First Experience of Fast Beam Losses measured with the Libera BLD

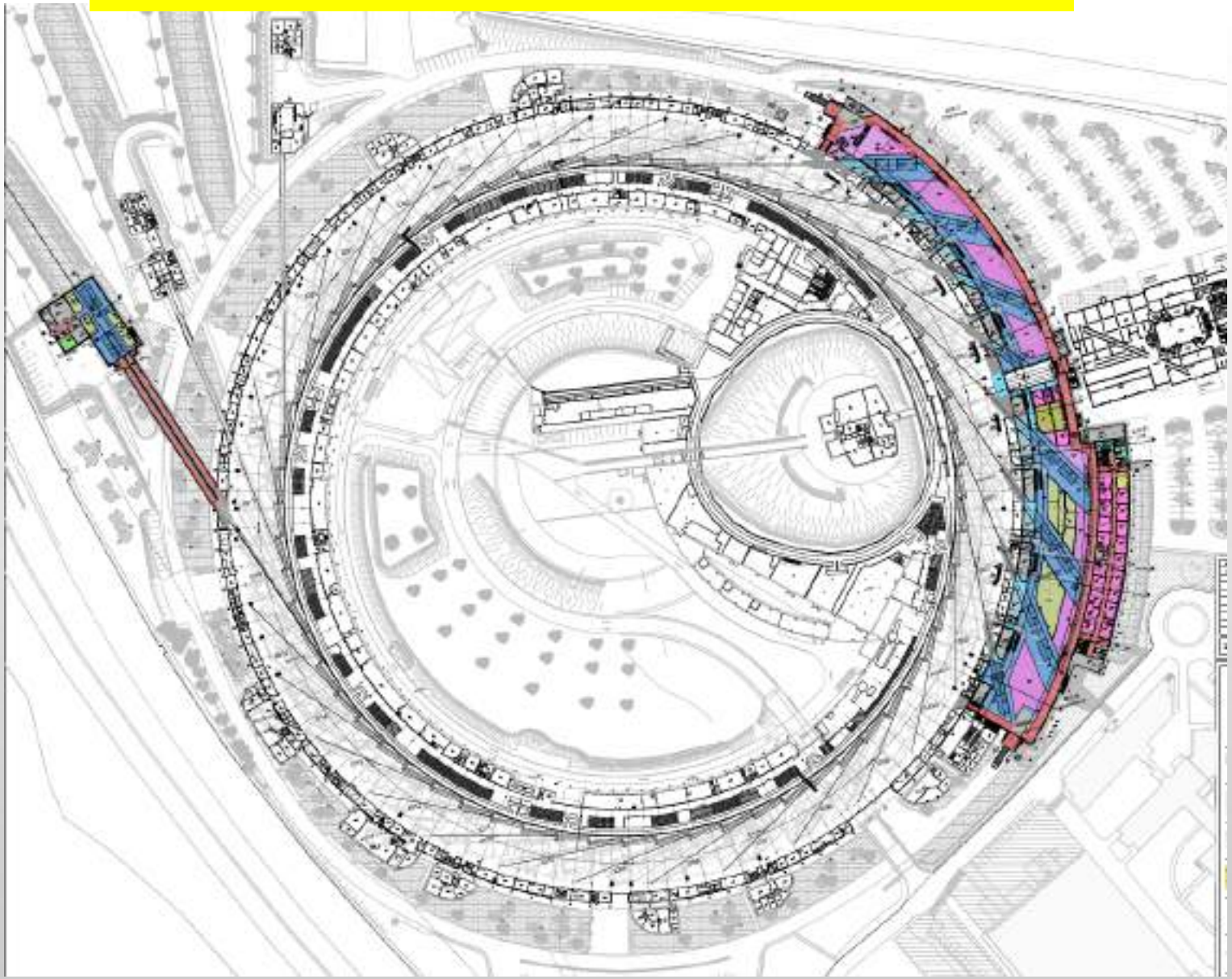
The **classical survey & control** of the 'slow' beam position stability,
Some words on **hardware failure**
The **"2011" firmware** is still not installed, awaited testing (this year ?)

The **Fast Orbit Correction** now in full operation

Other applications with the **SUM** signal

Beam Loss Measurements : the principles, applications & interest
results of Fast Injection Loss Measurements

ESRF extension progressing well



It started in december last year, followed by a shut-down of nearly 5 months

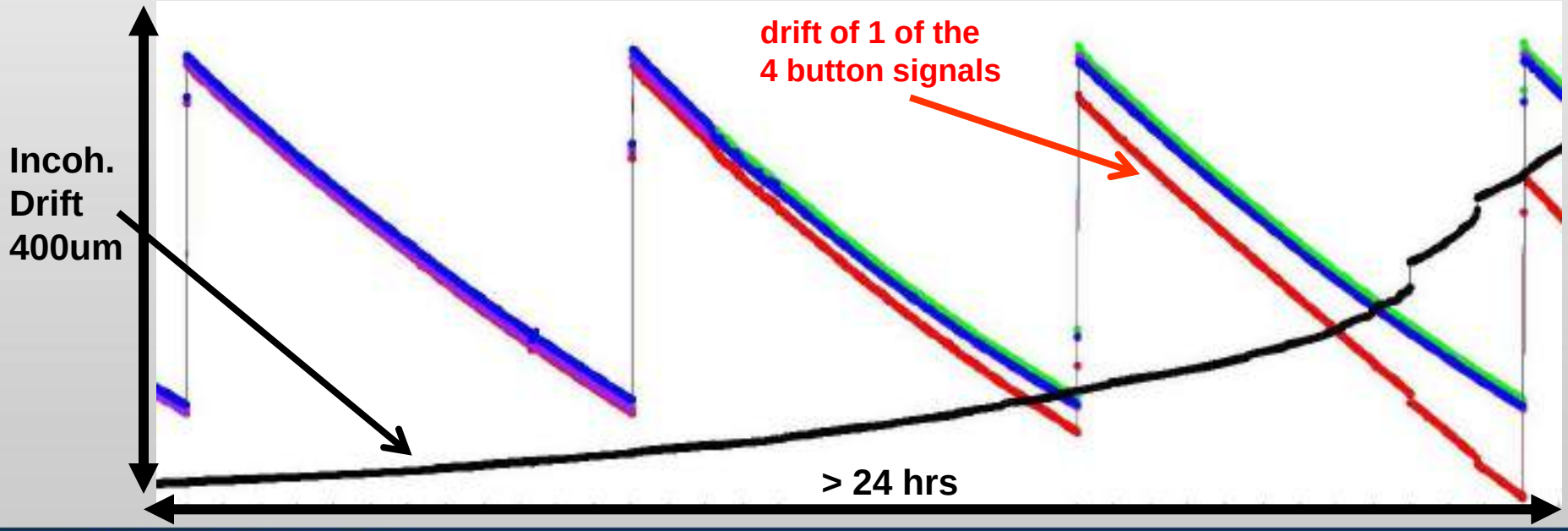
ESRF extension progressing well,

2 kinds of failures & breakdown of Hardware :

-1- Libera units :

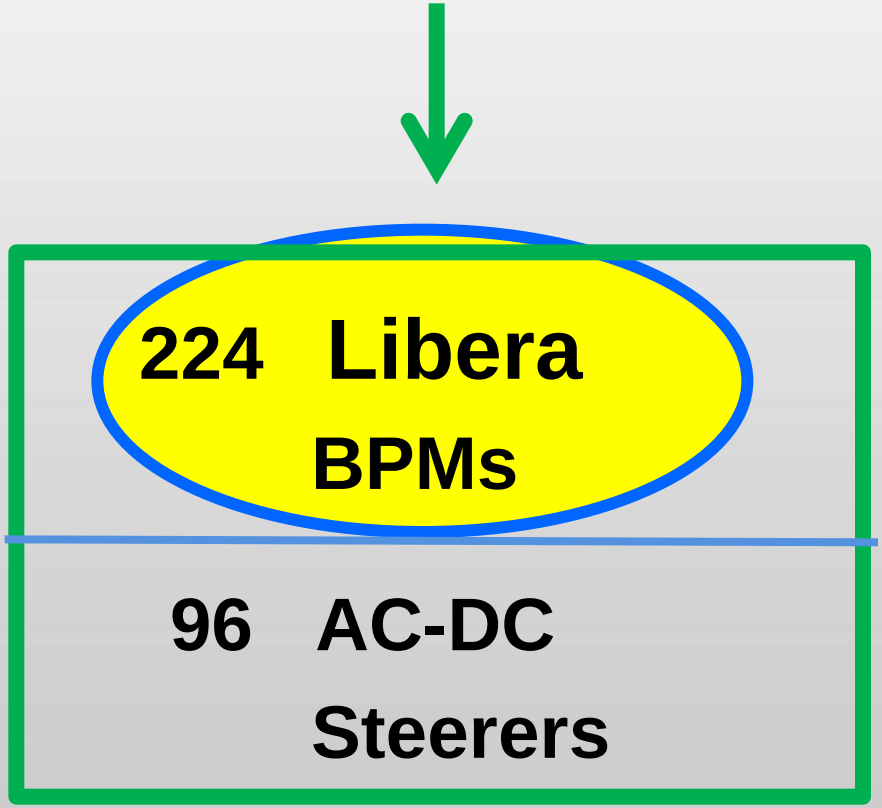
in 2009-2010	→ more than 10% repairs !
in 2011	→ only a few units (~1%)
in 2012	→ only a few units (~1%)
until April 2013	→ extended (2 yrs) warranty
after that . . . :	repair on case-by-case (?)

