LHC 25 ns injection MD II

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Objectives:
- **25 ns** injection for **higher intensity** (**72**, **144** and **288**b if possible)
- **RF/BI setup** with 25 ns
- checks of **emittance growth** seen in MD I
- preparation for "**scrubbing**" MD

Can be done before MD (GR/KC)

- **Checks of 25 ns beam** (1.1e11 p+/b, ~3 um) on cycle in **SPS**.
  - 24b, 48b, 72b, 144b and 288b.
- Measure characteristics for all beams (**trans/long emittances, scraping settings, intensities**)
- If possible (when LHC off – not very high priority)
  - extract **24b** onto **upstream TEDs** (based on 50 ns settings) and first steering if needed
  - extract **24b** onto **downstream TEDs** and detailed **TL steering**.
  - extract **144/288b** to **downstream TEDs**

During MD proper (7h)

- **Damper settings to 25 ns**
- **Inject with 12b at 50 ns and check steering** – 2h
  - Copy steering settings 50 ns -> 25 ns (if any changes!)
- Change SPS cycle to 25 ns and **test 24b beam injection into LHC**.
  - Correction of **injection oscillations** and **steerin**g for beam loss at TCDIs (only if needed)
    - if required opening to **+/-5 sig of most critical TCDI collimators**.
  - LHC **BPM calibration** (to remove offset seen last time)
- Detailed **RF setup**:
  - detailed setup of **dampe**r - 1h
  - detail setup **RF capture** - 1h
- **Accumulation of several 24b batches in each beam** (repeat pattern from last MD, 9 injections), surveying **vacuum, losses, cryo heatload and BSRT** (to see if emittance growth seen last time was due to damper) – 1h
- **Injection of longer batches** – 2h
  - Dump, re-inject with 48b batch;
  - if OK inject additional 72b batch;
  - if OK, inject additional 144b batch;
  - if OK, inject additional 288b batch;
  - **Need filling scheme for this** - maximise spacing between batches;

Recovery (after 2nd part of MD)

- Revert all settings to 50 ns ones (if needed)
- Revert all interlock thresholds to 50 ns ones, and perform separate cross-check
- Test injection of 12b at 50 ns still OK.

Issues/questions

- For Verena and Joerg: can we modify the intermediate beam threshold such that we can inject pilot-24b, without needing to inject the 12b 50 ns beam first? This would make things easier - will need to go through rMPP...documents to prepare

- For Wolfgang/Daniel - is it OK to switch damper to 25 ns settings before the first 50 ns beam injection?

- Plan is to push for 288b injection if everything looks great up to 144b. Maybe somewhat optimistic...