Discussion 23 March.

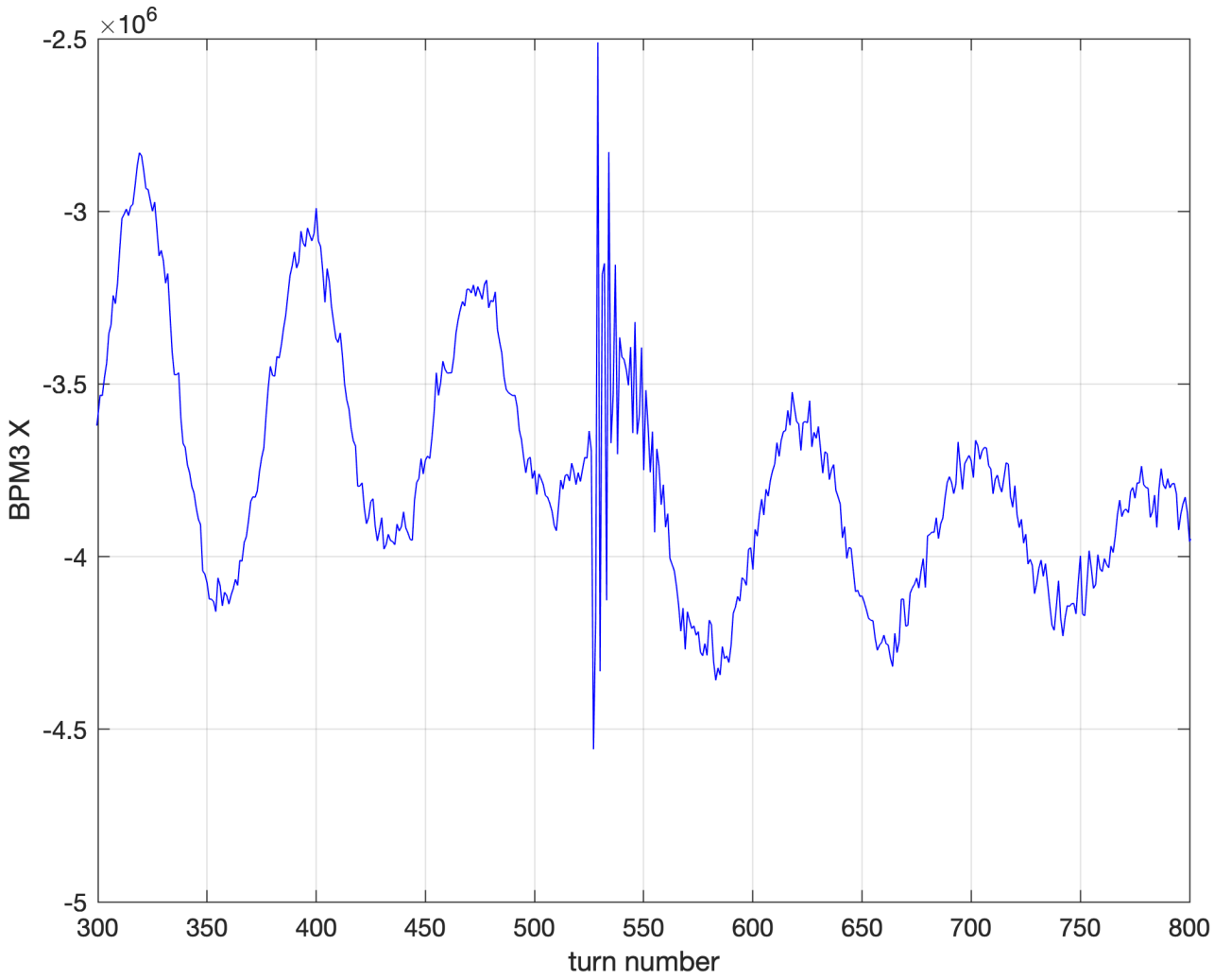
- Horizontal Tune was measured with excitation from extraction Kicker. Decoherence effects on beta oscillations?

