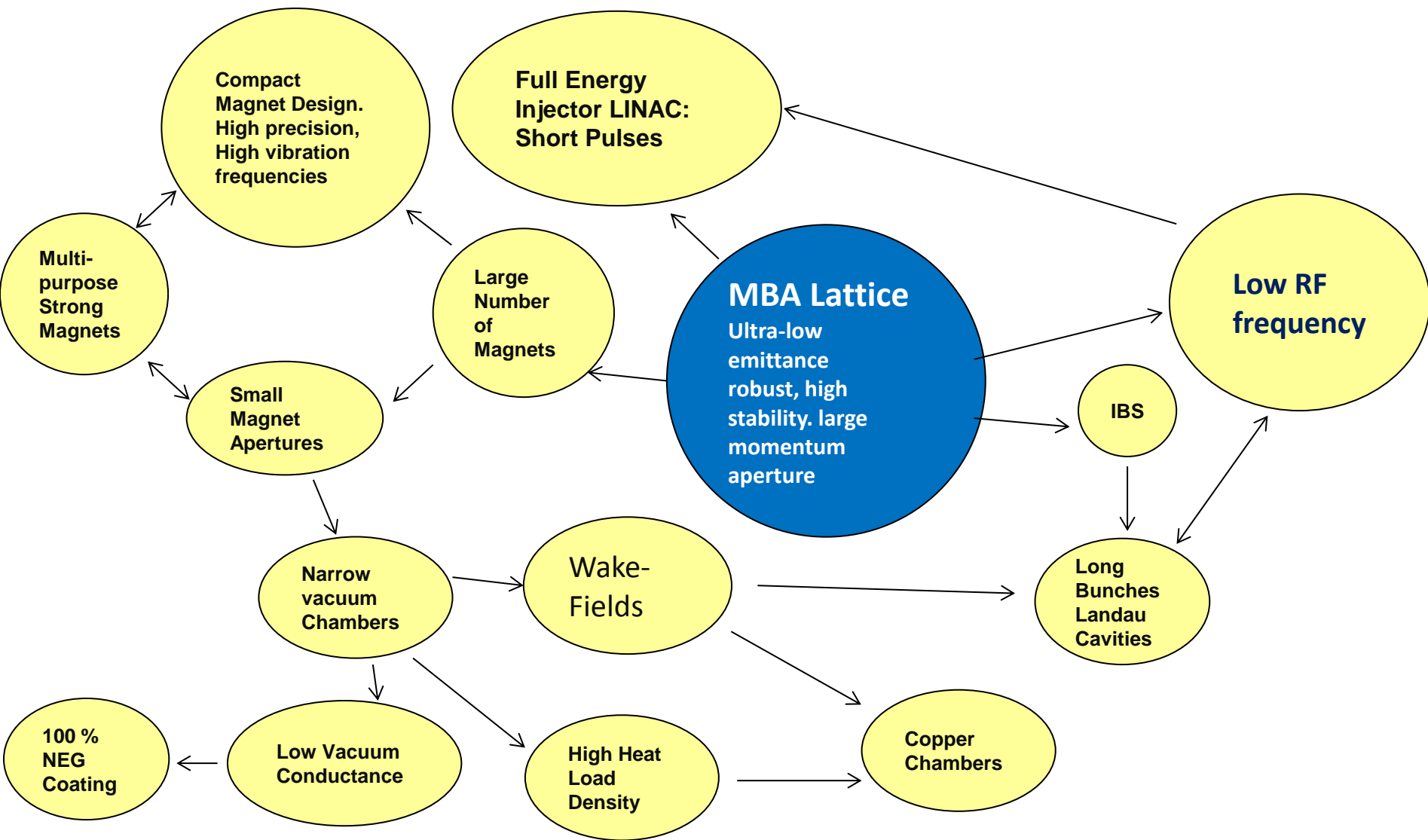# MAX IV 3 GeV Ring Commissioning

Pedro F. Tavares

MAX IV Laboratory
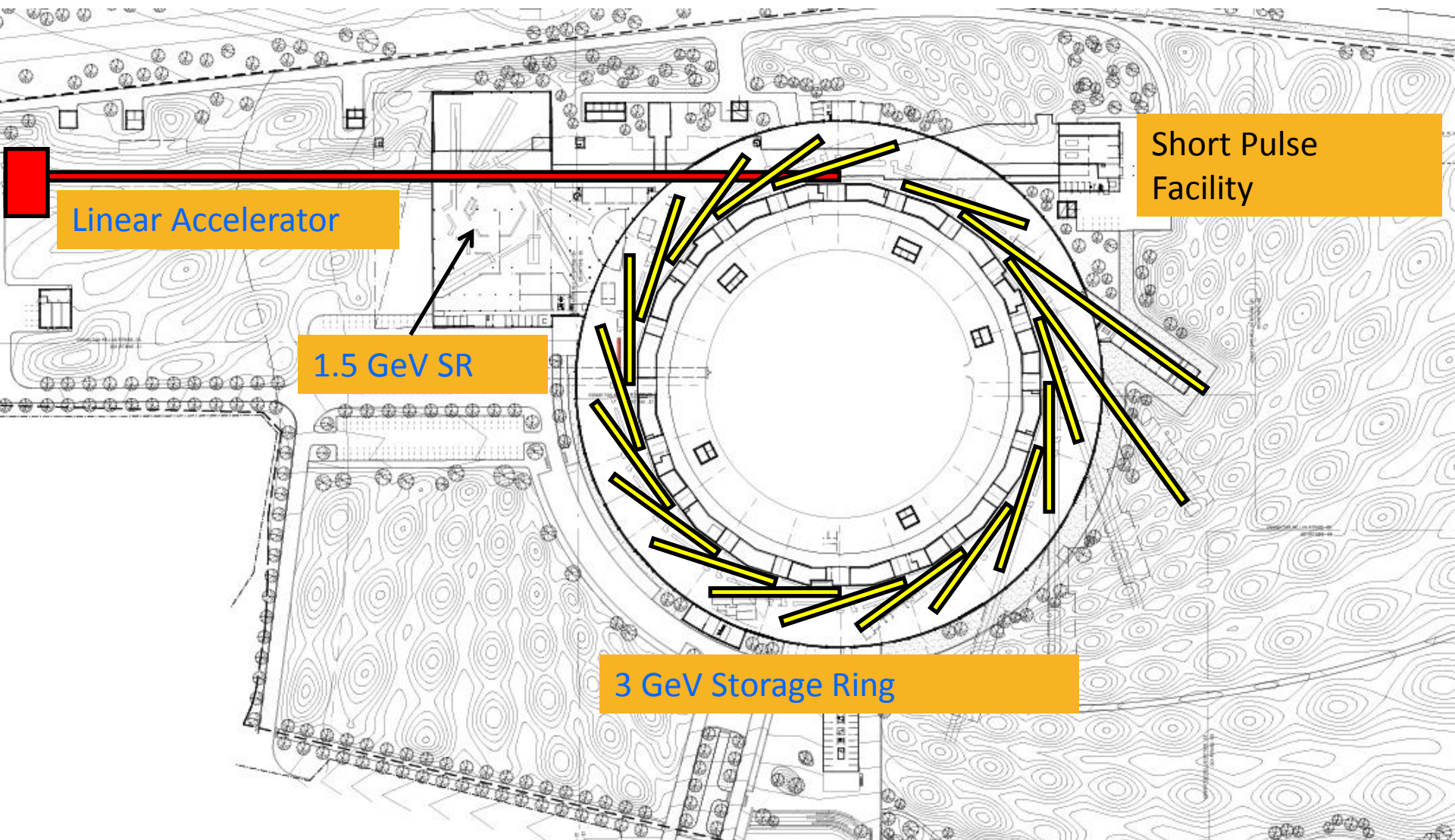
Summary

- The MAX IV Facility

- The MAX IV 3 GeV ring

- Commissioning Results

- Conclusions – Next Steps

MAX IV - An integrated Solution

19th ESLS-RF Workshop

MAX IV – an overview

Short Pulse Facility

Linear Accelerator

1.5 GeV SR

3 GeV Storage Ring

Annika Nyberg, MAX IV-laboratoriet, 2012

The MAX IV 3 GeV ring Lattice

7-bend achromat

20 periods

|	
Periodicity	20
Circumference	528 m
Horizontal tune ν_x	42.20
Vertical tune ν_y	16.28
Natural horizontal chromaticity ξ_x	-49.984
