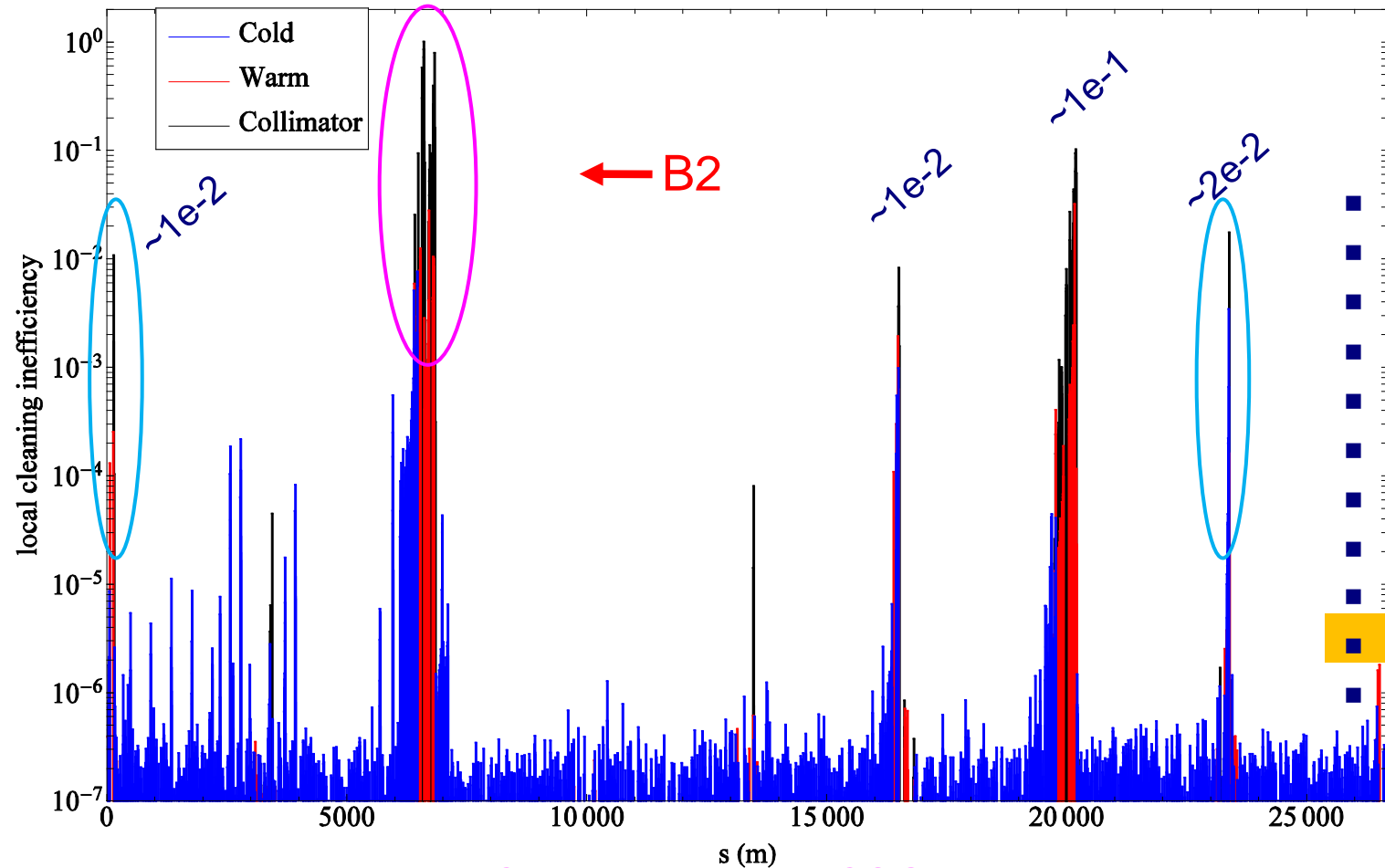
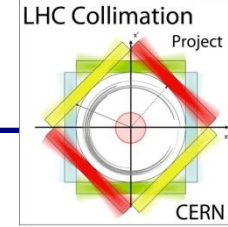
IR3		IR7		
TCP(H)	5.7 σ	TCP(V)	5.7 σ	TCT (H,V) 26 σ
TCS (H)	6.7 σ	TCS (V)	8.5 σ	TCL, TCLI, TDI open
TCLA (H,S)	10 σ	TCLA (V)	17.7 σ	
		TCP(H,S)	18 σ	
		TCS (H,S)	21 σ	
		TCLA (H,S)	24 σ	

- Measurements performed:

- Loss maps on horizontal plane, 3.5TeV with 1 nominal bunch, injection optics .
- V collimators in IR7 left in since no vertical collimators in IR3.
- Momentum loss maps could not be performed: beam dumped due to unmaskable BLM.