- Storage at 40 and 100 kV in the RF Cavity with automatic cavity frequency tuning. Orbit correction. Need DS to control RF.

- Understanding of injection, measurements of dispersion in TL and at injection undergoing.

- Orbit length? Cavity frequency? Origin , compensation? Need to develop strategy for compensation of 0.3 MHz.
  Problem is that orbit is shorter that the design value, so it is not due to misalignments of Quads and optics, but most probable due to dipoles positioning . BPM readings?

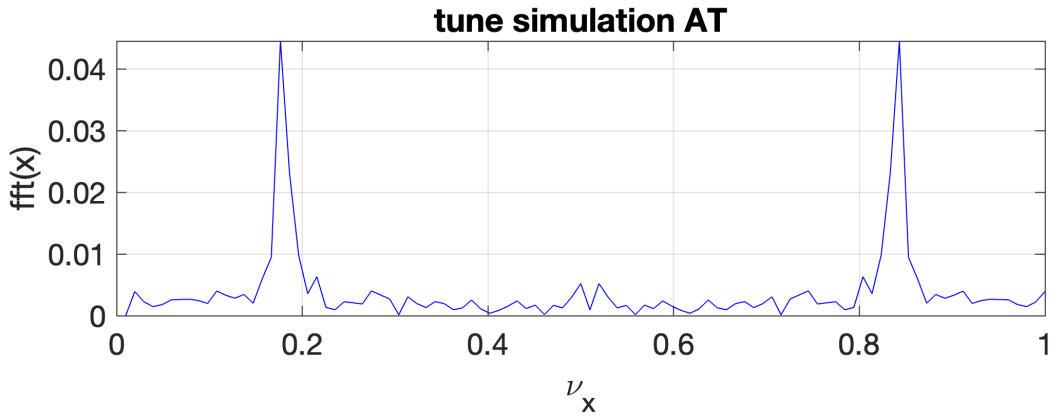
Excitation beta oscillations with Extraction kicker (V =800 V)

