

- LHC MD284 -

Beam tail population measurements using collimator scans

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on behalf of the collimation team



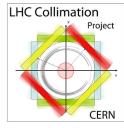
Halo measurements



- MD merit: Measurement of tail population and diffusion speed at 6.5 TeV will provide valuable input for LHC collimator operation and future active halo control techniques.
- From inward and outward collimator scans, losses at each collimator step can be fit using a diffusion model to obtain the diffusion rate.
- Can also obtain p-to-Gy calibration factors for e.g. lifetime analysis, comparison to simulations...
- Proposed MD programme (as done in 2012 @ 4 TeV):
 - Injection (2 nominal / beam) -> Ramp -> Squeeze (~2 hour)
 - Retract IR7 TCPs from 5.5 to 7 σ , scrape separately with H/V, B1/B2 TCPs down to \sim 2 nominal σ (\sim 2.5 hours)
 - \Rightarrow slow scraping of 10-20 μ m every 10-20 seconds
 - Retract TCPs to 5.5 σ, bring beams in collisions (~1 hour)
 - Repeat scraping in collisions (~2.5 hours)
 - Total: 8 hours
- The MD will be done in parallel to MD910 (off-momentum loss maps).



Halo measurements



Points raised by MPP:

- Would pilot bunches be possible? No, as we need to establish the collisions with the nominal orbit.
- Async dump mentioned in the MPP note? Remnant from MD block 1 proposal will not be done.
- Turning off of BLM-PM acquisition needed? No, we do not intend to dump the beam with the scraping. In the past (and in the MD) we only ever turned off the UFO buster acquisition.

Changes to MP settings:

- Setup beam flag: needed to mask collimators and BLMs.
- Collimators: need to open position thresholds to parking.

Recovery after MD:

N/A: collimators will be driven back using sequence, no beam processes will be changed.