Dynamic beta-beating

Address impact on optical function at beam instrumentation from head-on and long-range beam-beam interactions.

→ Luis left, maybe Jacqueline could start this? 3-4 months

EDQ aspects

1. **Tolerances on bunch-by-bunch luminosity to be addressed and determine specifications for the injectors**

Next EDQ meeting planned for December. Injectors to be invited. Tolerances from detectors might need further iterations.

2. **Experience with half detuning and implications for HL-LHC**

Partly discussed with focus on IP1 & IP5. To be revisited next year with LHCb.

OMC

1. **Triplet BTF b2R=10. Needs, possibilities and comparison to current triplets**
Almost completed:
https://indico.cern.ch/event/685264/contributions/2824695/attachments/1577465/2491449/WP220171219.pdf

2. **The requirement on the instrumentation (1% amplitude calibration accuracy) remains a key point**

Yes, need to hear from BI?

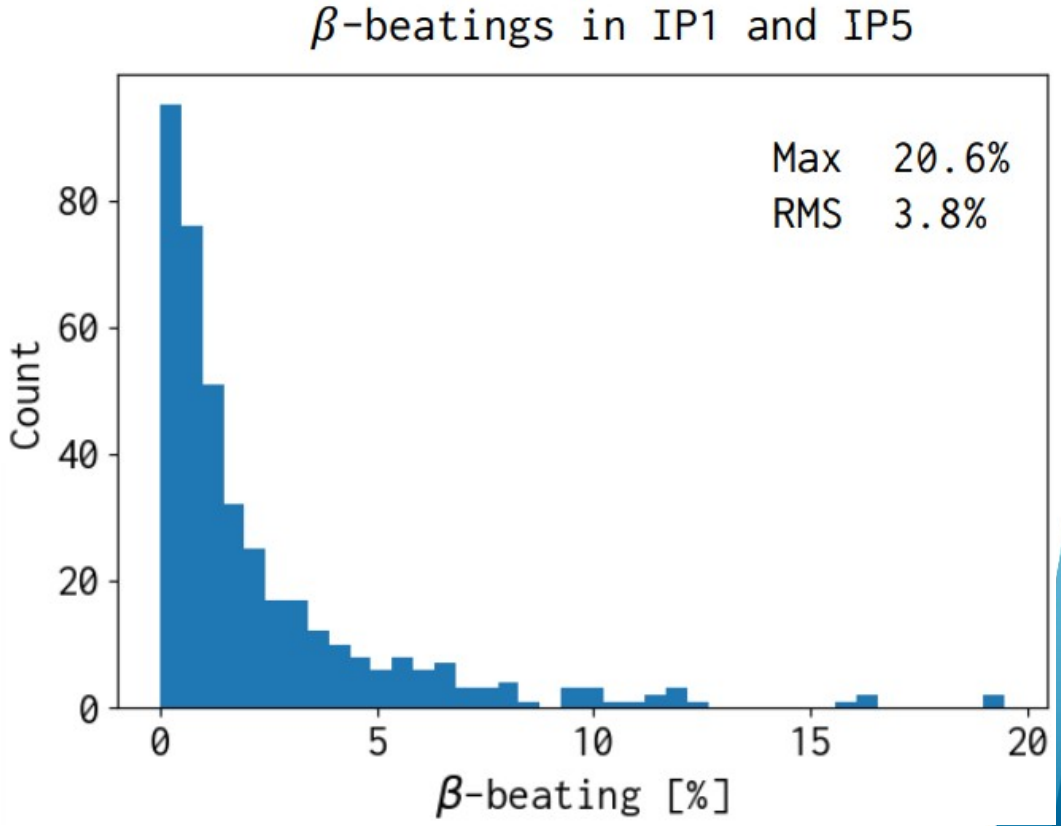
3. **Strategy to measure and correct beyond b4: skew octupole, decapole and dodecapole normal and skew components**