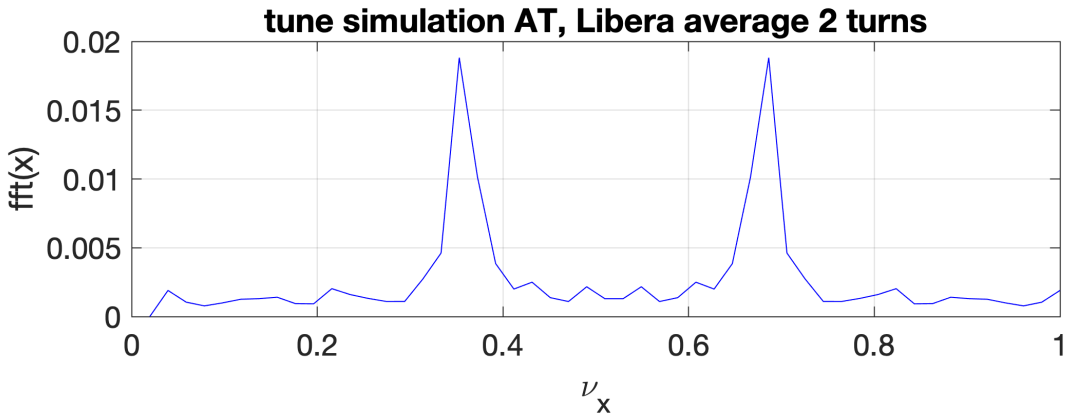


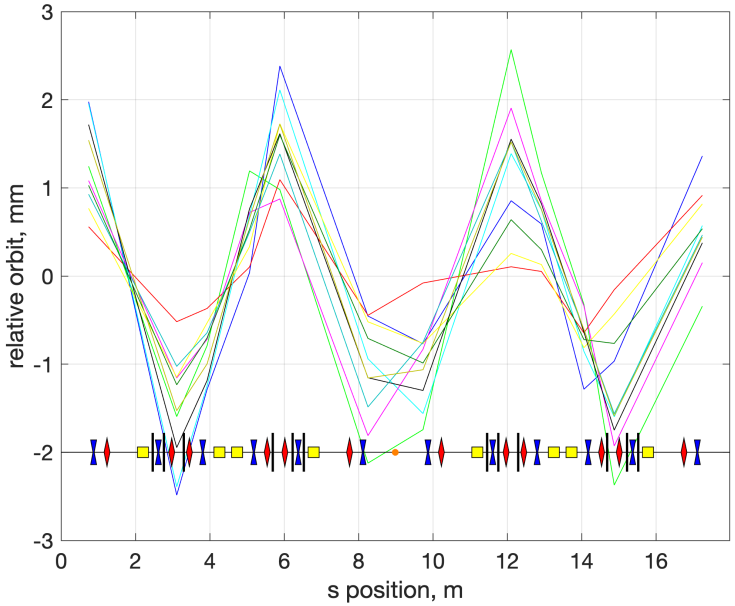
Energy:	0.05000 [GeV]
Gamma:	97.84757
Circumference:	17.98672 [m]
Revolution time:	59.99723 [ns] (16.66744 [MHz])
Betatron tune H:	**3.16998** (52835.37215 [kHz])
V:	1.64018 (27337.53540 [kHz])
Momentum Compaction Factor:	1.42815e-02
Chromaticity H:	+0.99537
V:	+0.99505

Assuming cavities Voltage:	300.00000 [kV]
Frequency:	500.02311 [MHz]
Harmonic Number:	30
Overvoltage factor:	204743.91281
Synchronous Phase:	3.14159 [rad] (179.99972 [deg])
Linear Energy Acceptance:	9.477 %
Synchrotron Tune:	**0.02015 (335.89828 kHz or 49.62 turns)**
Bunch Length:	0.13647 [mm] (0.45489 ps)

