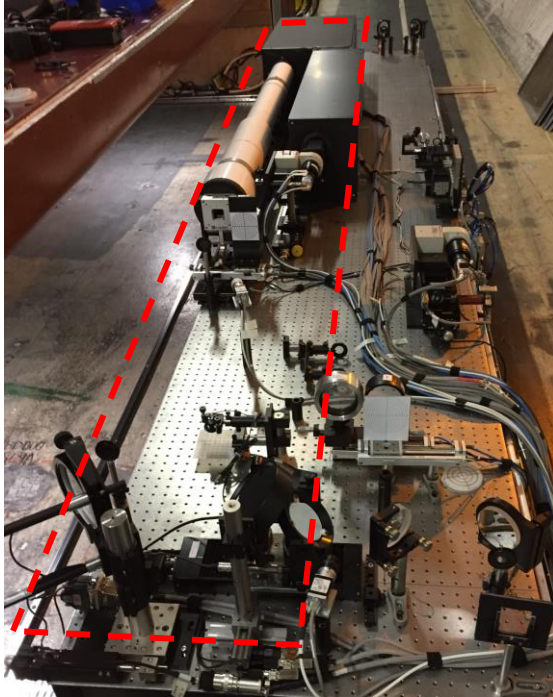# MD10303: characterization of the BSRH

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6 September 2023

MD goal

- Synchrotron radiation (SR) halo monitor (BSRH) **refurbished for Run3**

- Extensive simulations carried out in LS2 provided **better understanding of LHC SR** source and its limitations
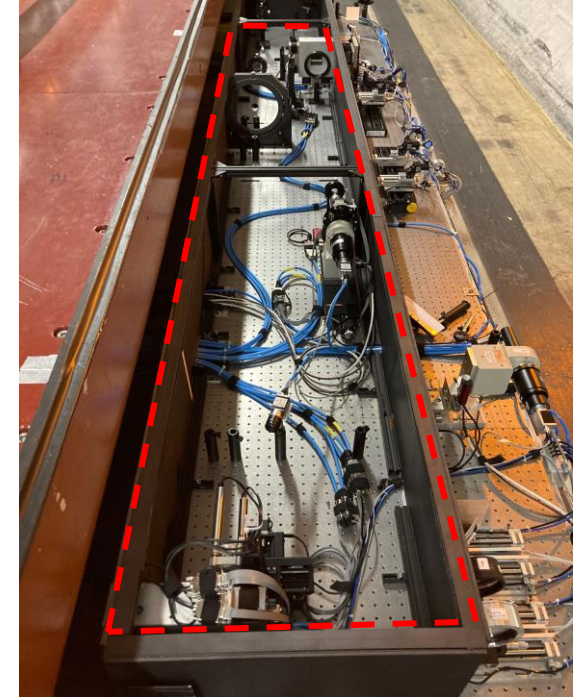

Run 2 setup
- proof of concept
- validated at injection (MD1900), discrepancies at flat-top (MD2243)

Run 3 setup:
- setup optimized for LHC parameters
- commissioning ongoing

- **Objectives:**

  - Is there a gain in contrast using a coronagraph instead of standard imaging (BSRT)?

  - What is the ultimate sensitivity of SR based diagnostics to halo population? (May require more MDs…)

MD requirements (update)

- **Beam 2** only

- Work in **setup beam,** 2 nominals and a few pilots

- A filling scheme with **evenly spaced bunches** would help the measurements

- Ramp to **6.8 TeV**

- Frequent **wire scanner** measurements for reference

- Collimator **scraping** and ADT **blow-up** on both planes

- Perform **multiple ramps** to increase statistics (given the few bunches allowed by setup beam)

MD procedure (update)

Principle: scrape nominals to simulate a beam core and overlap blown-up probes to simulate the halo

1. Inject 2 nominals surrounded by a few probes (nominal 2.5 um emittance). Quick coronagraph check at injection and ramp
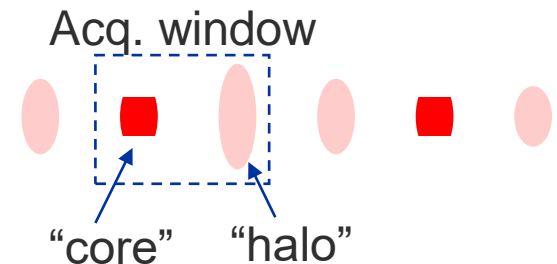
2. Scrape beam, ideally down to 3σ (HL reference, ~2.5σ LHC reference)

3. Open collimators >5σ, blow up probes to have several background levels. Take wire scanner reference profiles and reference images.

4. Take BSRH images overlapping nominal and probe(s) in the same acquisition window to assess the sensitivity to the fade background. Repeat blow-up / scraping sequence.

5. If possible, repeat entire cycle to increase statistics on both planes.

Acq. window

"core"   "halo"

Comments

- **No need for Beam 1,** available for other (non-conflicting) activities

- Setup beam should allow **maximum flexibility on scraping / blow-up**.
  Discussions with BLM and collimation teams, no significant limitations in safe beam.

- First MD on the new BSRH setup. Exact data taking plan adapted to experimental findings.

- **Longer* allocated time** (8h-10h) would help to perform multiple ramps and increase statistics
  - If only one cycle available, check both planes with only one bunch

*w.r.t. to the initial request of a 6h slot with with many nominals

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