Great achievements accomplished. Need HL-LHC simulations during shutdown

Triplet correctability

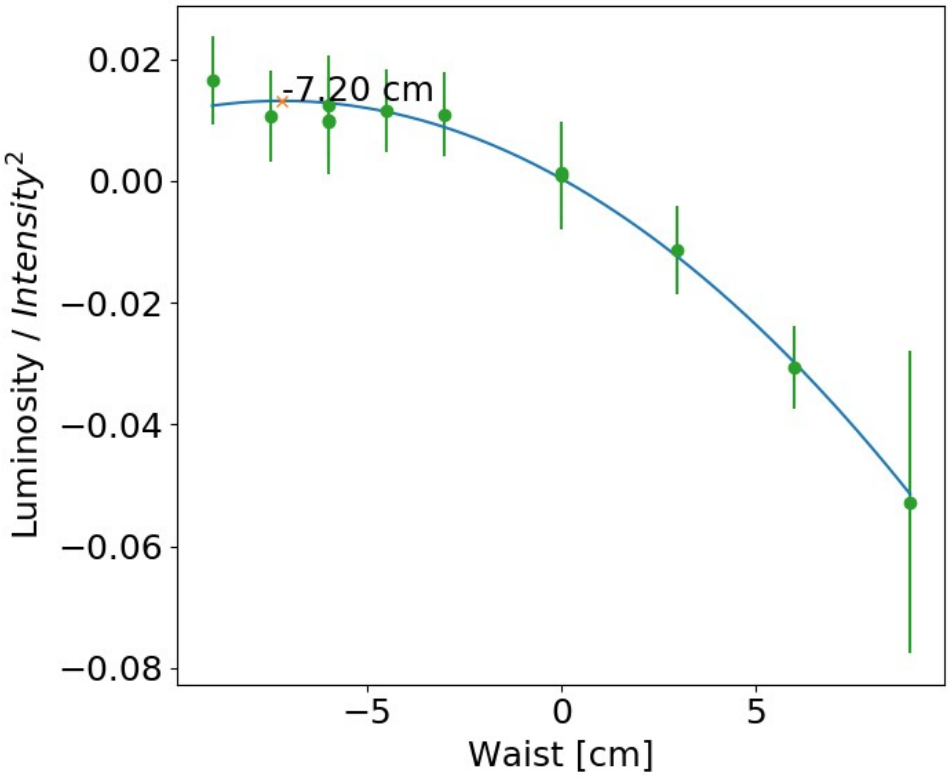
Assumptions:
Beta* = 15cm
Sorting in Q2 (no Q2A trim)
BTF b2R = 10 units
Tune uncertainty = $2.5\ 10^{-5}$
Longitudinal error = 2 mm

Challenging! Help could come from:
-1% BPM calibration
-Luminosity waist scans

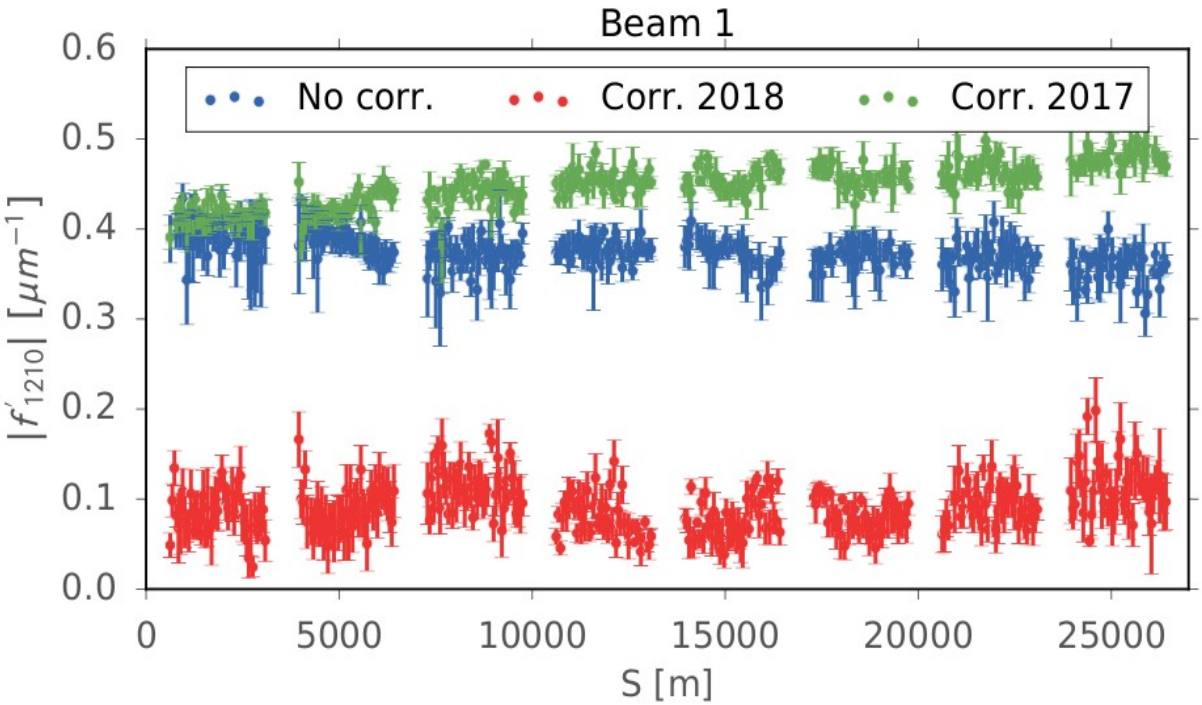


β* control with luminosity waist scan

- Diagnosing β* to sub-cm level via luminosity waist scans
  Very promising!
  Incorporation in commissioning yearly?



First corrections of triplet skew octupoles



Demonstrating observables for higher order corrections

In 2018 new observables have been shown to relate to higher orders, like DA, feed-down and, as illustrated, 2nd order amplitude detuning: