MD4828: Vacuum bump in IR7
MD3283: Active halo control using colored noise

Hector Garcia Morales
On behalf of the Collimation team
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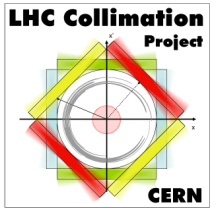


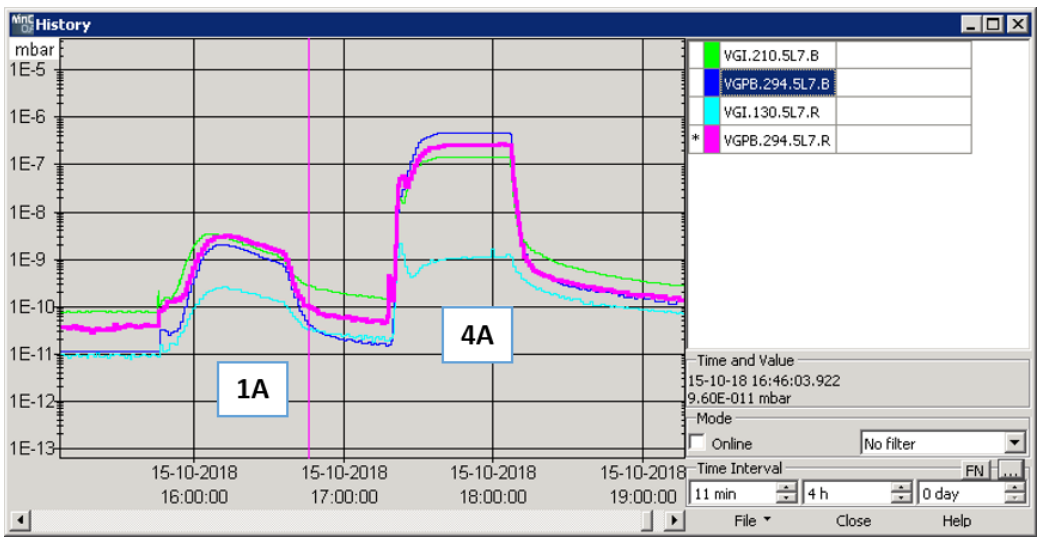
MD4828: Vacuum bump in IR7

Motivation: testing the effect of **pressure bumps in IR7** on beam losses and beam lifetime. This is important to understand the **vacuum specifications for new equipment** in IR7 as input to future collimator production.

Principle: **warming up NEG getters** in specific sectors in IR7. **Hydrogen release** in a controllable way up to levels that will be monitored online and can reach up to 10^{-6} mbar

Parameters:
- EOF at FT.
- 300 BCMs bunches

Procedure:
i. Trigger the heating of getters in the vacuum sector A5L7.R and .B.
ii. Monitor the **pressure** increase.
iii. Observe **beam losses** and beam **lifetime**.
iv. Carry out several steps every 10-15 minutes.



MD4828: Vacuum bump in IR7

MD overview

Reached pressures up to 1e-6 over about 20m.

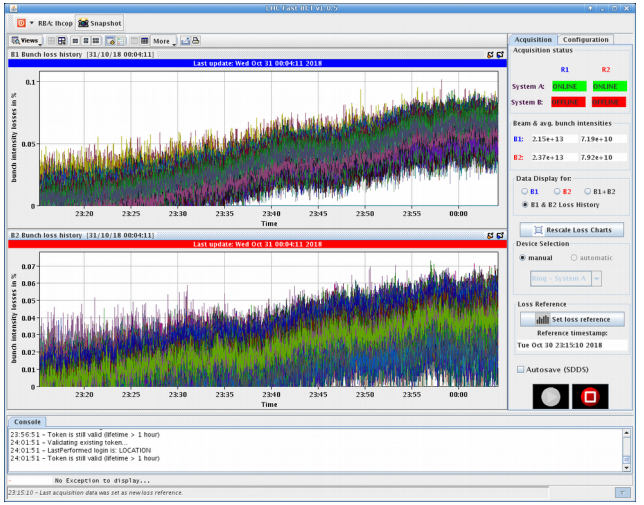
Monitored: **beam losses, beam lifetime, single-bunch losses**.

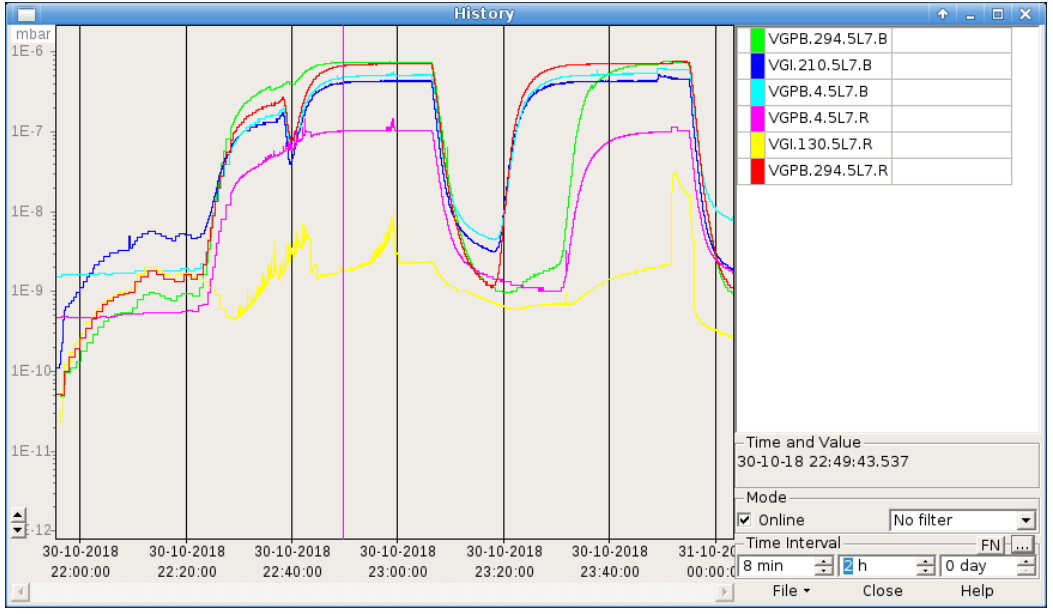
The test was very **successful**.

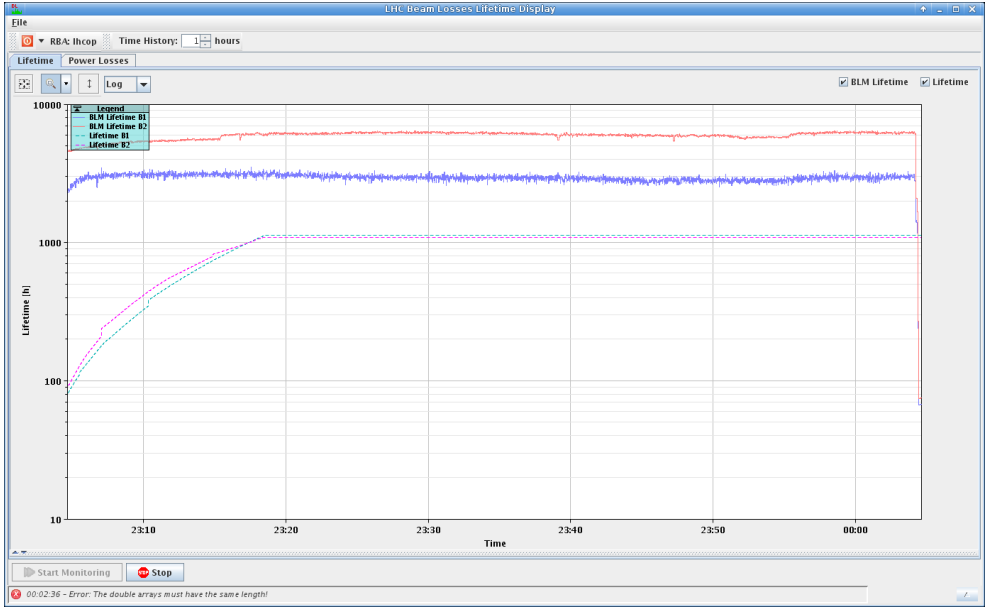
No apparent effect on beam lifetime.

Detailed off line analysis ongoing to extract conclusions.

Nominal vacuum conditions were recovered after the test.







MD3283: Active halo control using colored noise

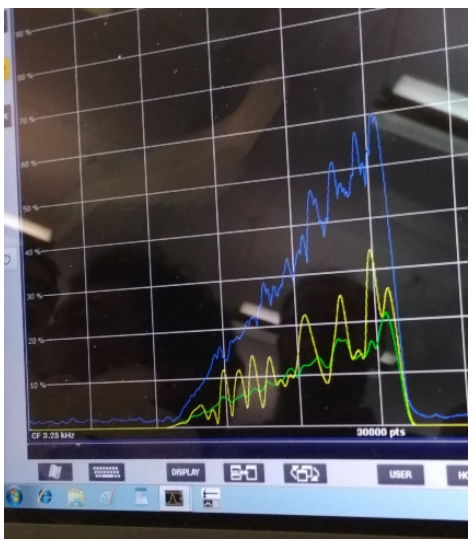
Motivation

Tail population may impose operational limitations for the HL-LHC when accidental scrapings are produced due to beam jitter. Active halo control aims at removing those particles in a controlled way without affecting the core of the distribution.

In this MD, after several tests using narrowband excitation using the ADT, we try a colored noise excitation. The aim is to excite simultaneously different regions of the tail to obtain a more efficient cleaning.

Procedure:

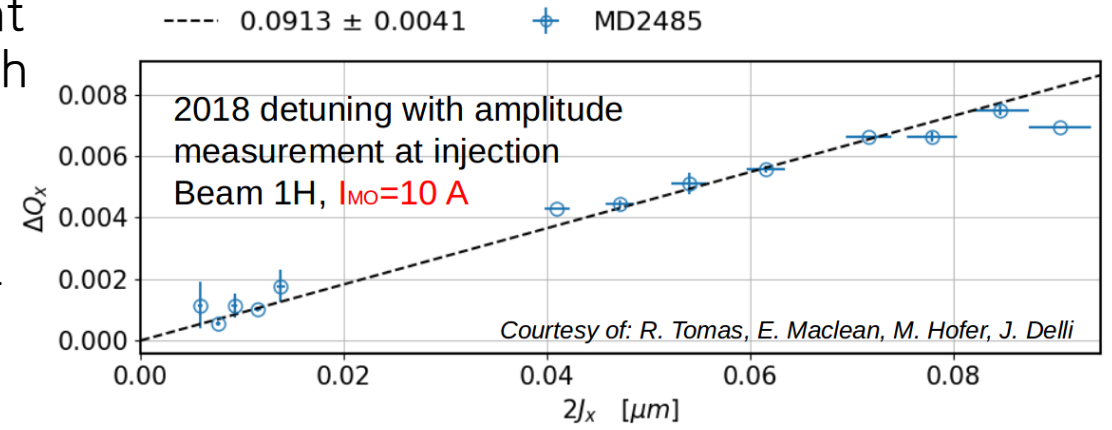
- Injection energy
- One nominal bunch per injection
- ADT excitation
- Wire scanner and collimator scraping.
- Reinject.



MD3283: Active halo control using colored noise

MD overview

- 8h allocated. Useful time = 5h (SPS kicker)
- Detuning with amplitude measurement
- ADT window adjusted to detuning with amplitude.
- Core study (nominal bunch)
- Tail study (blown up bunch)
- Wire scanners and collimator scans for profile reconstruction



Courtesy of E.Maclean and R.Tomas

Results

- Clear intensity reduction only for blow up bunch
- Intensity loss in tail region, but…
- …more than 20% intensity loss
- …and emittance blow up.

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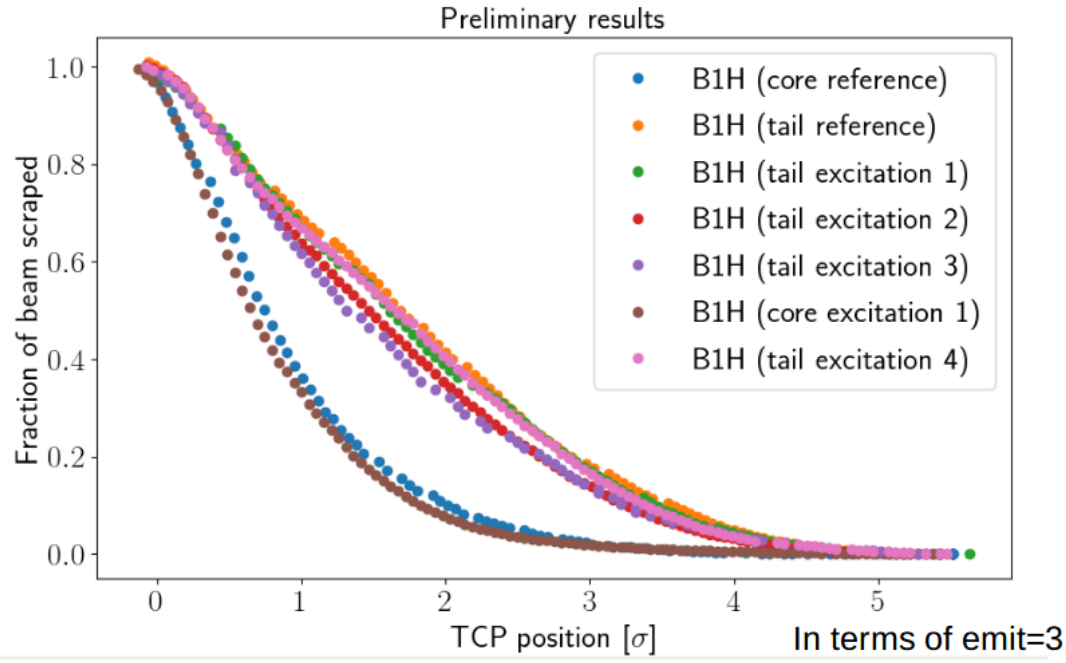

