

# REPHASING MD

## SUNDAY AUG 28<sup>TH</sup>, 02:00-08:00

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# MD Planning Sun – Mon (28– 29Aug)

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Day	Time	MD	MP
Sun	02:00	450 GeV → 3.5 TeV: <u>p-p rephasing</u> – debunching during ring rephasing with nominal emittances	<b>B</b>
	08:00	Ramp down, cycle.	
	10:00	450 GeV: <u>UFO studies</u> – generation mechanism at MKI's, statistics, MKQA tests (p-Pb interlock test in the shadow)	<b>C</b>
	18:00	450 GeV: <u>Quench margin at injection</u> – observation with special QPS instrumentation, losses from TCLIB collimator	<b>C</b>
	22:00	450 GeV → 3.5 TeV: <u>Quench test at 3.5 TeV</u> – test losses in other dispersion-suppressors	<b>C</b>
Mon	06:00	<b>Technical Stop</b>	

# Motivation

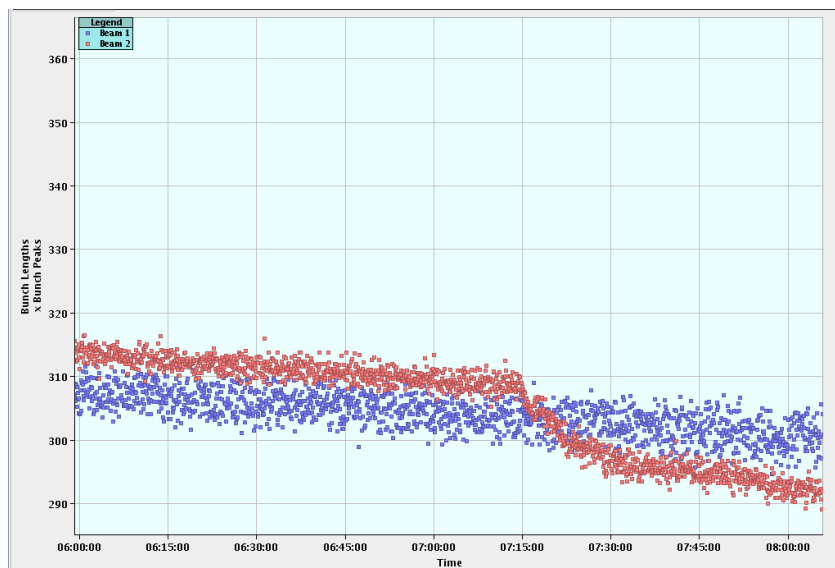
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- In p-Pb physics, injection in the two rings will be at different RF frequencies and the two rings RF will be ramped independently
- Before physics the two RF will be made identical. But crossing will be anywhere in the circumference
- One ring will then be “rephased” to bring the collision in the detector centre
- This was tried on Oct 30, 2010 (5 single bunches,  $\sim 5E10$ /bunch) and resulted in significant losses. But the conditions were not favorable
  - ▣ 8 MV RF
  - ▣ Beam injected  $> 9$  hours before. Used for Totem run (night Oct 29-30)
  - ▣ Frequency change too fast?

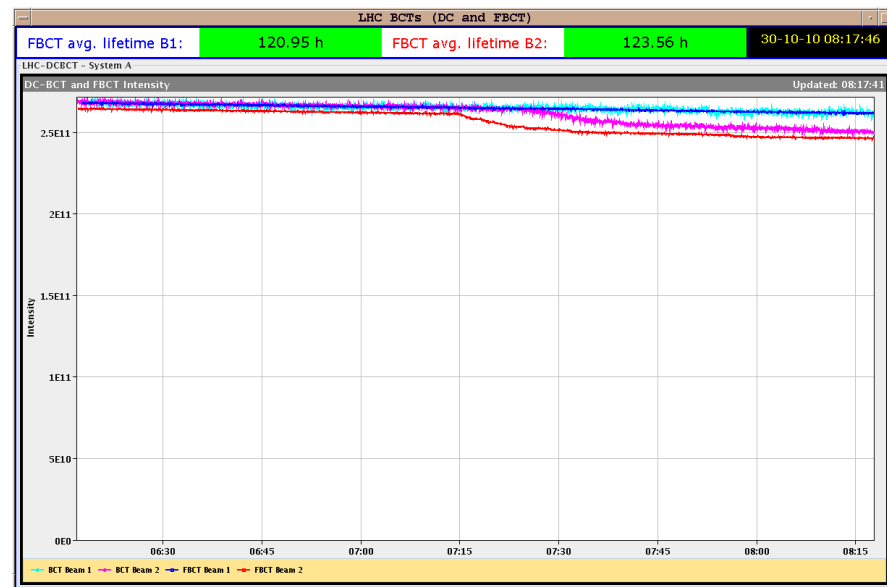
# Summary of Oct 30<sup>th</sup>, 2010

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- We have observed debunching during the longitudinal displacement
- It was the strongest on the first -15 ns step
- Lifetime drops was observed on the first three steps (-15, -10 and -5 ns), then again for the last three steps (+5, +10, +15 ns)