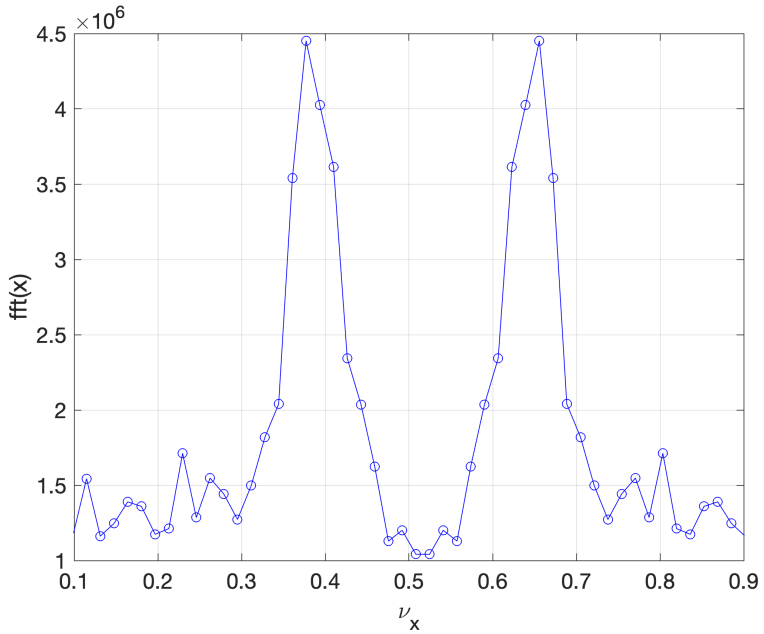
Simulation



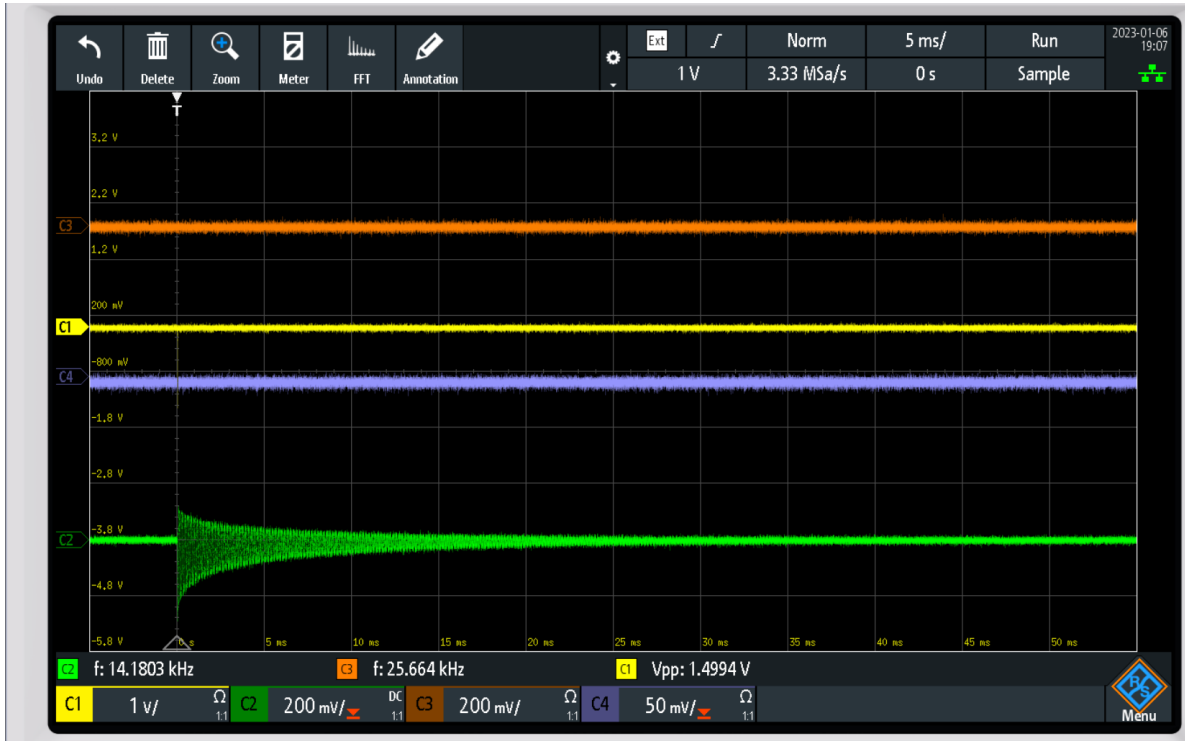