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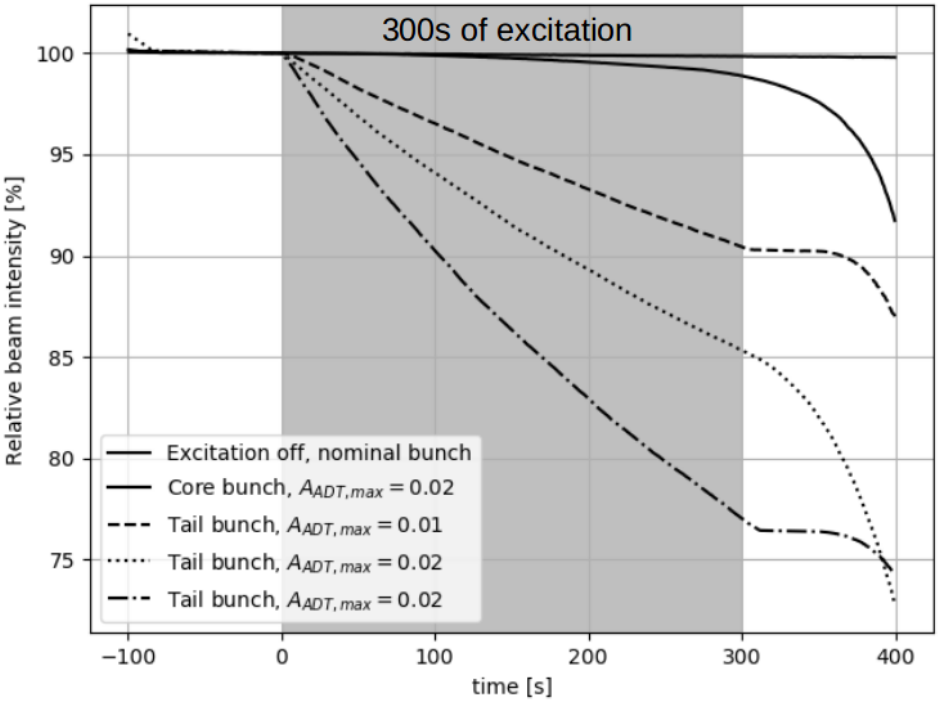

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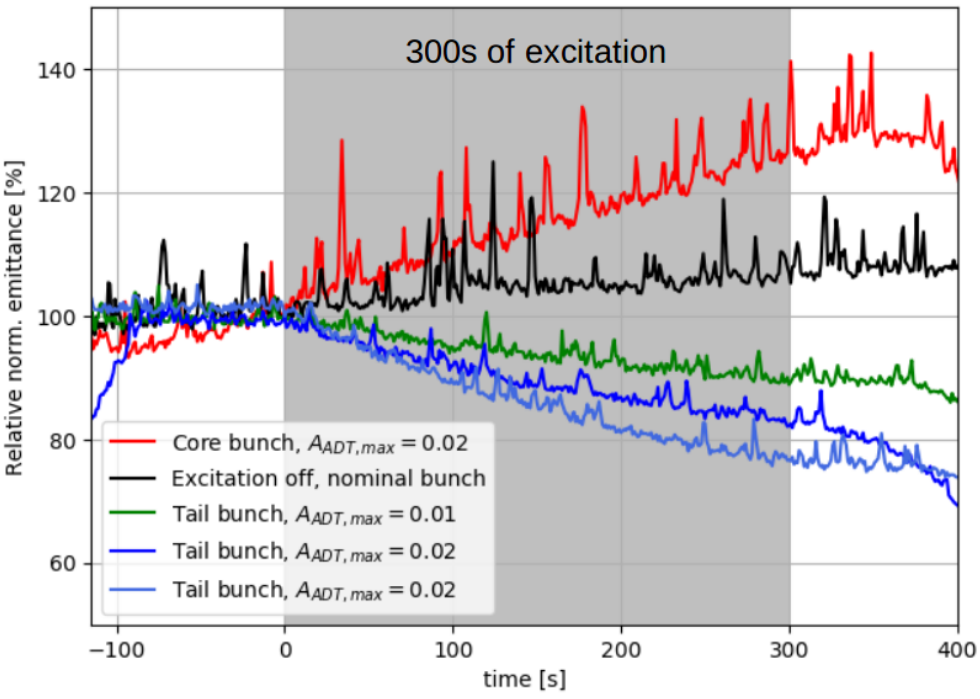

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Conclusions

- That was the **first time** we successfully tested a **colored noise excitation** for actively depleting the beam halo.
- New measurement of **detuning with amplitude at injection** in horizontal plane.
- Clear **intensity decrease** for blown up bunches while intensity stays constant for nominals.
- Clear **emittance blow up** for nominal bunches
- The **evaluation of this method** as a practical tool for halo depletion is ongoing but it seems **less promising** than other candidates such like hollow electron lens.