Bunch Length.Peak product showing losses



Fast and DC BCT show that losses were important for the first -15 ns displacement only. Not significant after this initial scraping

# MD planning: Fill 1

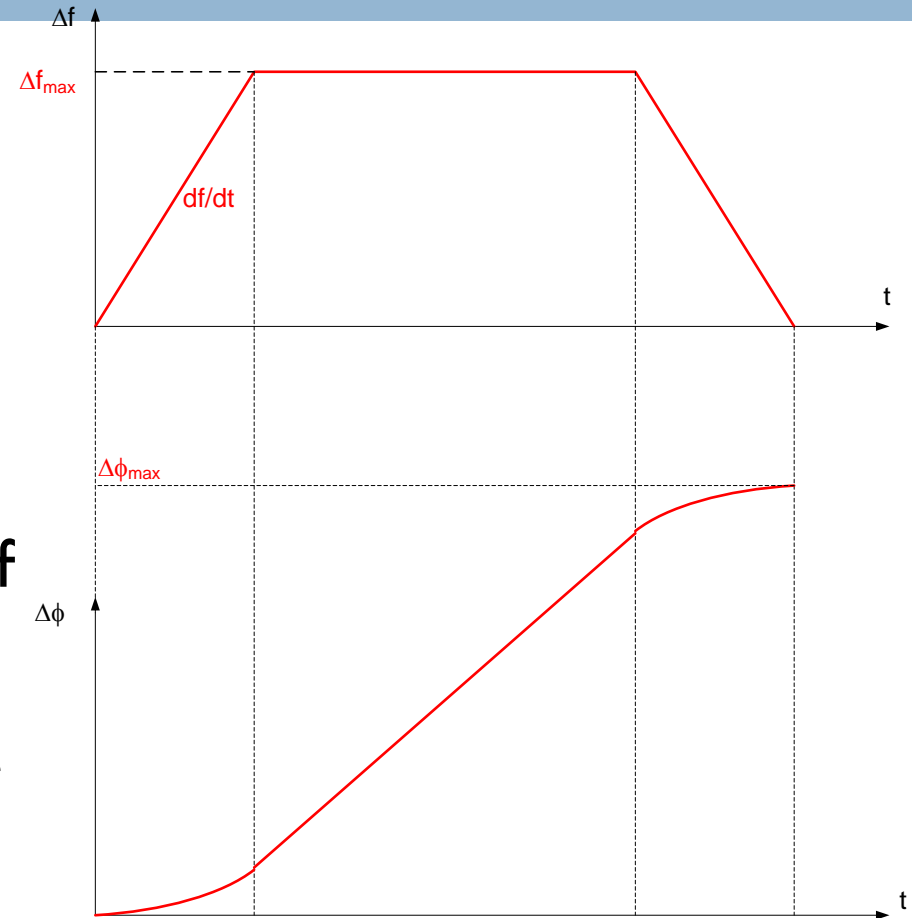
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- 8 single bunch ( $\sim 1E10$ , spaced by  $1/9$  turn) plus pilot,  $\sim 0.5$  eVs (1.5 ns, 4-sigma SPS), captured with 6 MV
- Ramp with voltage rise to 12 MV and blow-up to 1.2 ns (4-sigma, LHC)
- As soon as we arrive on flat top
  - First a 40 microsec rotation, clock-wise B1, counter-clockwise B2
  - Then a series of smaller amplitude rotations: 1 microsec, 10 ns, 1 ns
- For each rotation, measure b-by-b loss, blow-up (length), dipole oscillation, bunch profile, abort gap population

# MD planning: Fill2...if time allows

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- Same beams as for Fill1
- Same flat top rephasing but with different speed for the RF manipulations, either faster or slower depending on the results of Fill1
- Move B1 counter-clockwise and B2 clock-wise



The rephasing frequency bump.

# To be prepared (not LHC RF)

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- SPS single-bunch  $1E10p$  with blow-up to 1.5 ns. Can hopefully be prepared in advance.
- Abort Gap monitor