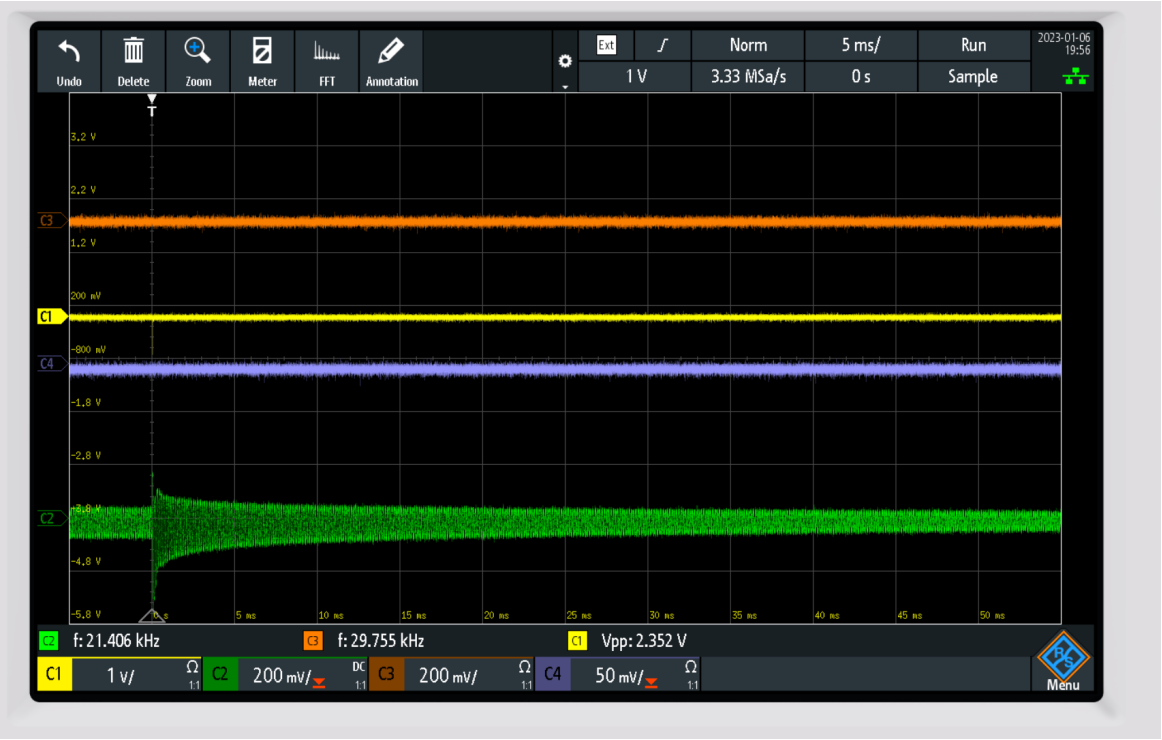


Measured

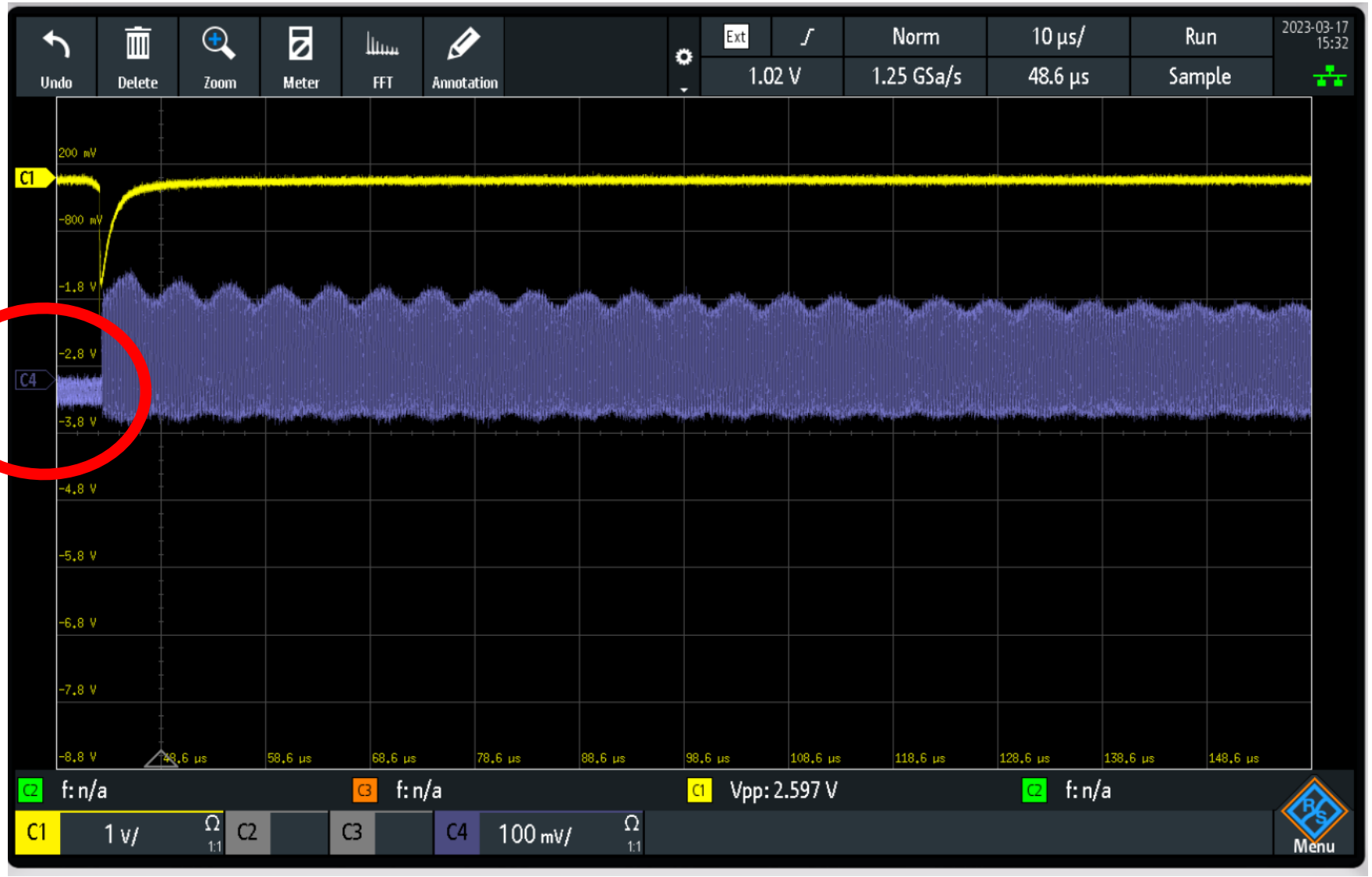


Data from old shift (data from logbook) : [2023-01-06_19-23-52]