-2- degrading of RF connections : (remedy : cleaning on the external connector)



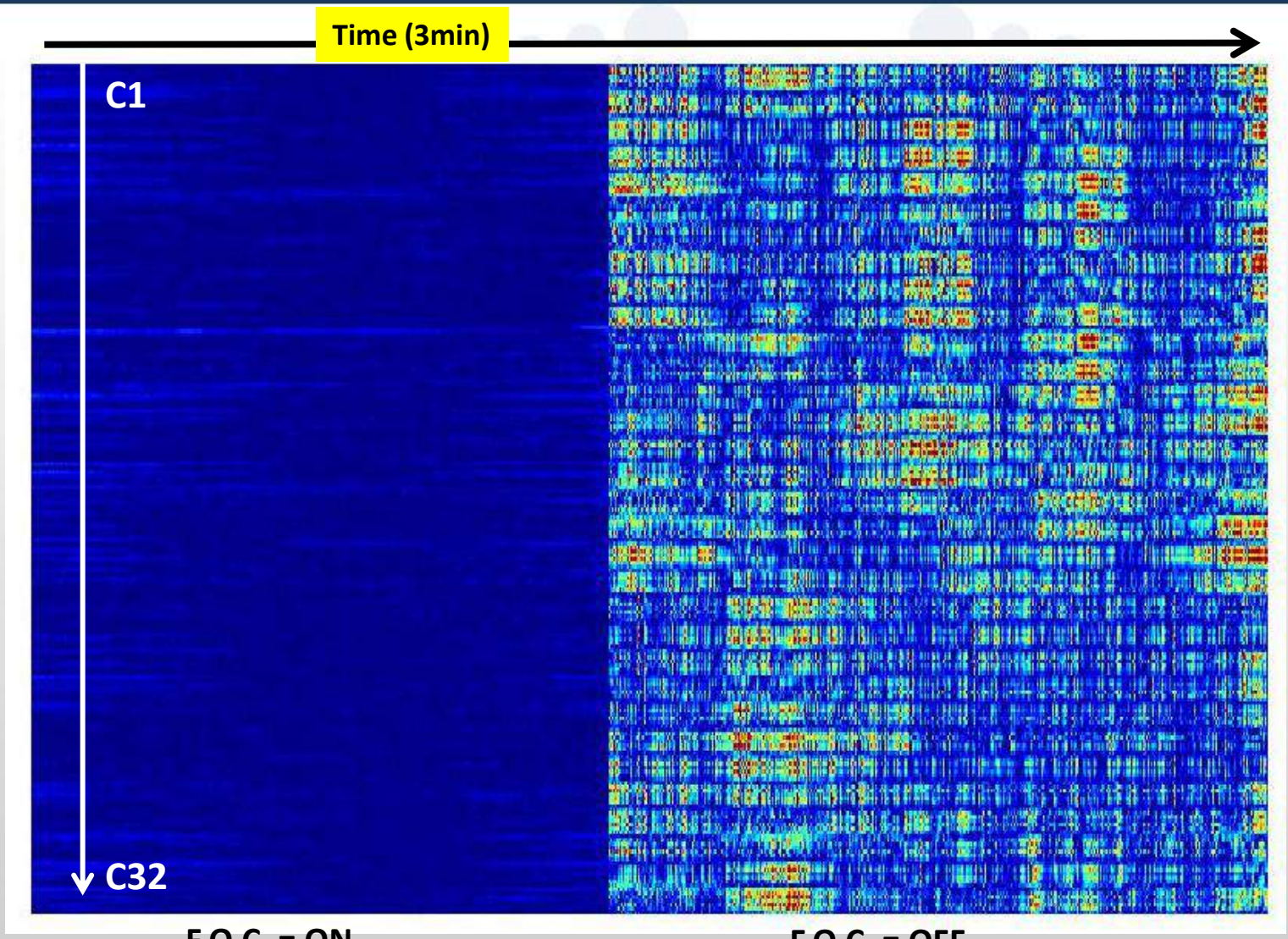
NOW (since May 2012) :

the **Slow-Fast**-Orbit-Correction uses :



Eric Plouviez,
Jean-Marc Koch,
Francis Epaud

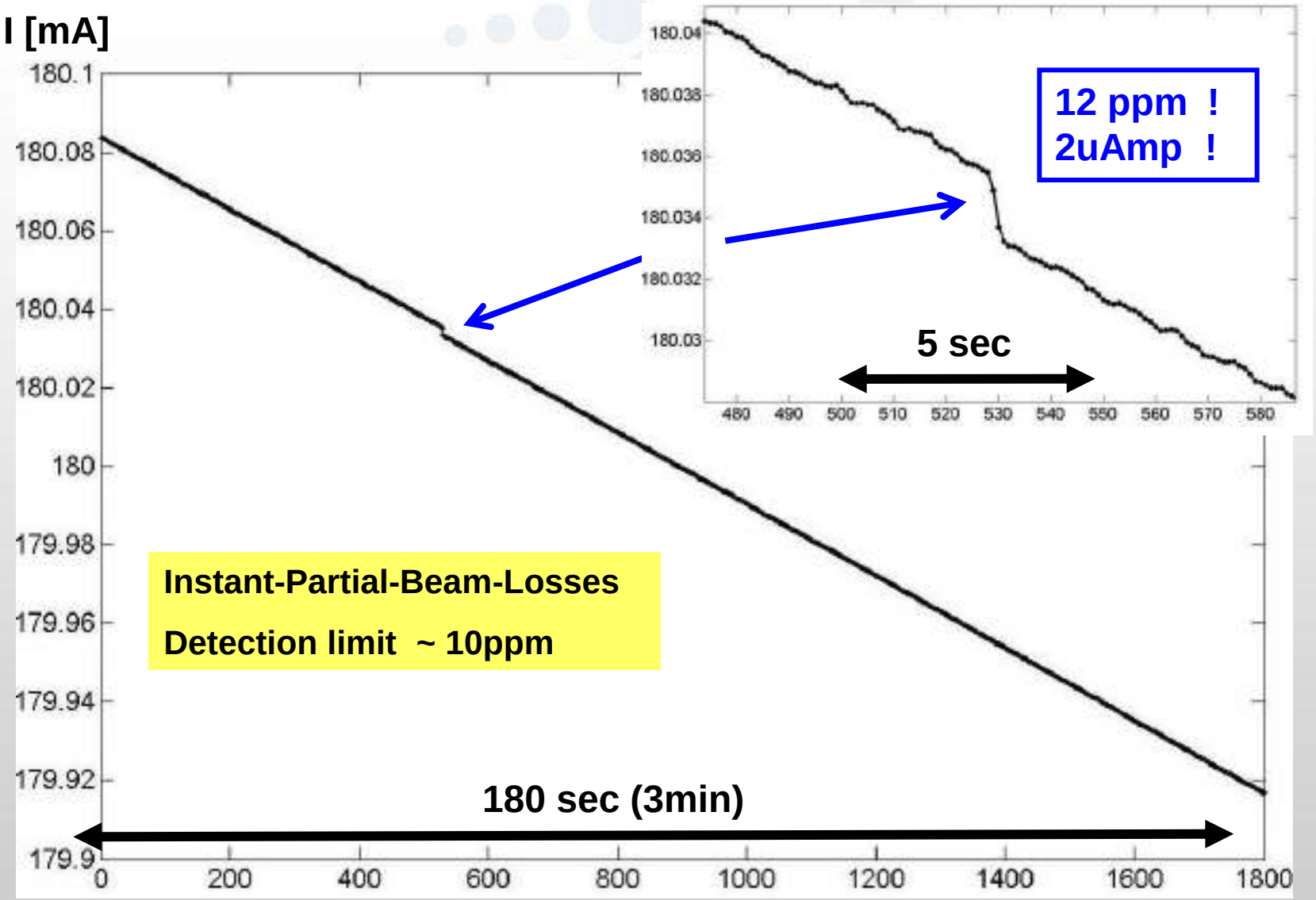
The **Fast Orbit Correction** now in full operation



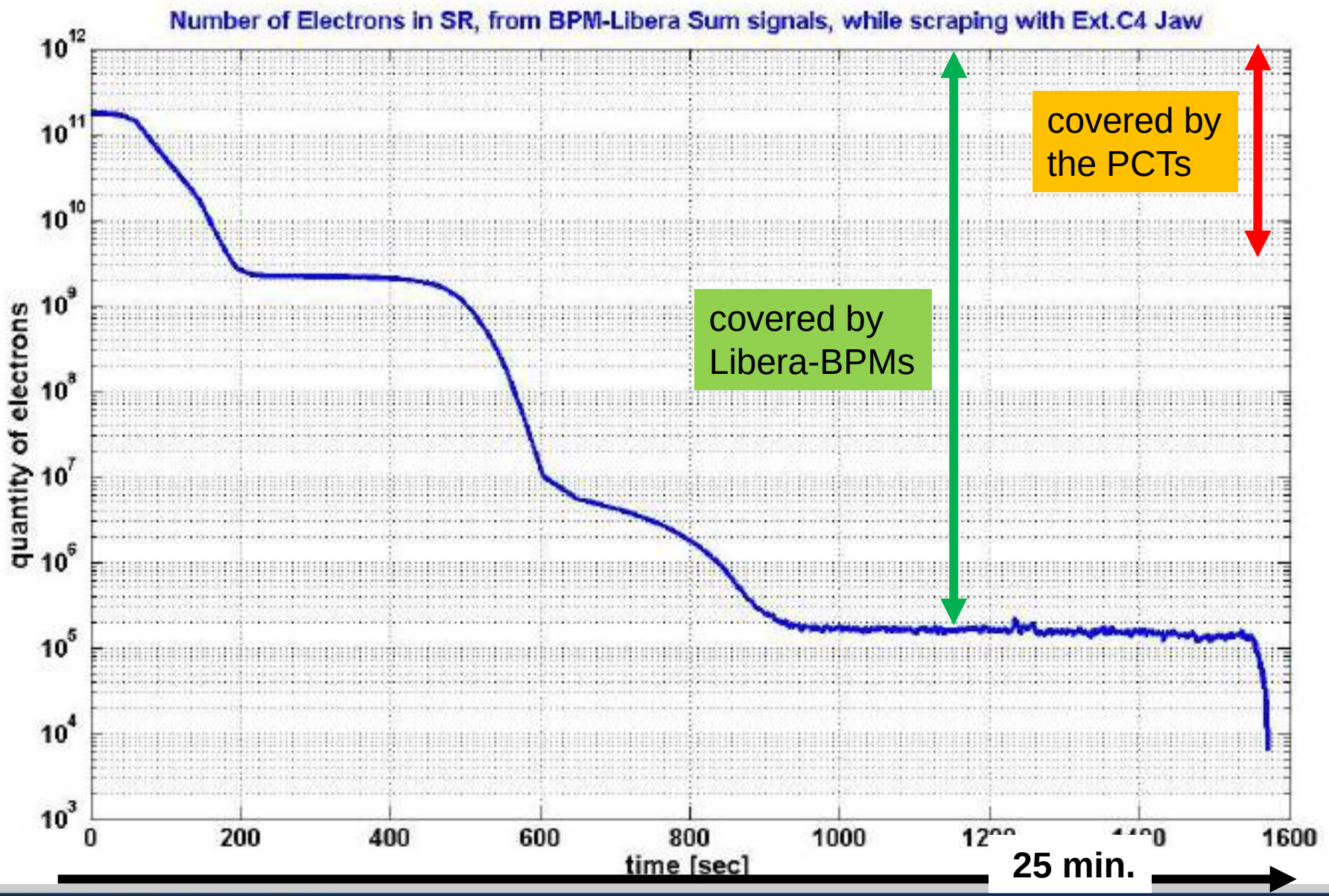
F.O.C. = ON
Average Horizontal Orbit movement 21 nanometer rms

F.O.C. = OFF
Average Horizontal Orbit movement 188 nanometer rms

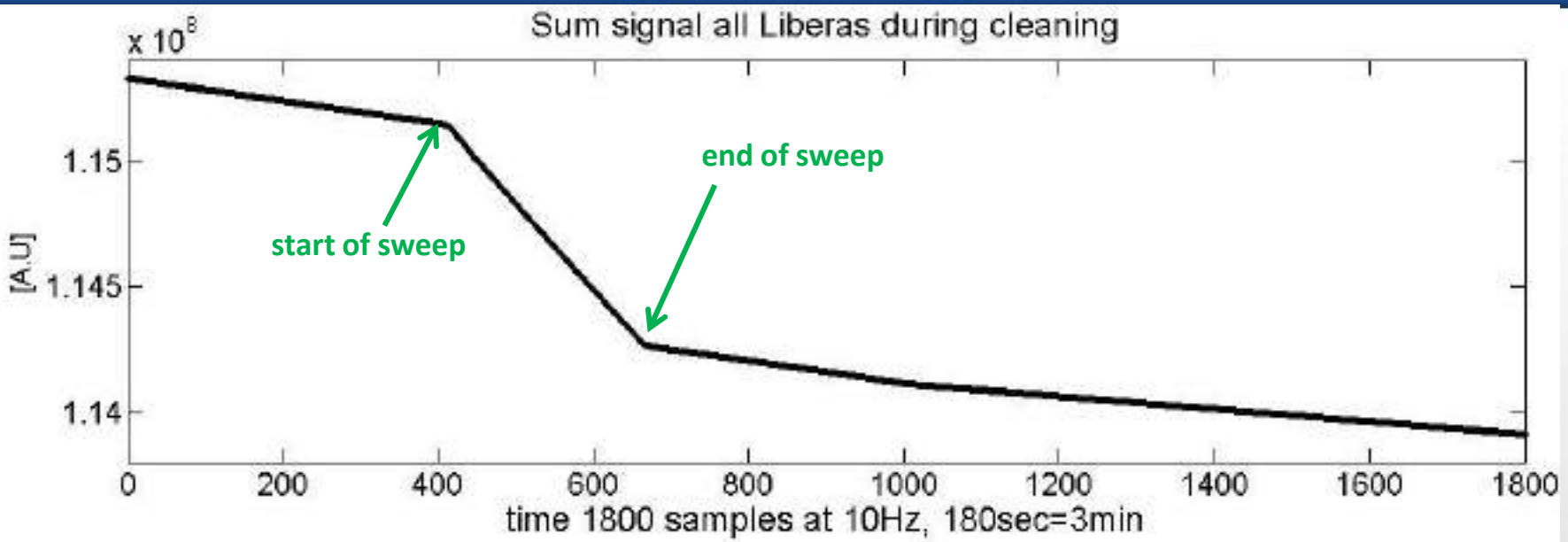
Other applications with the **SUM** signal

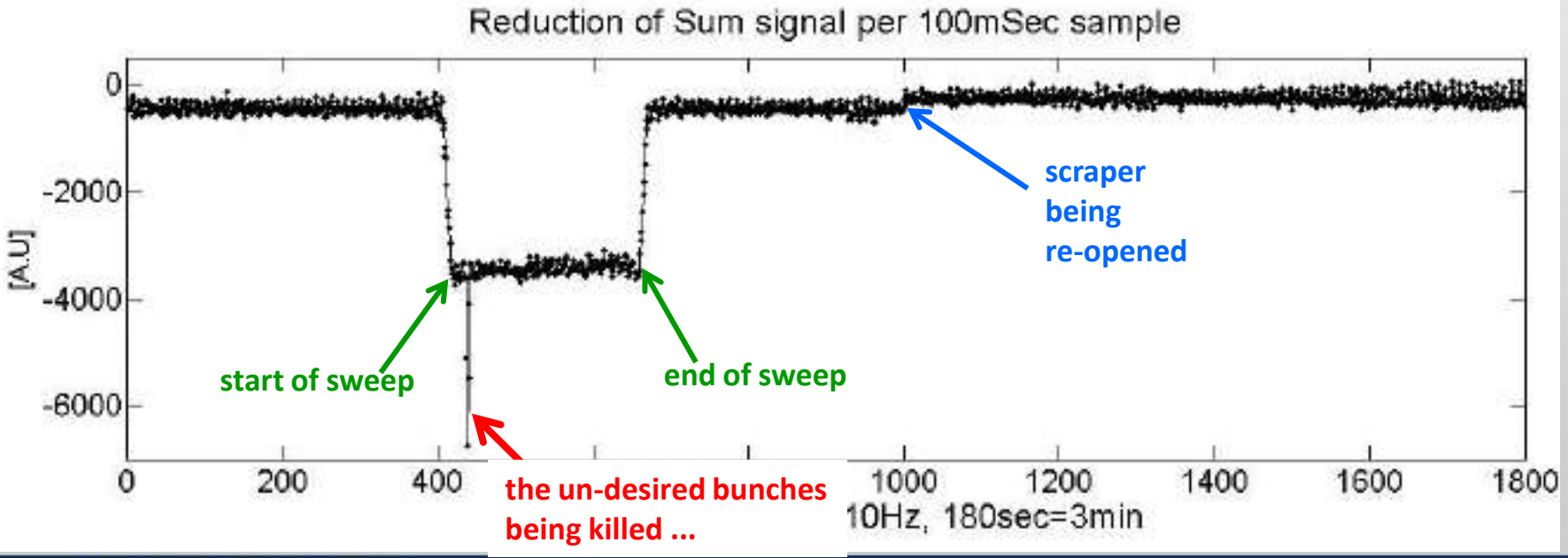


Other applications with the **SUM** signal



NEW : application with the **SUM** signal





Upgrades on the BeamLoss Detectors

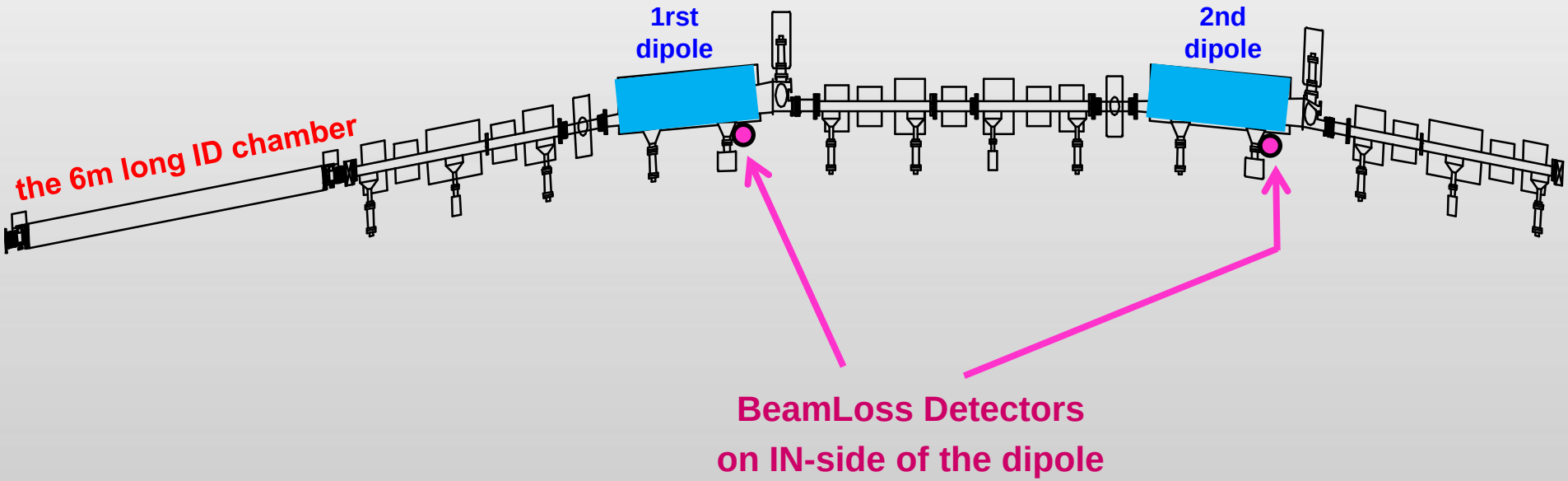
The vacuum lay-out of 1 cell (1 / 32 of the Ring) with :

the 6m long ID chamber

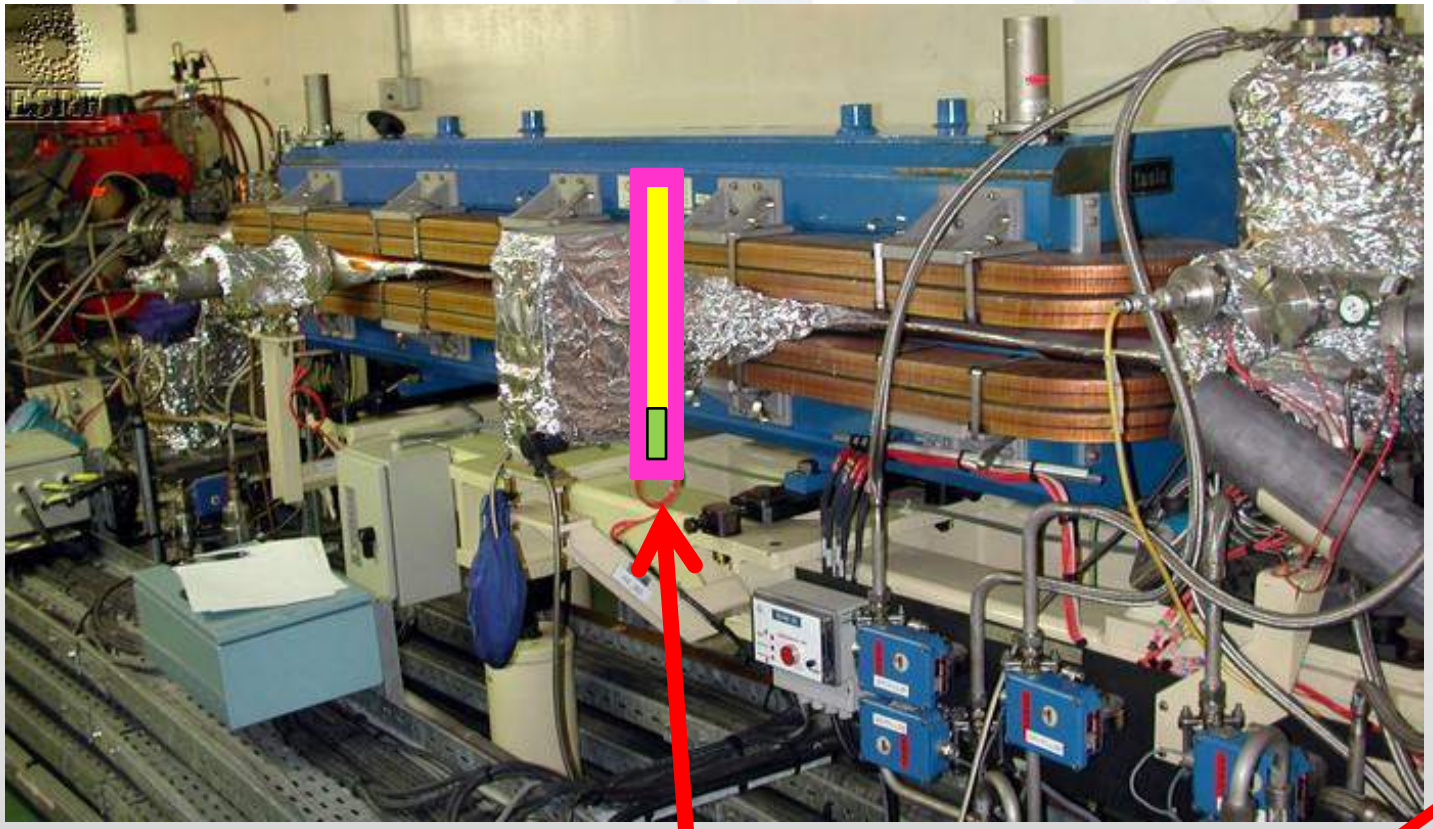
the 2 dipoles

the 2 BeamLoss Detectors

Top View



So : in total 64 BLDs in the Ring



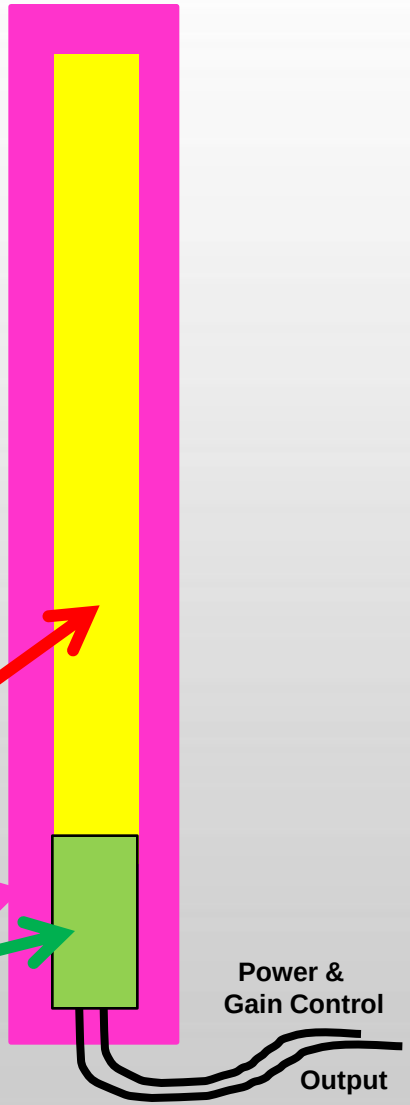
Beam Loss Detector :

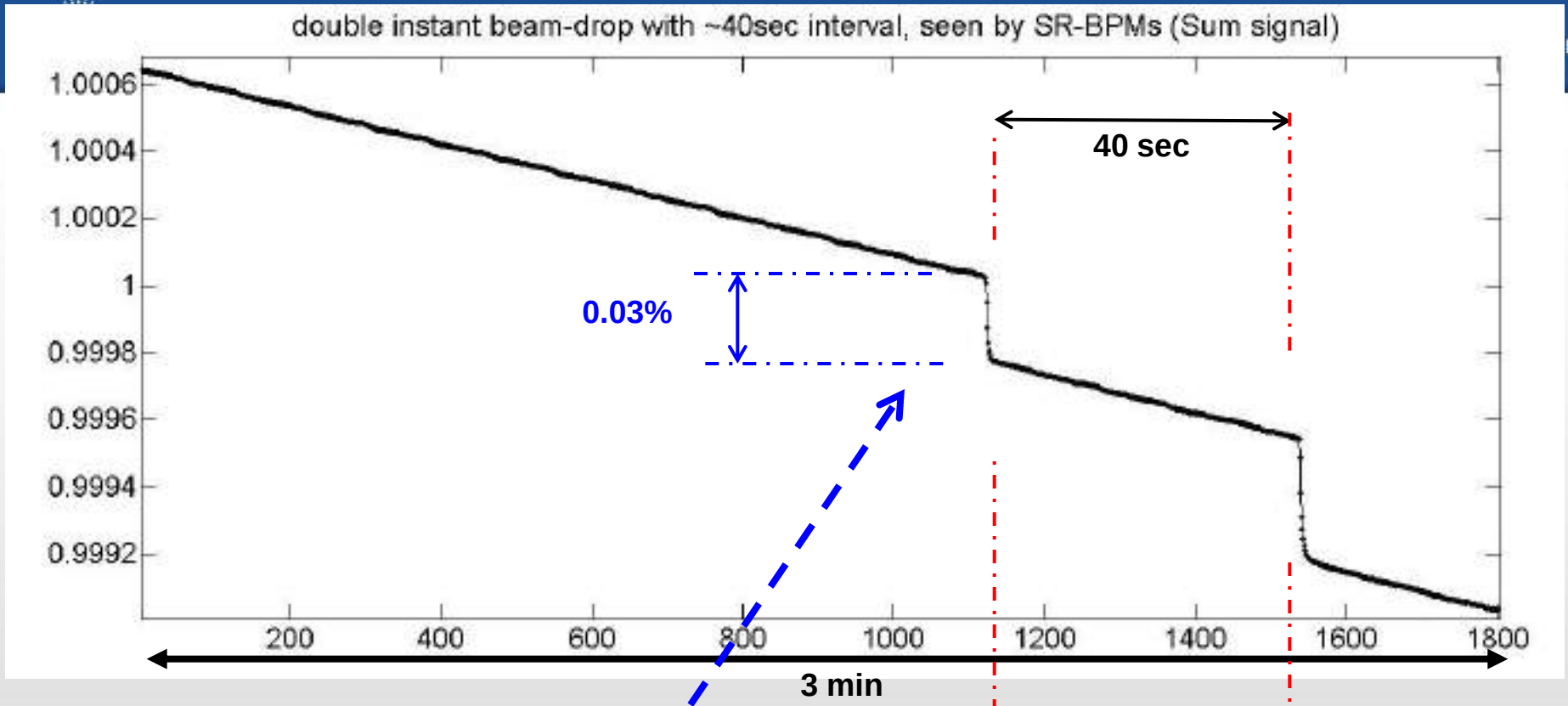
on the inside of each of the 64 Dipoles,