Natural vertical chromaticity ξ_y	-50.198
Momentum compaction (linear) α_c	3.06×10^{-4}
Horizontal damping partition J_x	1.8471
Bare lattice emittance ε_0	0.328 nm rad
Bare lattice energy loss per turn	363.8 keV
Bare lattice natural energy spread σ_δ	0.769×10^{-3}
Bare lattice horizontal damping time τ_x	15.725 ms
Bare lattice vertical damping time τ_y	29.047 ms
Bare lattice longitudinal damping time τ_E	25.194 ms
Horizontal beta function at center of LS β_x^* (bare lattice)	9.00 m
Vertical beta function at center of LS β_y^* (bare lattice)	2.00 m

y [m]

2.0

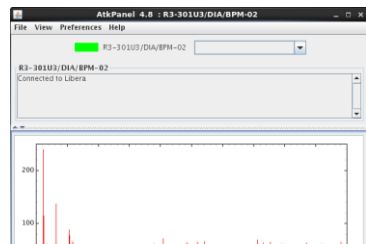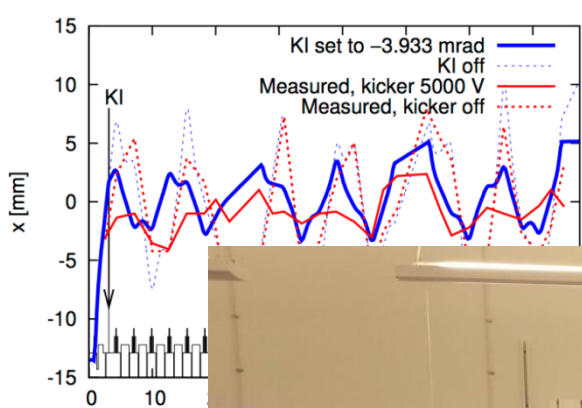Picture MAX IV DDR

25

Str

MAX IV
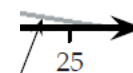
Early Commissioning Results

M1
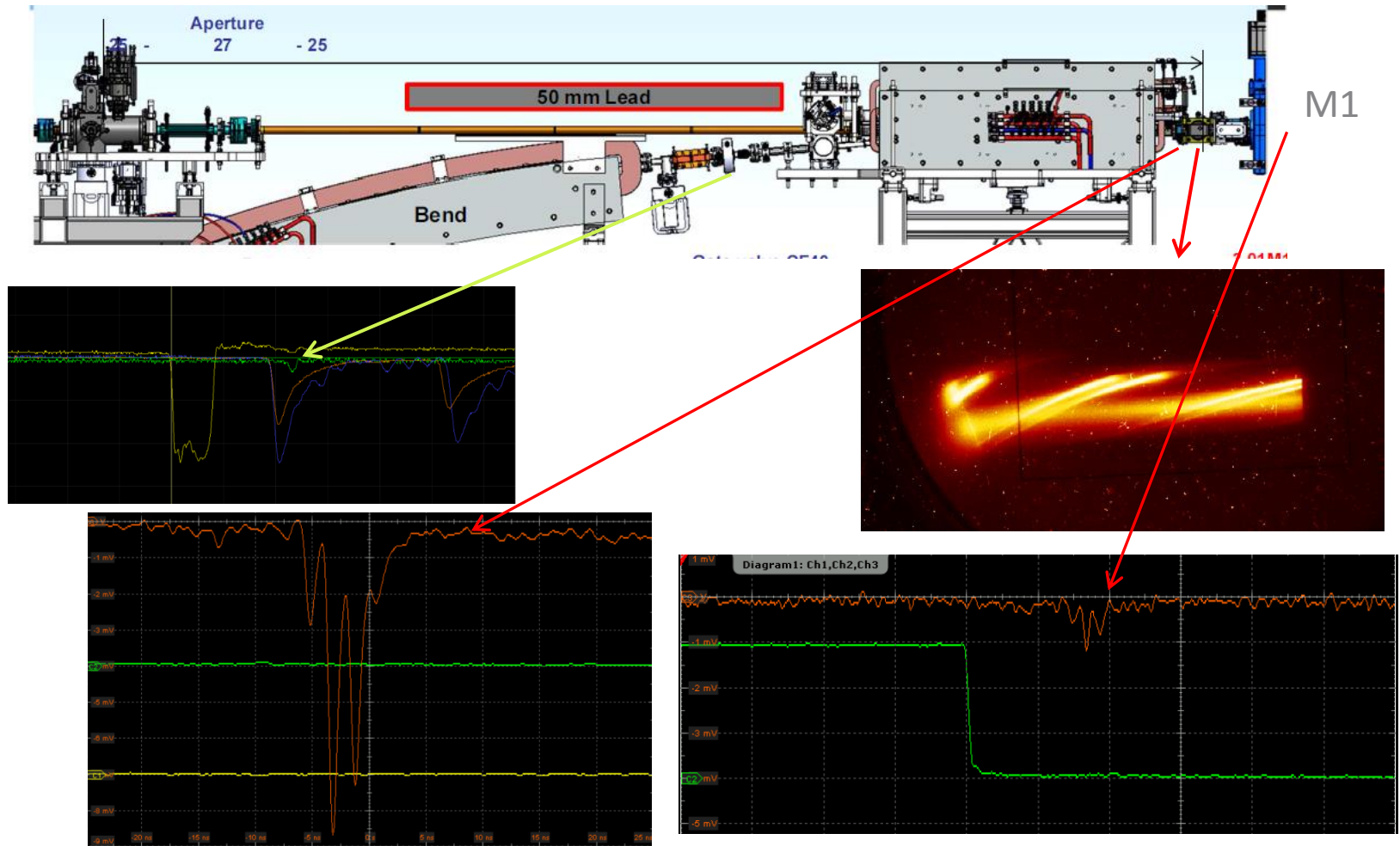
- Beam observed at the end of TR3 and into the ring.   **2015/08/11**