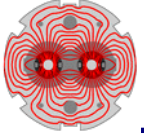
Results for IR3 combined cleaning, H, injection optics



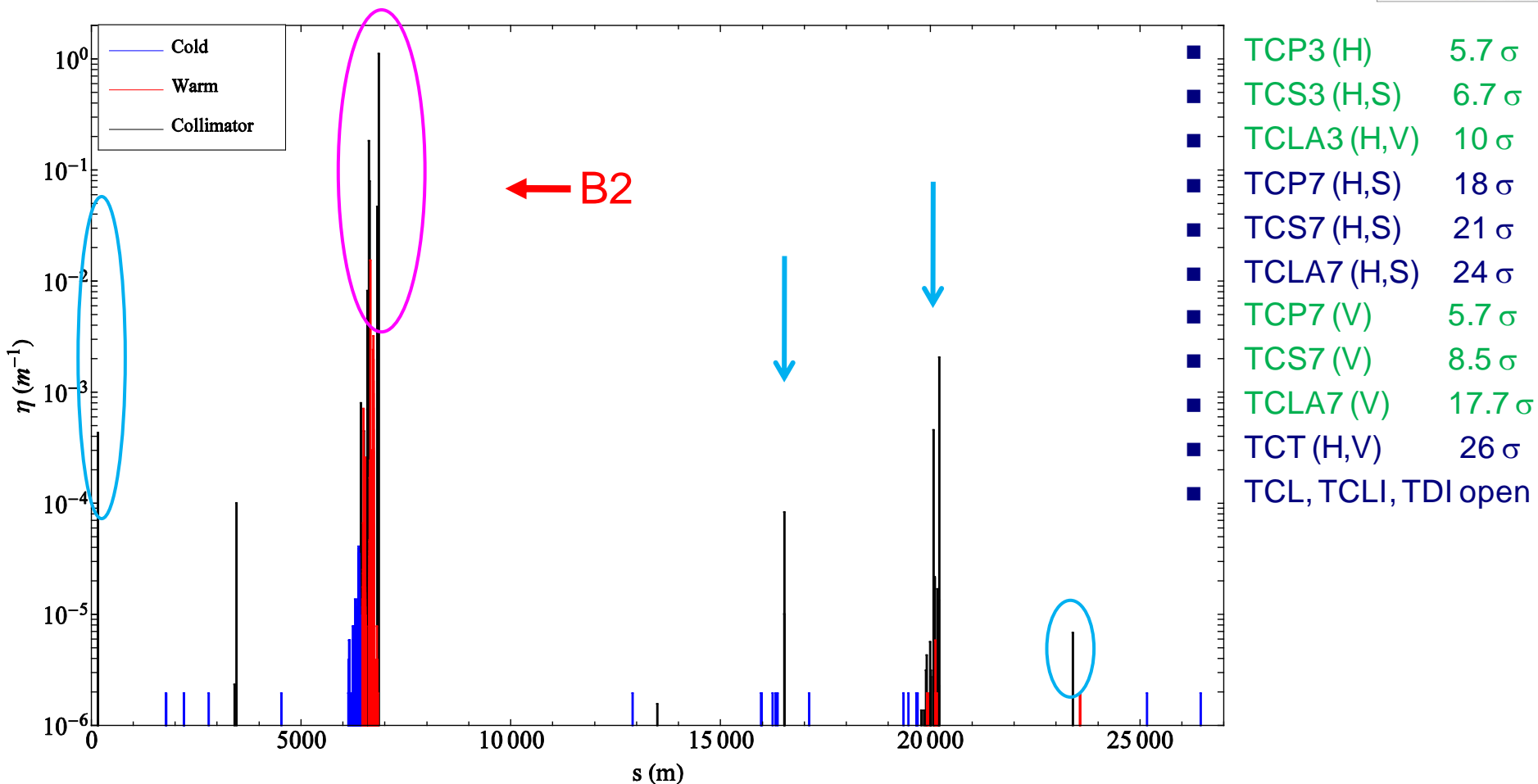
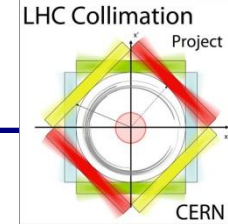
Setup apertures