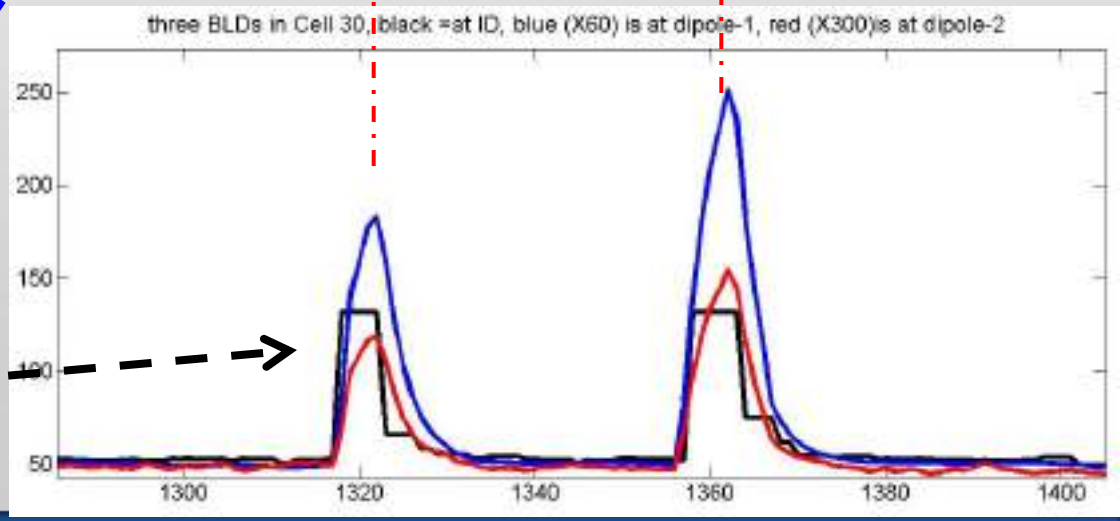
Perspex Cherenkov radiator rod of 600mm x 25mm diam.

with a 10 mm tubular Lead shielding

and a Photomultiplier tube for light amplification







2 beam-drops caused by a local (C-30) vacuum outgassing,

seen by current monitor (Sum-BPMs) for quantizing

and by BLDs for localizing

Brilliance- BPM

224 Units in service for Orbit Correction

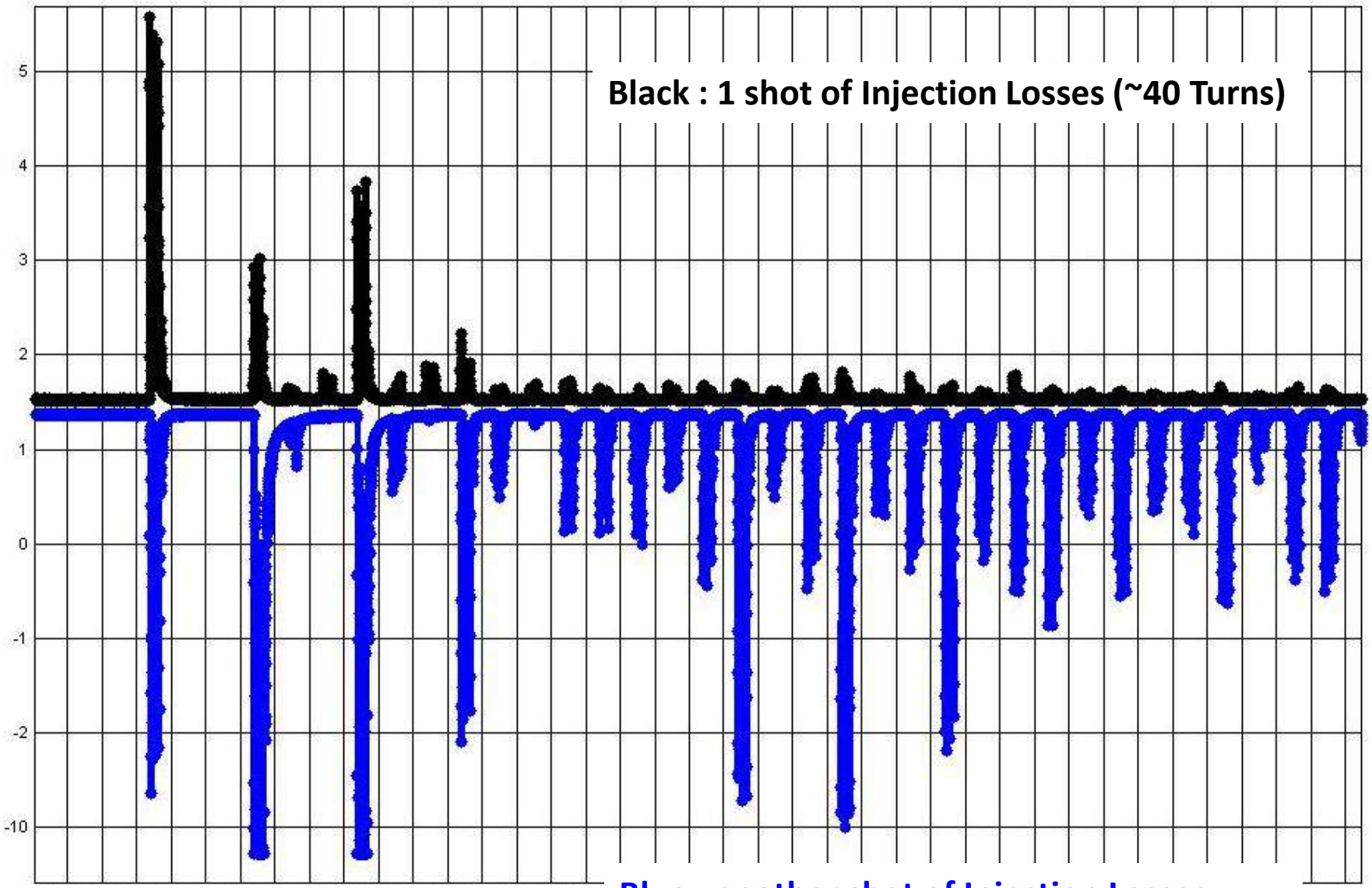
and also for Turn-by-Turn Orbit measurements

Beam Loss Monitor

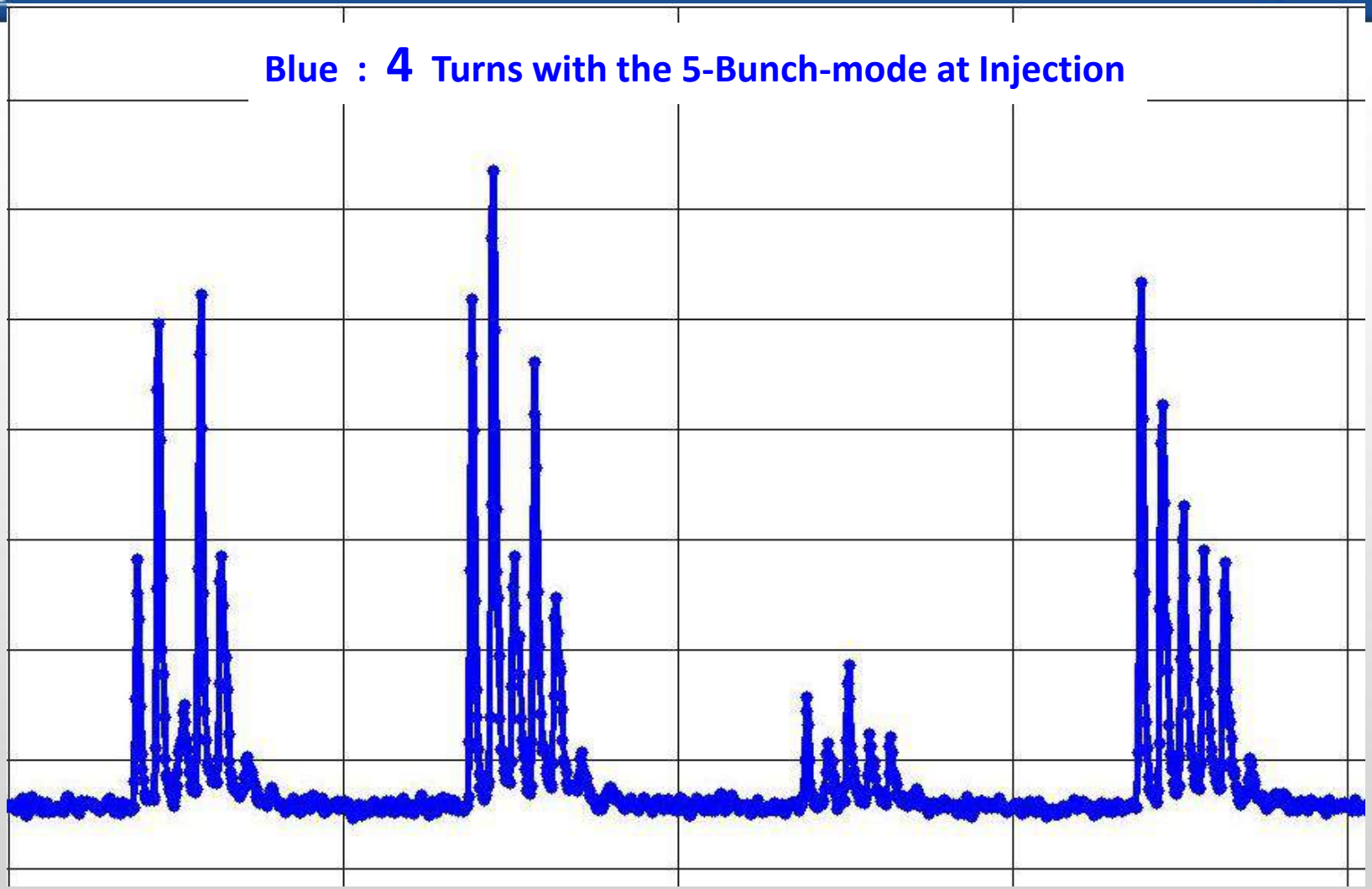
1 unit procured & installed (for 4 BLDs)

and also for Turn-by-Turn Loss measurements

on a “Fast-Compact BLD” on 1rst dipole C4

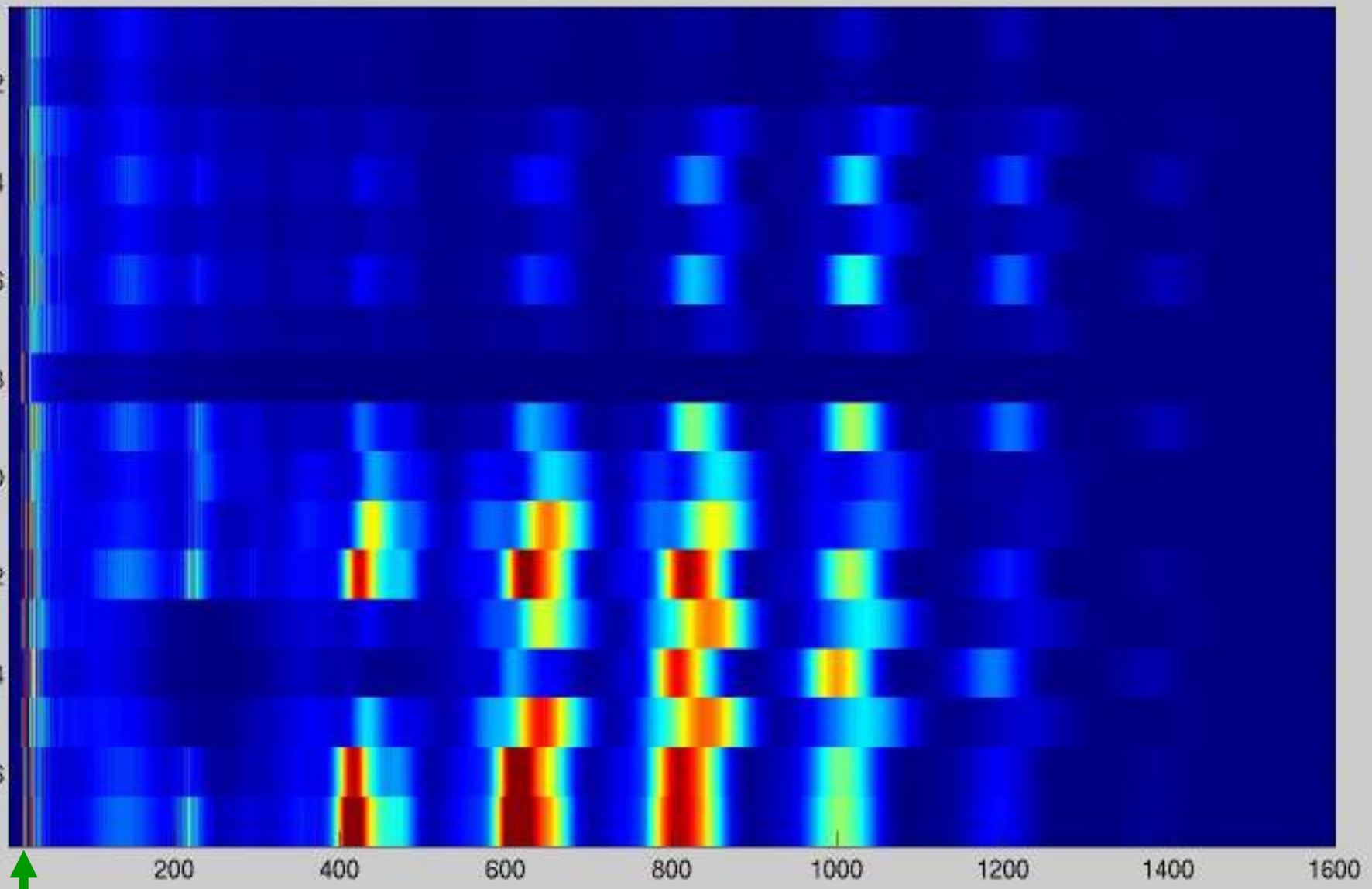


in same injection, 5 bunch mode



Observations : - Losses vary strongly from Turn-to-Turn
- Losses vary strongly between the 5 bunches
- Losses vary strongly from shot to shot

BeamLosses seen at Injection by the BLD directly after the C5 vert. scraper



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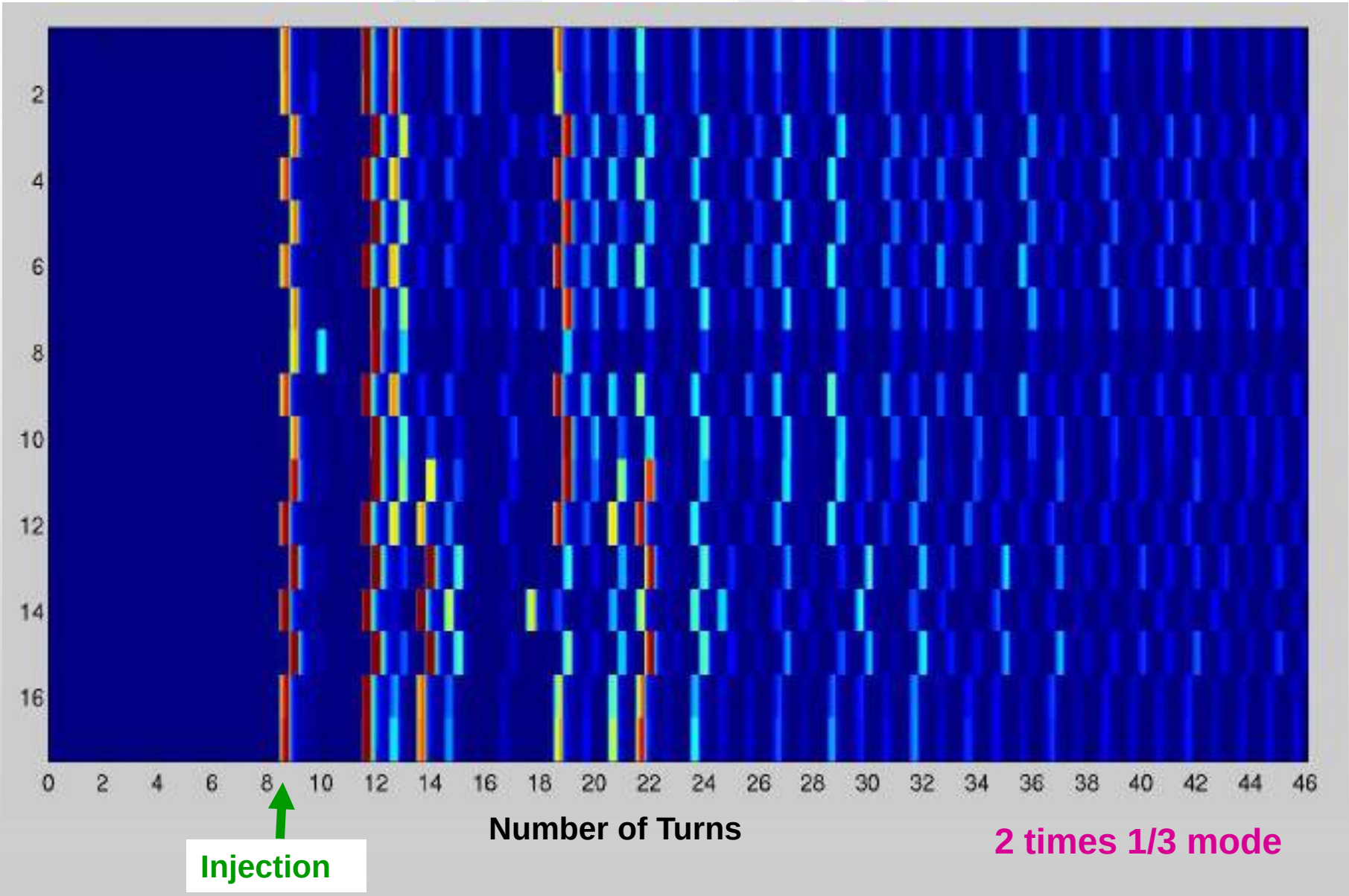