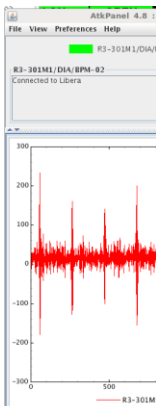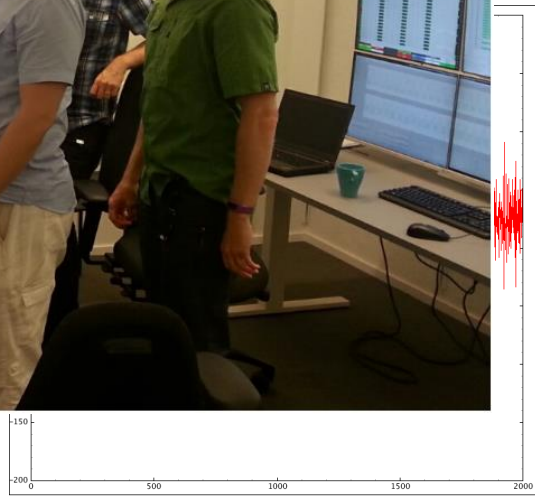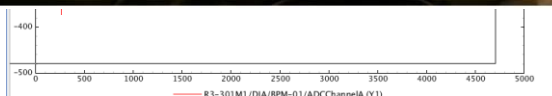# Threading the beam – first turn – many turns

2015/08/25

3 passes

OFF

2015/08/26

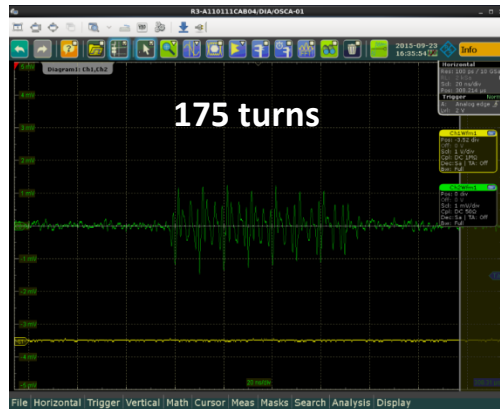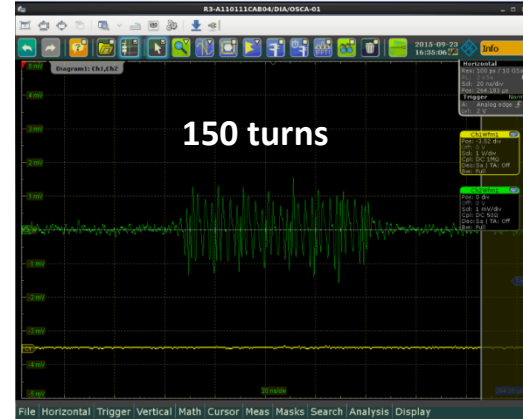2015/08/27

First Stored Beam
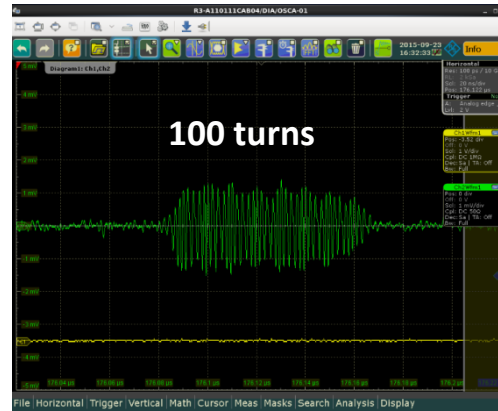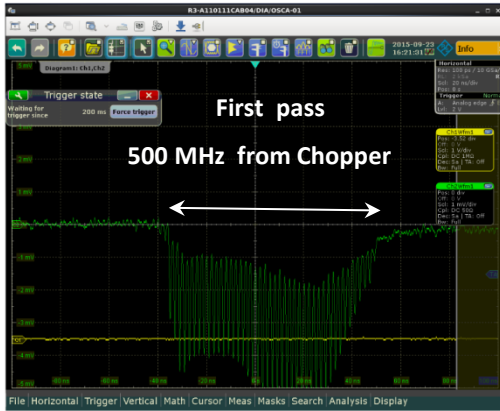

Injected beam

Stored beam 2 seconds after previous injection pulse

Injection

Kicker Current

2015/09/15

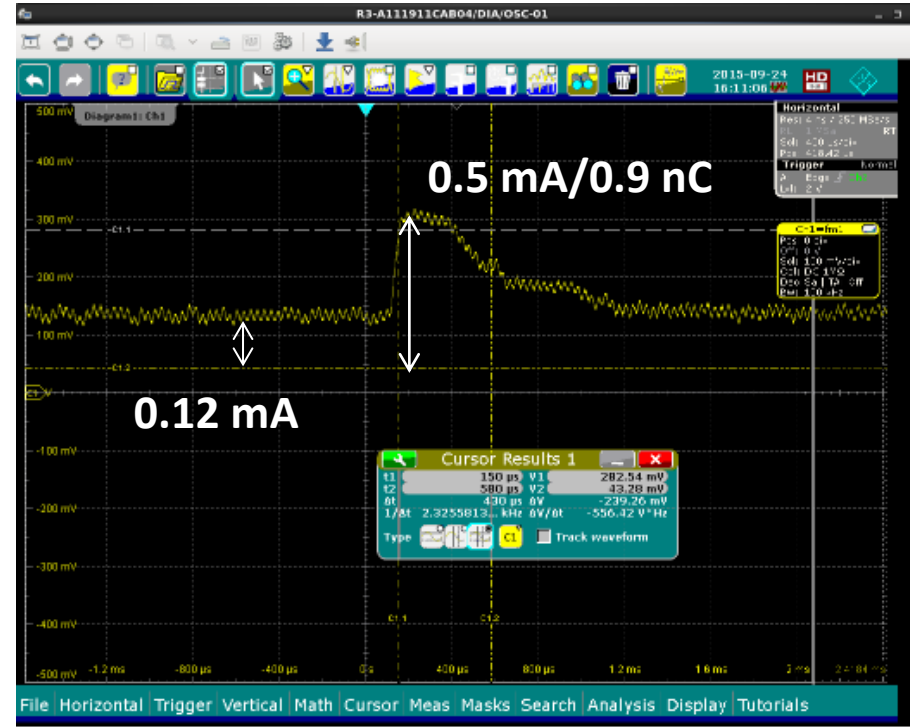# Capture and Bunching
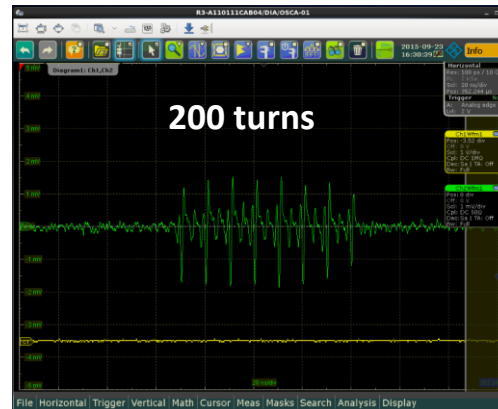
Beam capture seen on DCCT/Button
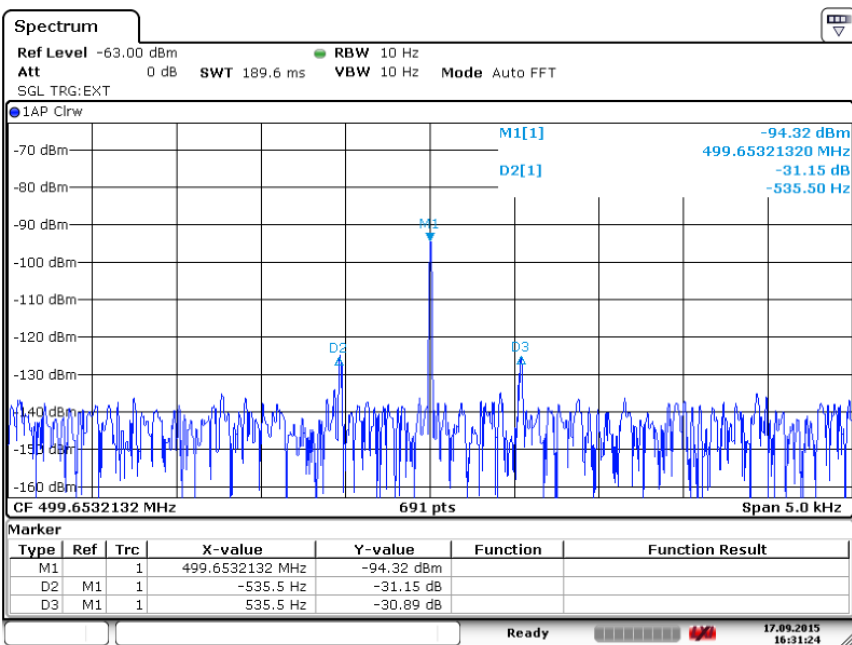

