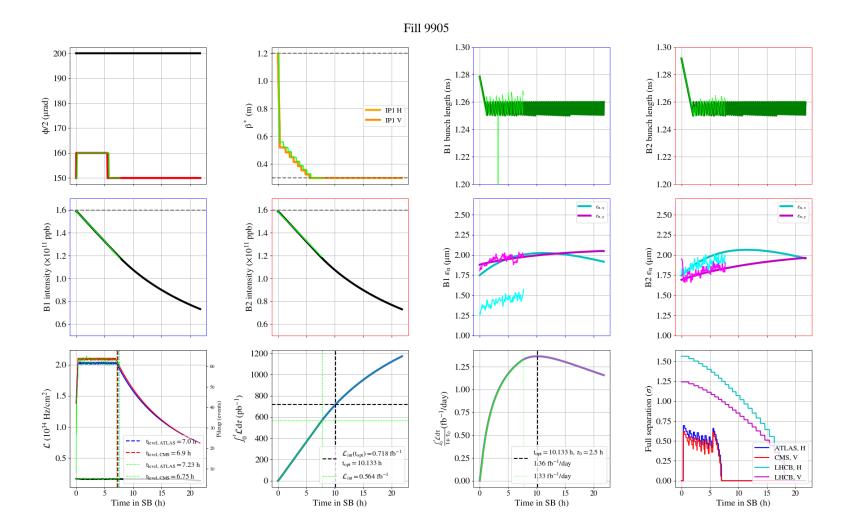
30-22 cm segment



2024 reference fill 9905





Beam-beam limit

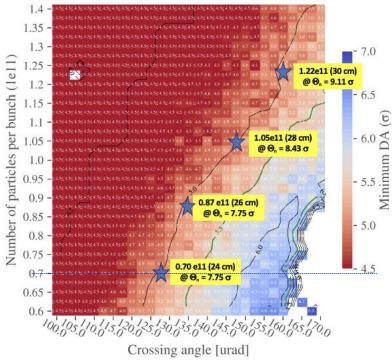
From S. Fartoukh

β* [cm]	X-angle [µrad]	X-angle [σ] @ <u>γε</u> =2.5 μm	IR1 aperture[σ] @ <u>γε</u> =3.5 μm (worst case)	Max allowed TCT gap [σ] in IR1 @ χε=3.5 μm	TCT retraction w.r.t. D1 [σ] in IR1 (worst case)	Intensity range [10 ¹¹ p/b] <u>w/o wire (& MO>0)</u> PRELIMINARY
30	198.0	9.11	9.09	8.09	1.00	1.22 → 1.05
28	155.2	8.43	8.93	7.96	0.97	1.05 →0.87
26	146.1	7.75	8.76	7.83	0.93	0.87 → 0.70
24	138.8	7.07	8.56	7.67	0.89	0.70 → ??
22	131.0	6.38	8.35	7.50	0.85	??
20	122.8	<u>5.71</u>	8.11	<u>7.29</u>	0.82	??

20 cm probably not reachable for beam-beam and/or aperture

C. Droin

DA for Bunch charge vs crossing angle (2024 EoL 30cm optics)