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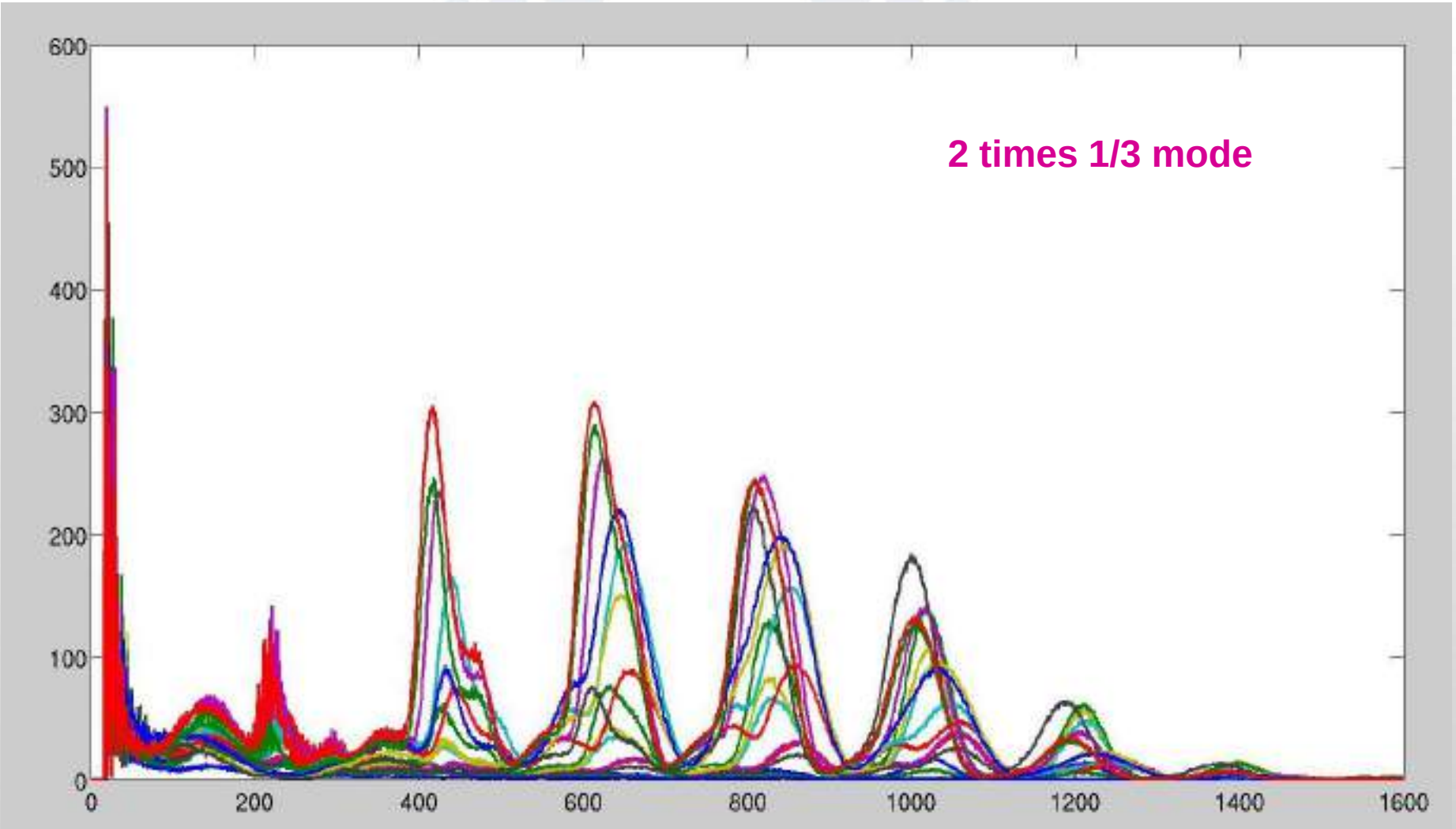

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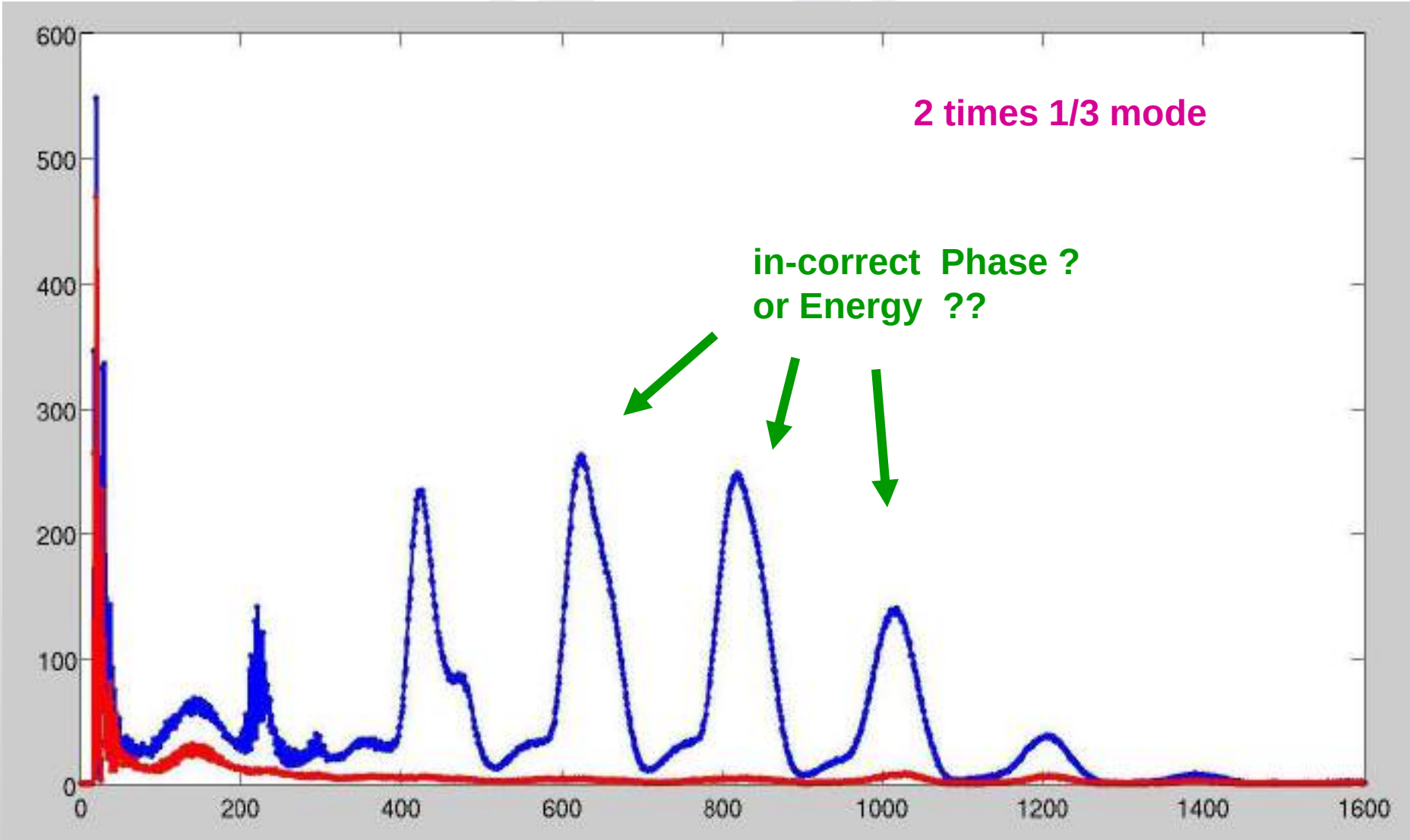
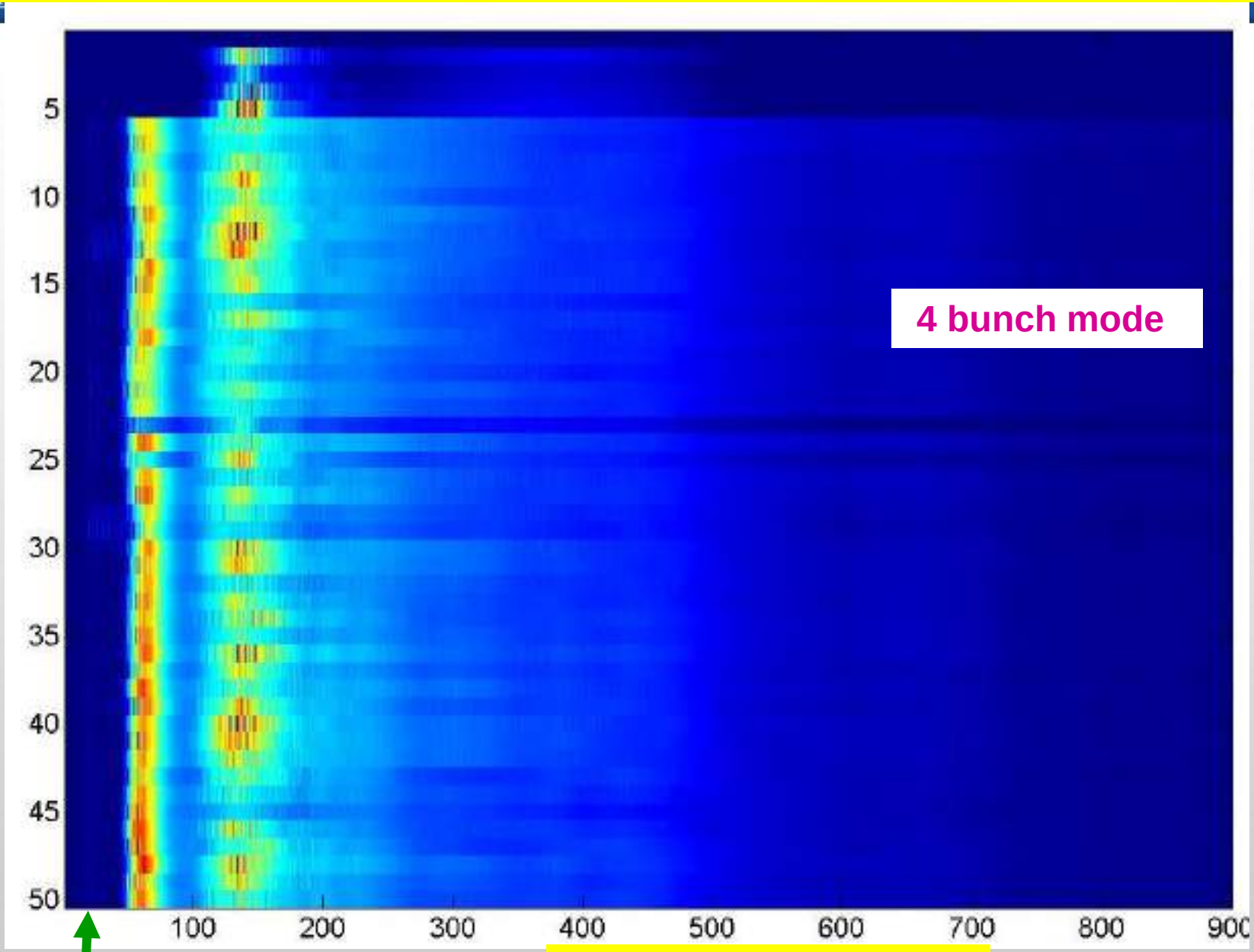