Trf

0.5 mA/0.9 nC

0.12 mA
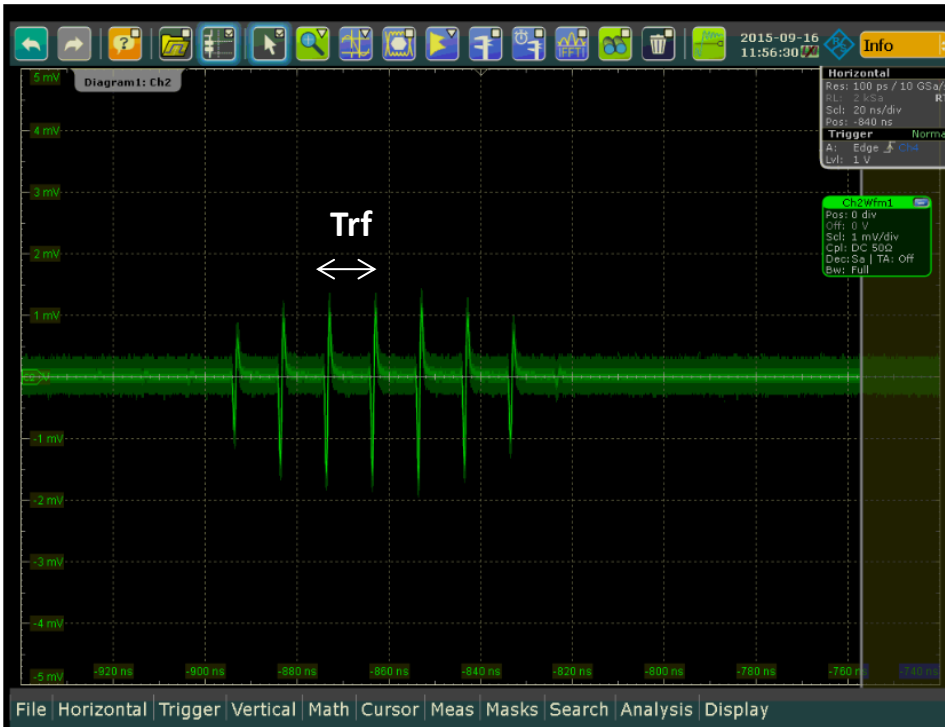
Synchrotron Tune and Cavity Phasing
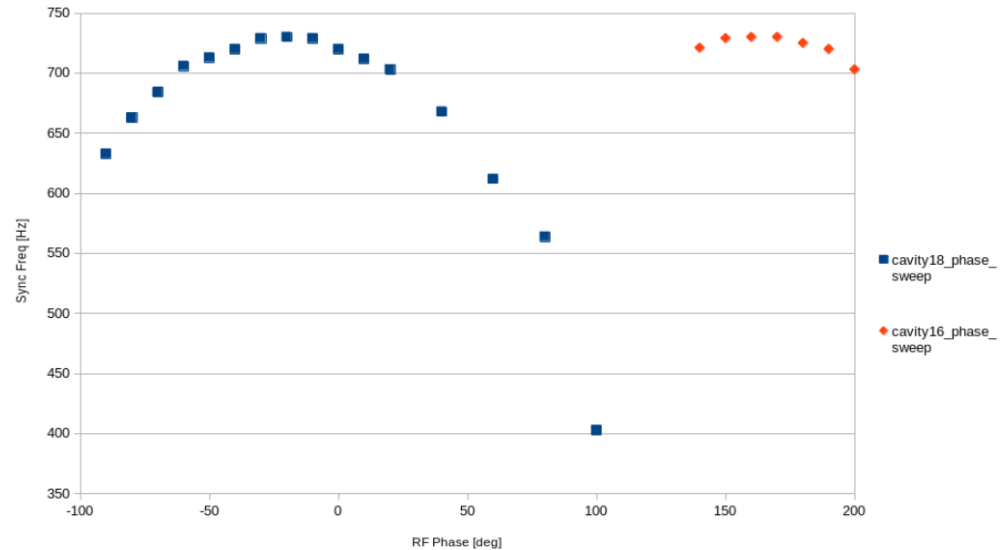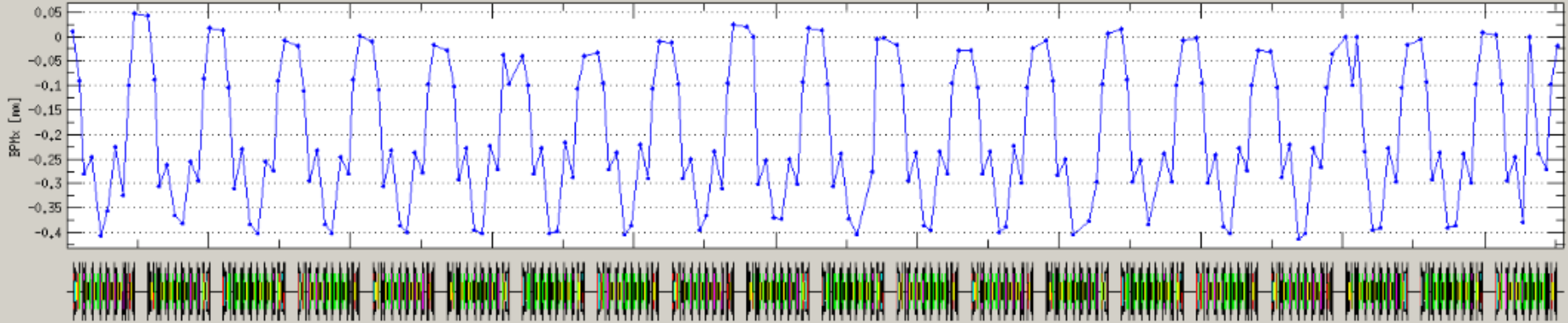

