MD: Variable Transverse Damper Gain, Tune Measurement and Emittance Preservation

presented by W. Hofle
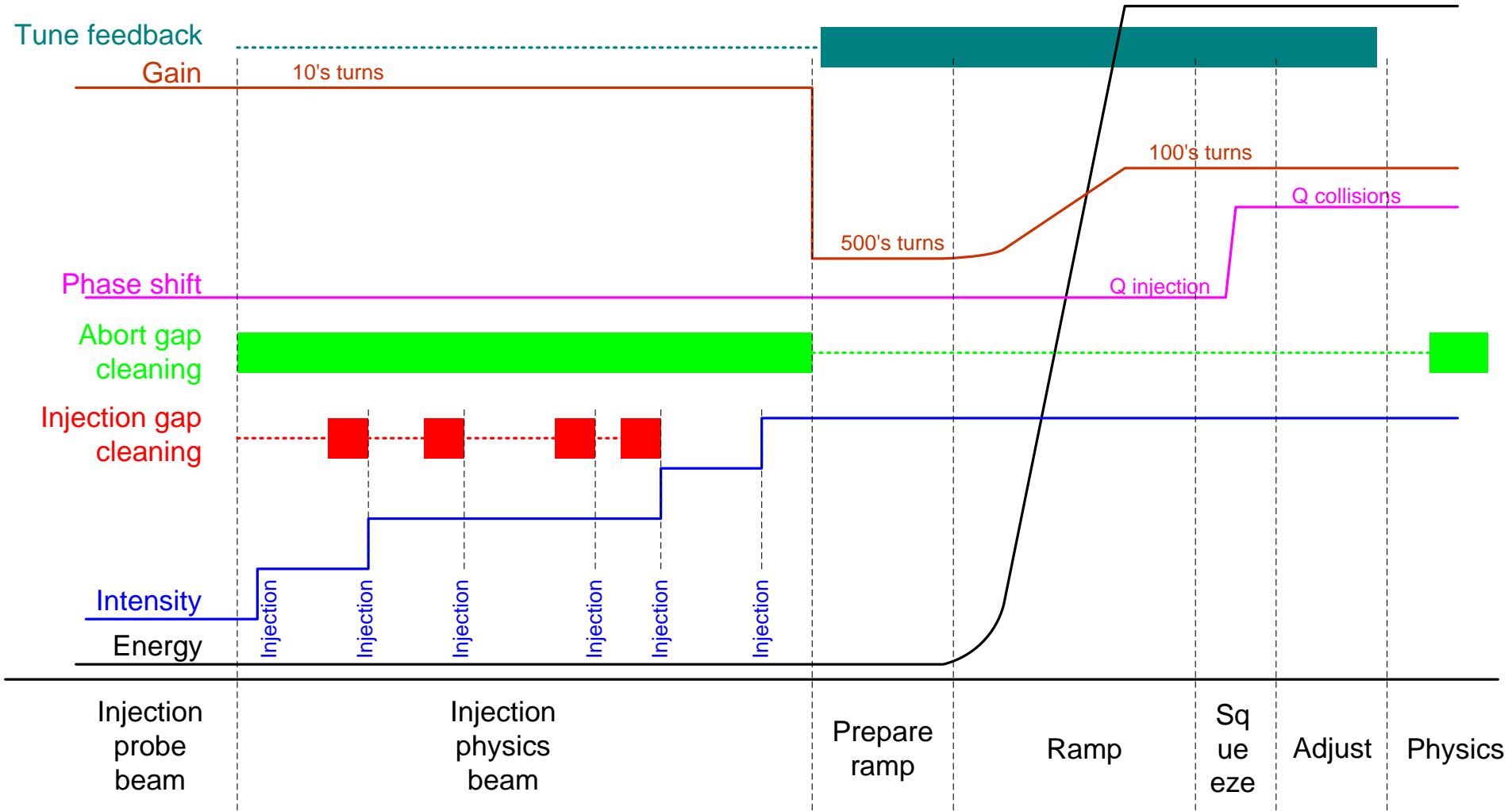
Participants:

