ATS at 2016 MD block1


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→ Allocated time, initial objective, and main achievements

→ Highlights
“Budget”, objectives and main achievements @ block 1

→ Budget
2 shifts of 10 h (Wed. 27/07) + 8 h (Sat. 30/07)

→ Objectives:
“Commission injection, ramp and pre-squeeze at low intensity, including optics correction at 40 cm”

→ Achievements:
Injection, ramp and pre-squeezed commissioned at low intensity, including optics correction at injection and 40 cm. Ramp and squeeze with all bumps on.
Highlights @ first ATS shift

→ Beams circulated immediately (thank to the COD, Q and Q’ trim pre-setting based on nominal optics)

150 μm r.m.s reached after ~30 min of optimization
Highlights @ first ATS shift

→ New IR4 optics: ADT settings recomputed on-line, incorporated and successfully tested (for injection oscillations)

→ New IR6 optics: So far so good!

LSWG 07/08/2016
Highlights @ first ATS shift

Rather typical 20-30% beta-beat at injection
→ Global Correction knob calculated for incorporation (2d shift)
RQ8.L4b1 does not manage to regulate correctly at 450 GeV, but
→ In the noise for beta-beat (<4%) and tune shift (a few 0.001)
→ Recover rapidly at the beginning of ramp
.. Experts are informed. In the worst case a new-new-new-.. IR4 optics
will be provided without blocking with the present ATS program
Highlights @ first ATS shift

→ Smooth ramp & squeeze with several optics measurements taken on the fly

→ Beta-beat < 5-10% at flat top (3m at IP1/5, 10 m @IP2, 3 m @IP8, MQX@7TeV-equivalent < 205 T/m in all IRs)
→ No correction needed except the local one as extracted from the nominal optics (few empirical trims applied to the triplets)
Highlights @ first ATS shift

→ ~10% beta-beat at 1.2 m

→ Beam dump (both beams) when playing the last squeeze segment (45 cm to 40 cm) due to a typo in the sequence.
Highlights @ first ATS shift

→ …Ramp-down, Inject, Ramp, and Squeeze in steps (but without intervention) to 40 cm

→ β-beat < 10-15% (only relying on local correction)
Highlights @ first ATS shift

→ ...and the W’s (off-momentum beta-beating) as a key signature of the ATS (with or w/o telescope)
Highlights @ second ATS shift

Beta-beating at 40cm ~4% after correction

LHCB2 6.5 TeV, ATS $\beta^* = 40$cm
Highlights @ second ATS shift

Tested all the bumps at injection and 40cm, including correction of the dispersion induced by crossing bumps.

Performed a ramp & squeeze with all bumps (except dispersion compensation) – TCTs fixed at +- 15 mm → extract the beam position evolution at TCT to build function.

Next time - tentative:
• Injection, ramp, squeeze nominal bunch, align TCTs
• Squeeze in one step
• Aperture at 40cm