At 480 kV, estimated fs= 540 Hz

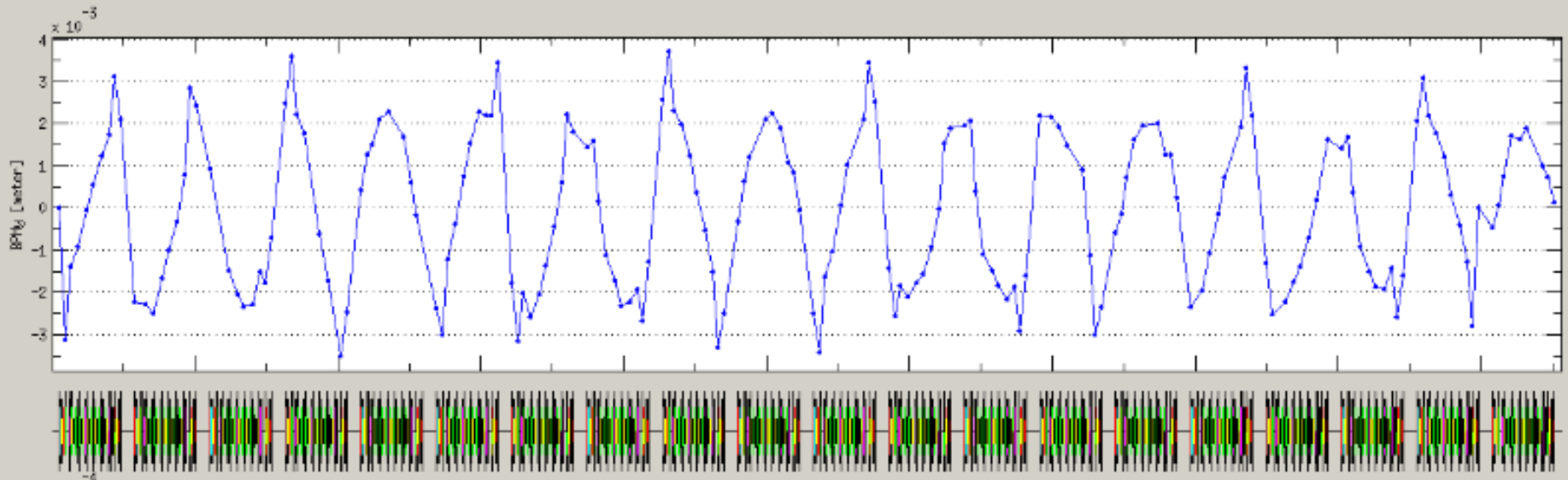# Observations with Stored Beam

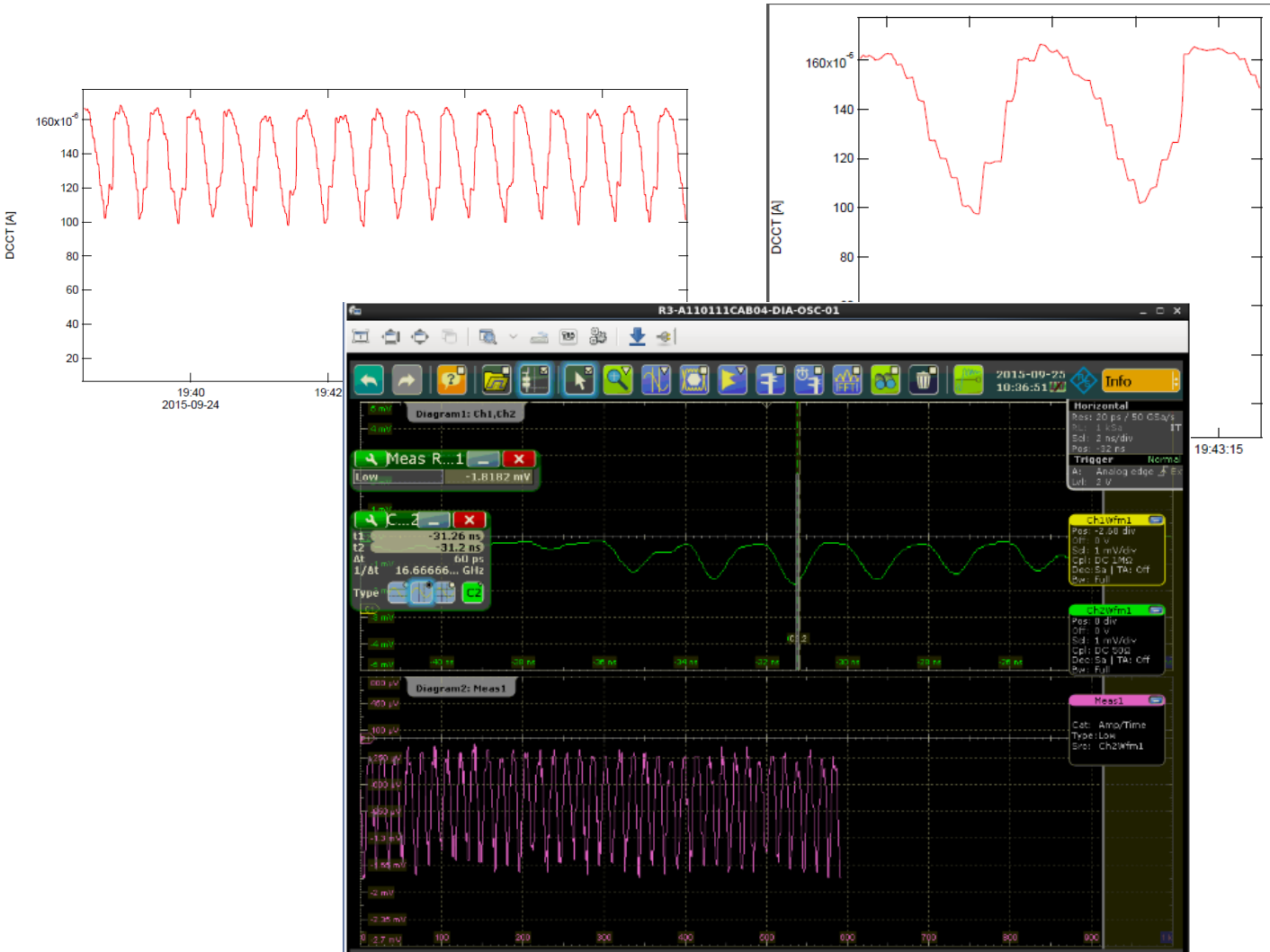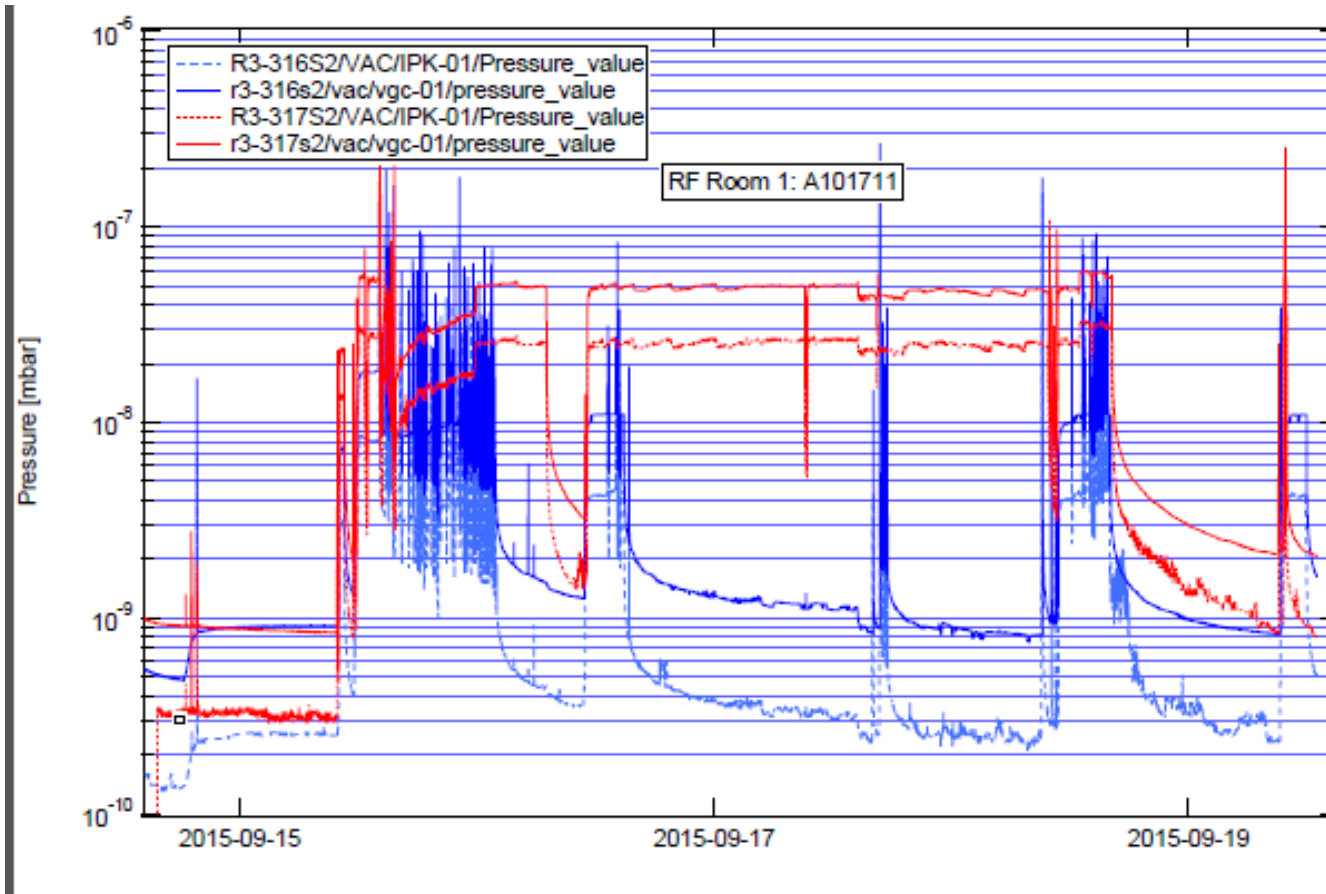**Hor. Dispersion**   **Δf=150 Hz**

Vertical Integer Tune

Capture Fluctuations due to lack of phase lock between 500 MHz chopper and Ring 100 MHz

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RF Cavity Conditioning

19th ESLS-RF Workshop

Next immediate steps

- Demonstrate Stacking

- Further cavity conditioning

- Detailed linear optics characterization

- BPM offset calibration

- Orbit correction

- Engage position interlocks

- Increase current

- Vacuum conditioning

MAXIV