BeamLosses seen at Injection by the BLD directly after the C5 vert. scraper



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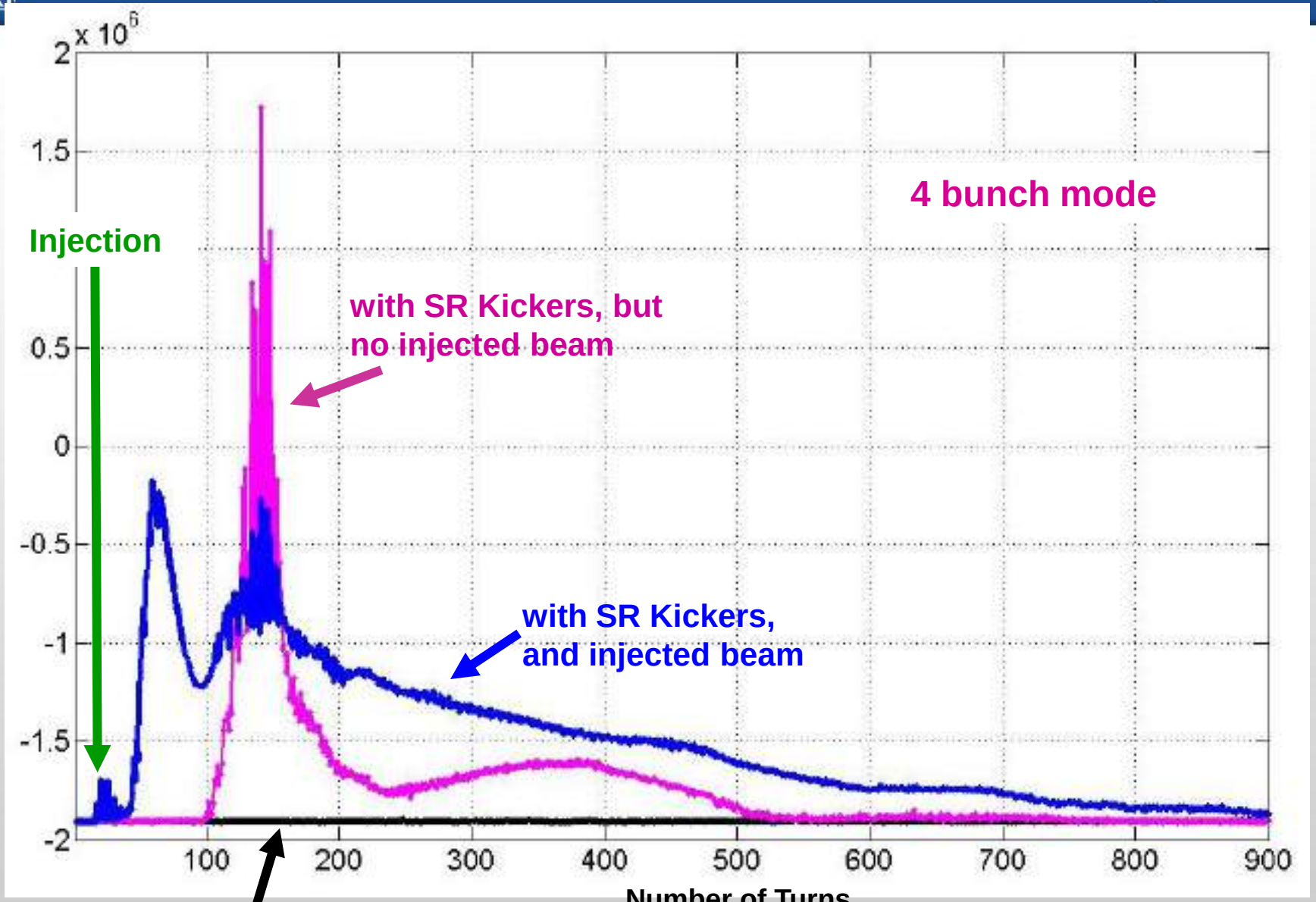
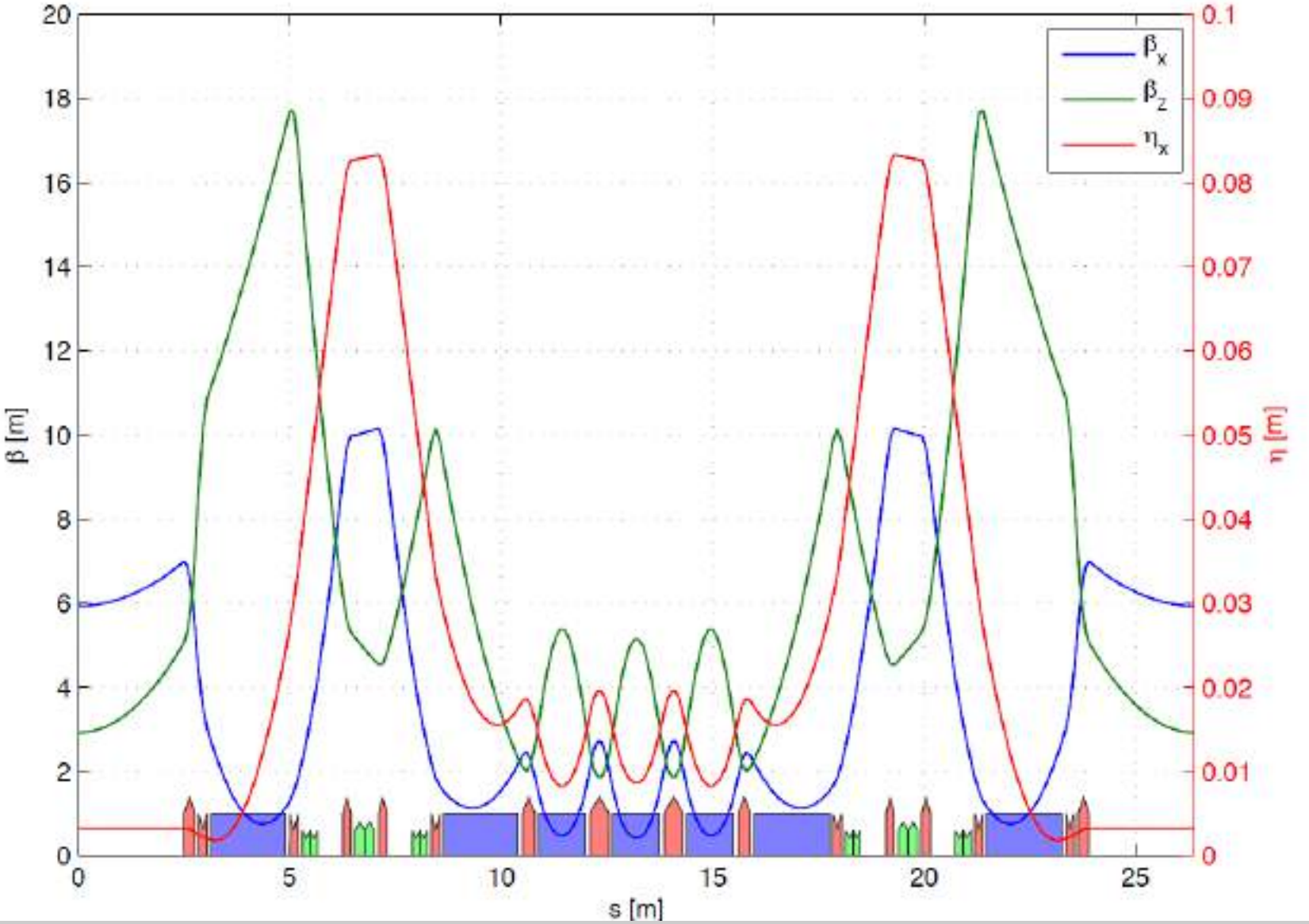


a “short-slim” BLD in the TL-2 transfer line + Libera Beam Loss Monitor :

extremely low Injector currents (in single-shot) can be seen :

→ “dark current” from Linac

New : Low Emittance Lattice
if approved : contruction in ~2017
needing 160 additional BPMs



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many thanks !

for your hospitality

and your attention