■	TCP3 (H)	5.7 σ
■	TCS3 (H,S)	6.7 σ
■	TCLA3 (H,V)	10 σ
■	TCP7 (H,S)	18 σ
■	TCS7 (H,S)	21 σ
■	TCLA7 (H,S)	24 σ
■	TCP7 (V)	5.7 σ
■	TCS7 (V)	8.5 σ
■	TCLA7 (V)	17.7 σ
■	TCT (H,V)	26 σ
■	TCL, TCLI, TDI open	

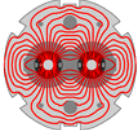
- Main losses on TCP.6R3.B2 and TCSG.A5L3.B2 → Hierarchy or showers? (TCP3 was tested to be the primary collimator prior measurements)
- High losses at TCTVs right of IR1 (~1%) and IR8 (~2.6%)



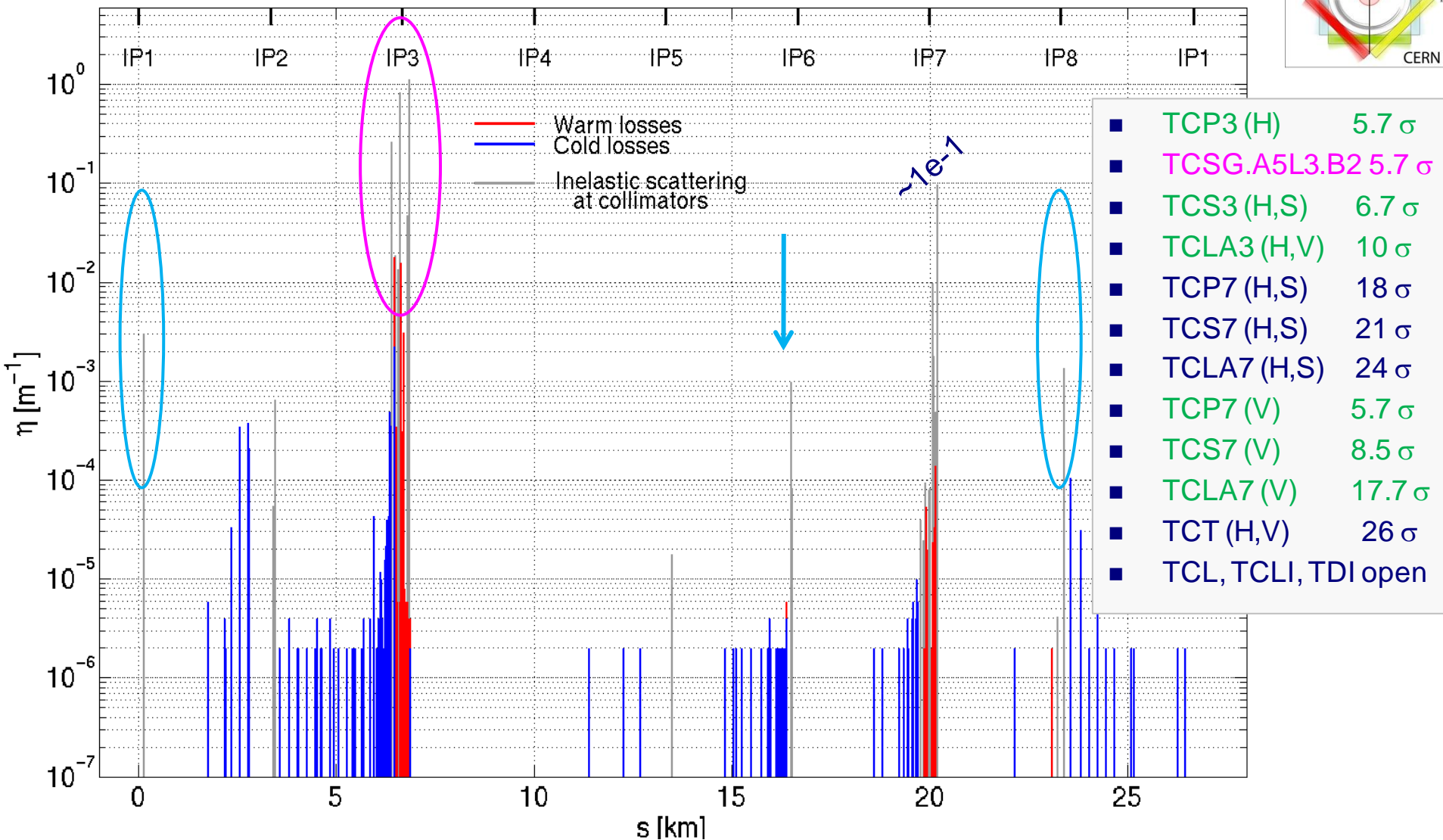
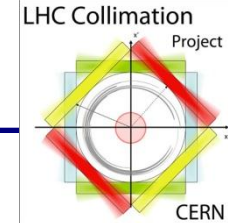
SixTrack simulations with collimators as thought to be