loct=300 A, 160 µrad, wire OFF Chromaticity 15, optimized working point

3

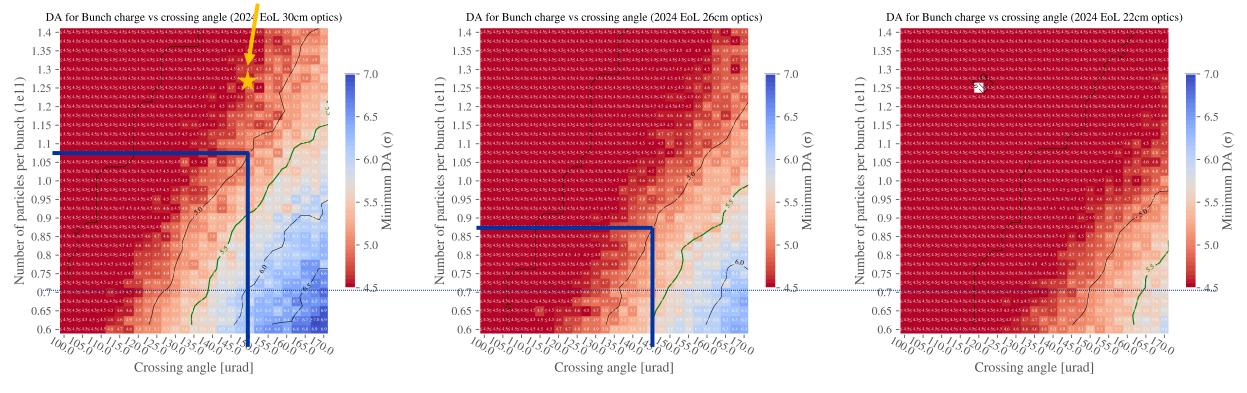


DA 30cm, 26 cm, 22 cm

C. Droin

loct=300 A, wire OFF Chromaticity 15, optimized working point

Not exactly here as octupoles 400A & chroma at 8



Not possible from BB point of view



Leveling on PU without BB limit

- es, x

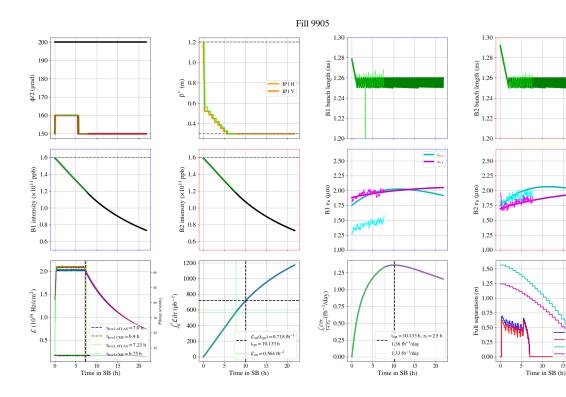
ATLAS, H

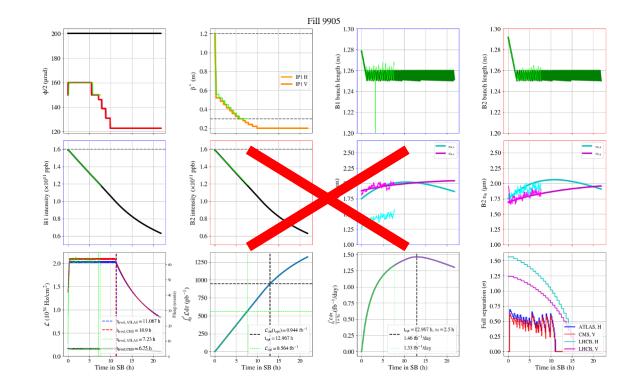
15 20

CMS, V

LHCB, H

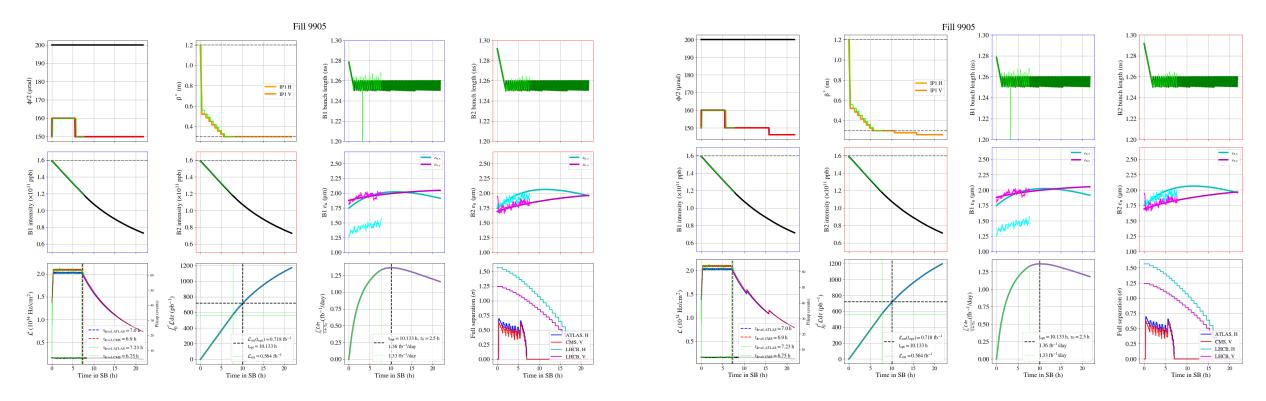
LHCB, V







Leveling on lifetime-BB limit



- Only 2 additional matching points can be added with round optics (28 & 26 cm) during long fills (>15h), DA simulations need to be updated
- No change in leveling time & optimal fill length → no gain in integrated luminosity if fill is dumped before or at the optimal fill length
- Need to push beam-beam limit: 1. flat optics 2. negative octupoles 3. wire