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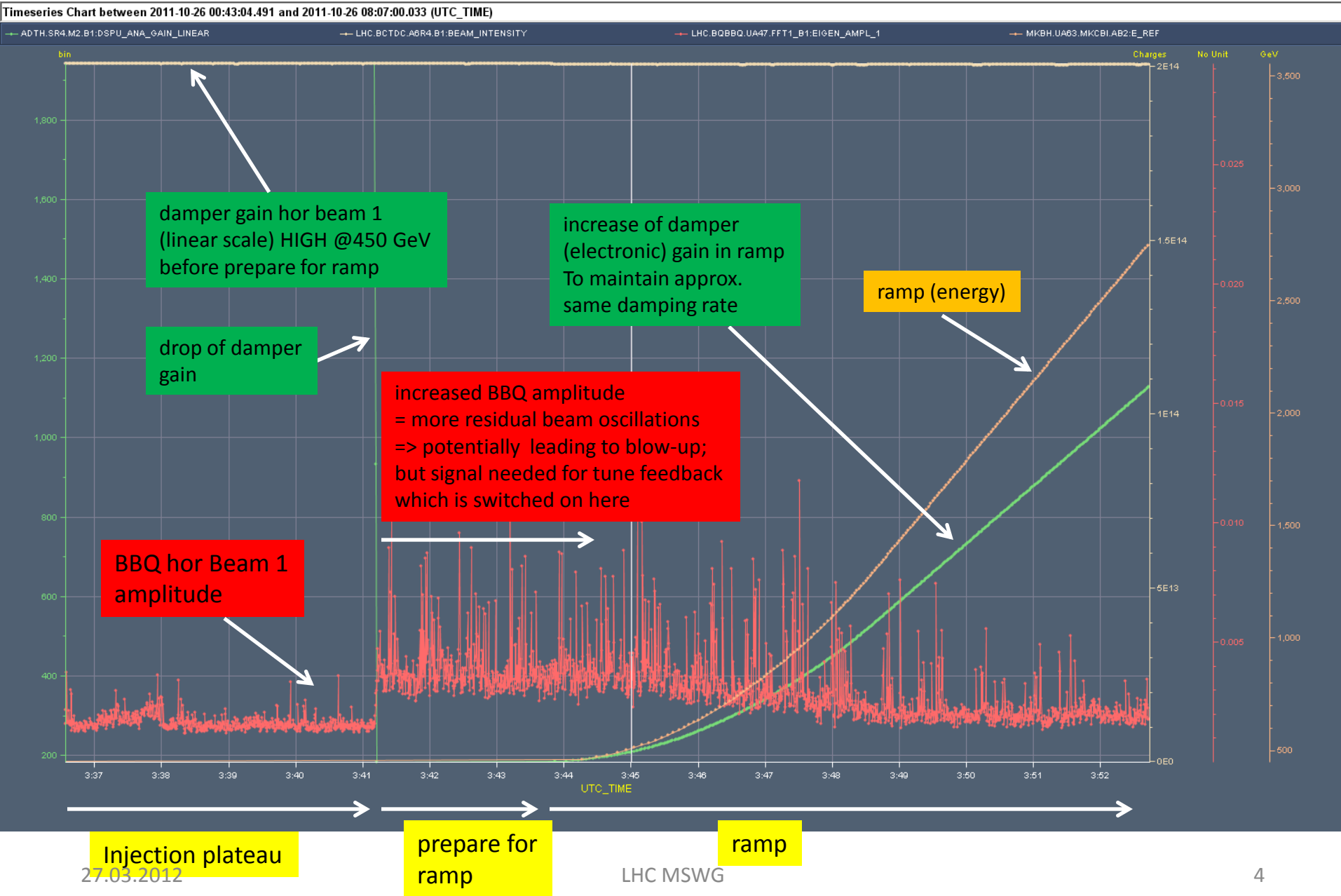
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Proposal from Chamonix 2012

1) lower ADT gain for first bunch train of 12 bunches

2) implement in ADT observation of two selectable bunches

3) observe results of lower gain, incl. on BBQ (gated BBQ ?)

4) check practical feasibility of tune from residual damper signa

ADT through the cycle

Tune feedback

Gain — 10's turns

100's turns

Q collisions

500's turns

Phase shift — Q injection

Abort gap cleaning

Injection gap cleaning

Intensity

Injection

Injection

Injection

Injection

Injection

Injection

Energy

| Injection probe beam | Injection physics beam | Prepare ramp | Ramp | Squeeze | Adjust | Physics |

How we ran in 2011 with 50 ns beam

Objectives of proposed MD

❑ investigate if higher ADT FB gain is cure for blow-up in ramp

❑ improve compatibility of ADT and tune feedback by witness bunch(es) with lower ADT gain

❑ collect data for investigation of practical feasibility of tune measurement from ADT PU data

New features prepared
on ADT side for 2012 (D. Valuch)

❑ New 16k memory block(s) on FPGA for quasi continuous observation, for example 8 bunches each 2048 turns

❑ Gain modulation, bunch selective, batch-by-batch (limited only by bandwidth of power system) in digital part of FB loop

Proposal for 1st MD Block 2012 (1)

- ❑ inject 8 bunches per beam
- ❑ one bunch per beam shall have 20% more intensity
  (the "witness" bunch)
- ❑ witness bunch without transverse feedback (zero gain)
  → check if good BBQ signal at 450 GeV when
  changing ADT FB gain for remaining 7 bunches
- ❑ if OK, enable gain modulation for the 7 bunches
- ❑ if OK lock tune feedback, then ramp with tune feedback and gain modulation

Proposal for 1st MD Block 2012 (2)

Observations

❑ bunch-by-bunch wire scanners

❑ cleanliness of BBQ signal

❑ ADT bunch-by-bunch data (tune dip, offline)

❑ losses bunch-by-bunch

Time

❑ 6 hours, 1 ramp + preparation

❑ Both beams, 8 nominal bunches per beam, nominal conditions, except ADT

❑ stop MD at 4 TeV, if bunches good, can be used by other MD users