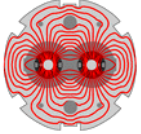
SixTrack simulations with H sheet beam hitting TCP3: cannot reproduce IR3 loss shapes, nor high losses in IR1/8, nor IR6 and IR7 level



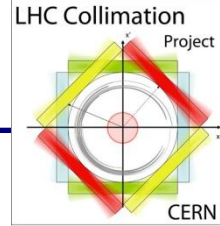
SixTrack simulations



Sum of results: sheet beam hitting TCP.6R3.B2 and TCSG.A5L3.B2

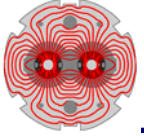


Summary and future work

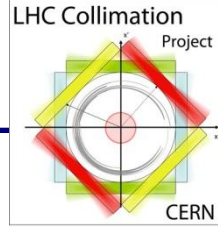


■ Results:

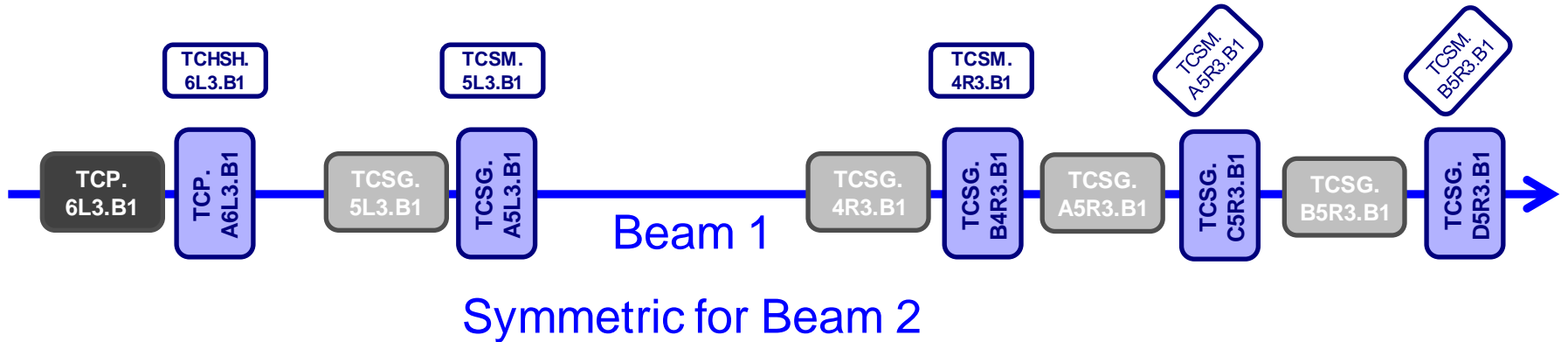
- After standard beam based setup in IR3.
- H betatron loss maps dumped both beams.
- Measured loss map pattern different from usual:
 - Main losses on TCP.6R3.B2 and TCSG.A5L3.B2 → Hierarchy or showers?
But prior measurements TCP3 was moved in to verify it was the primary collimator.
 - High losses at TCTVs right of IR1 (~1%) and IR8 (~2.6%)
- Simulated loss map pattern could partly be reproduced by overlapping results from “hierarchy breakdown” and sheet beam hitting both collimators with highest losses.
- Further study to interpret/reproduce data.
- After analysis (simulations also with FLUKA to include showers) measurements should be repeated to validate scheme.



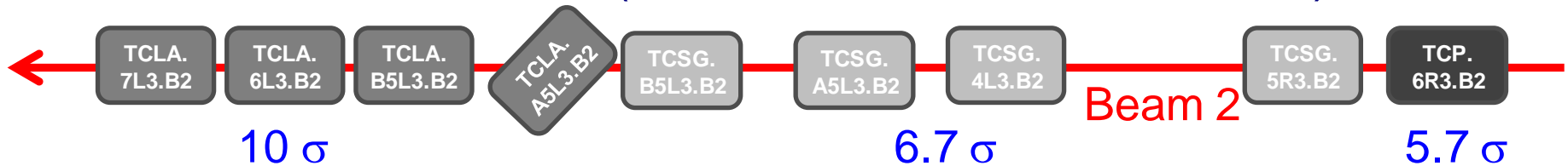
IR3 combined betatron / momentum cleaning



- What we would have (+ TCLA's)



- What we could test (no vertical collimators in IR3)



- Less passive absorber than in IR7