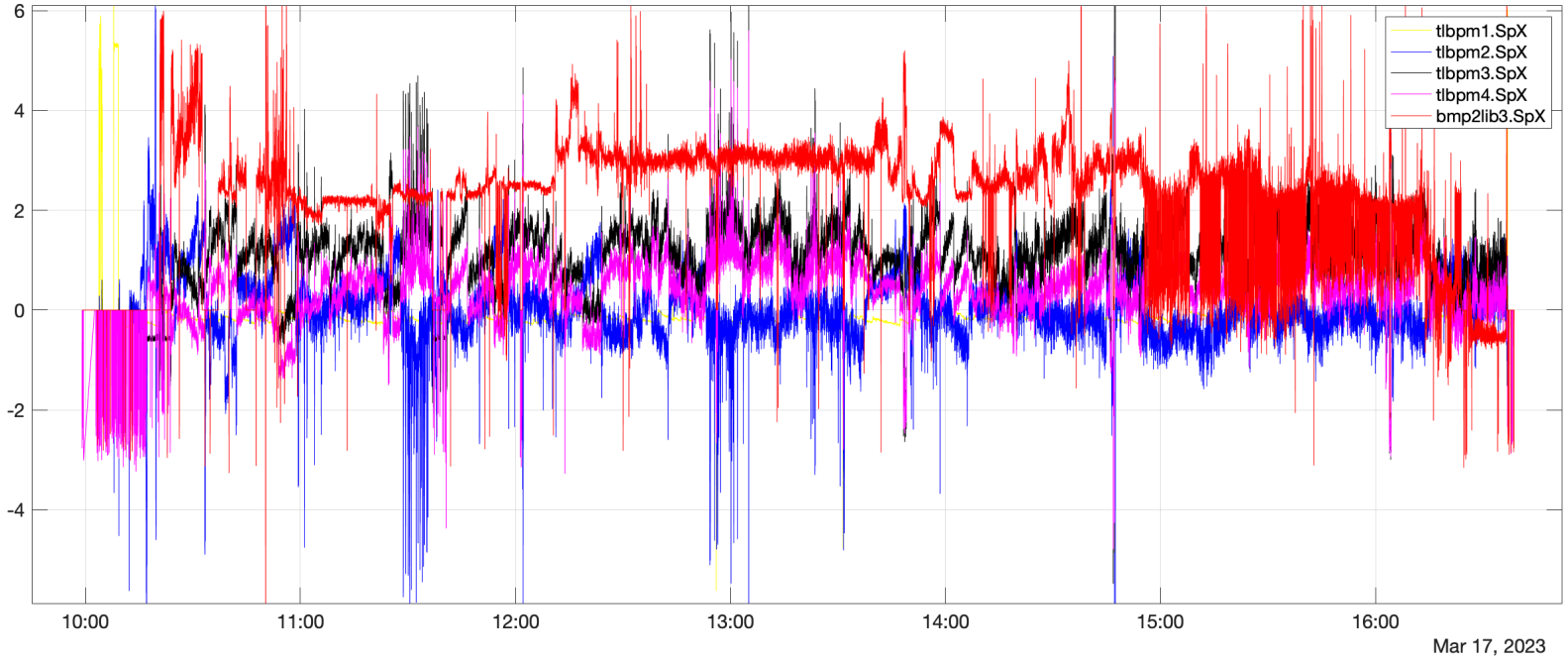


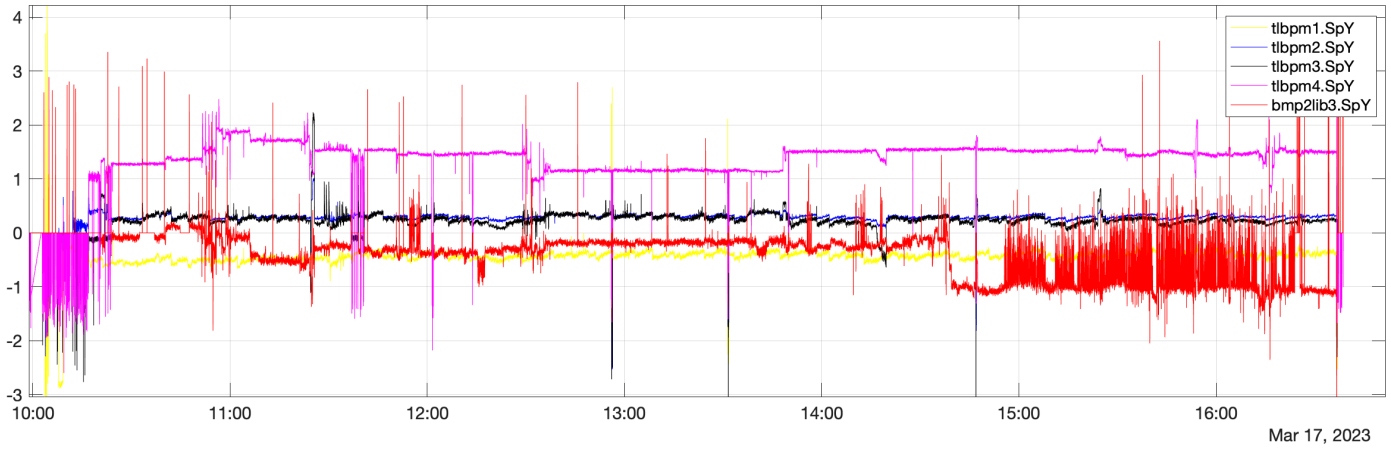
March 17



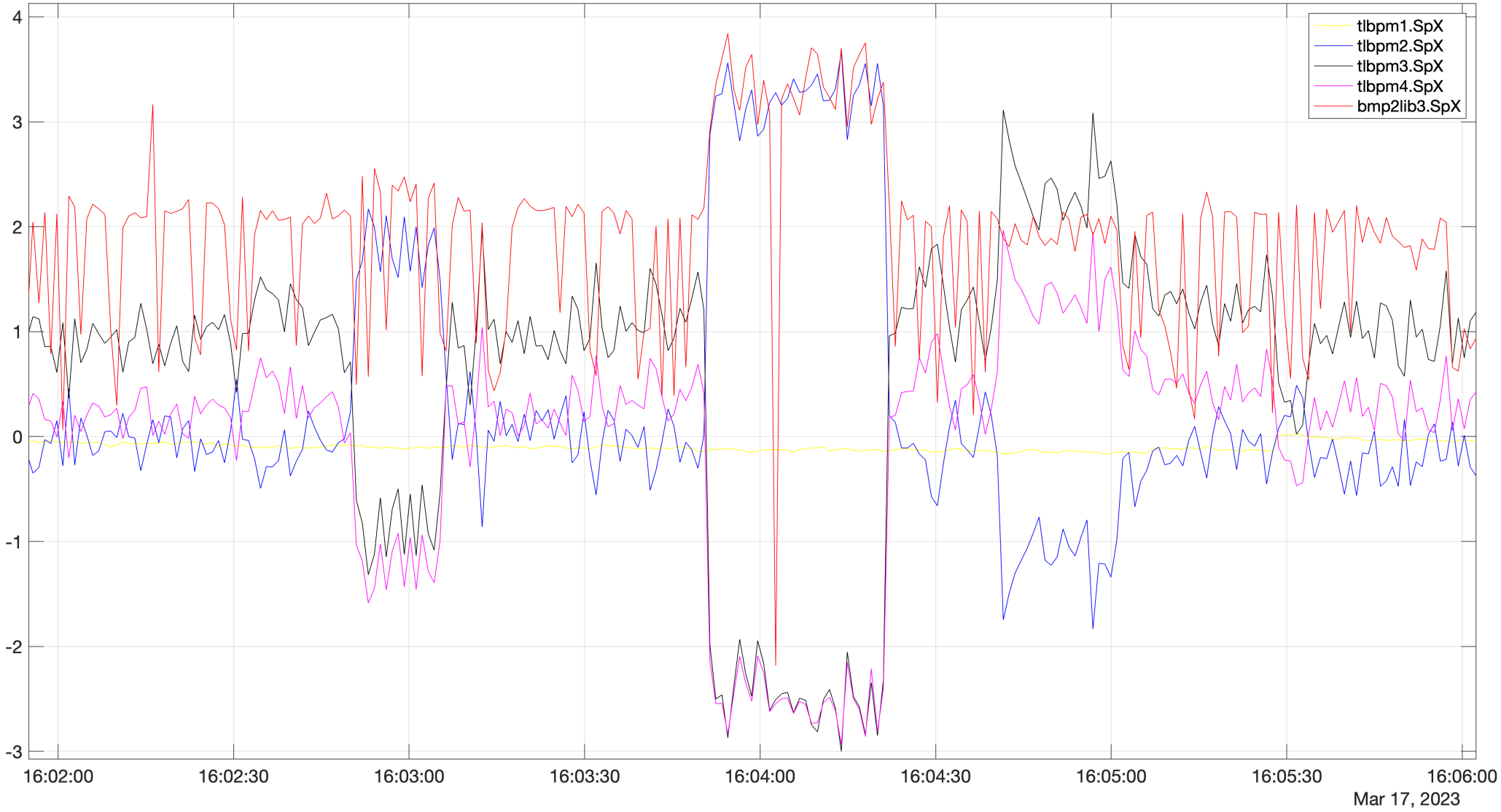
Storage>100 ms

BPM readings at 1Hz of TL and 1st in the ring. Search for good storage conditions.





Dispersion characterization.



How well do we know the circumference of a storage ring?

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ABSTRACT

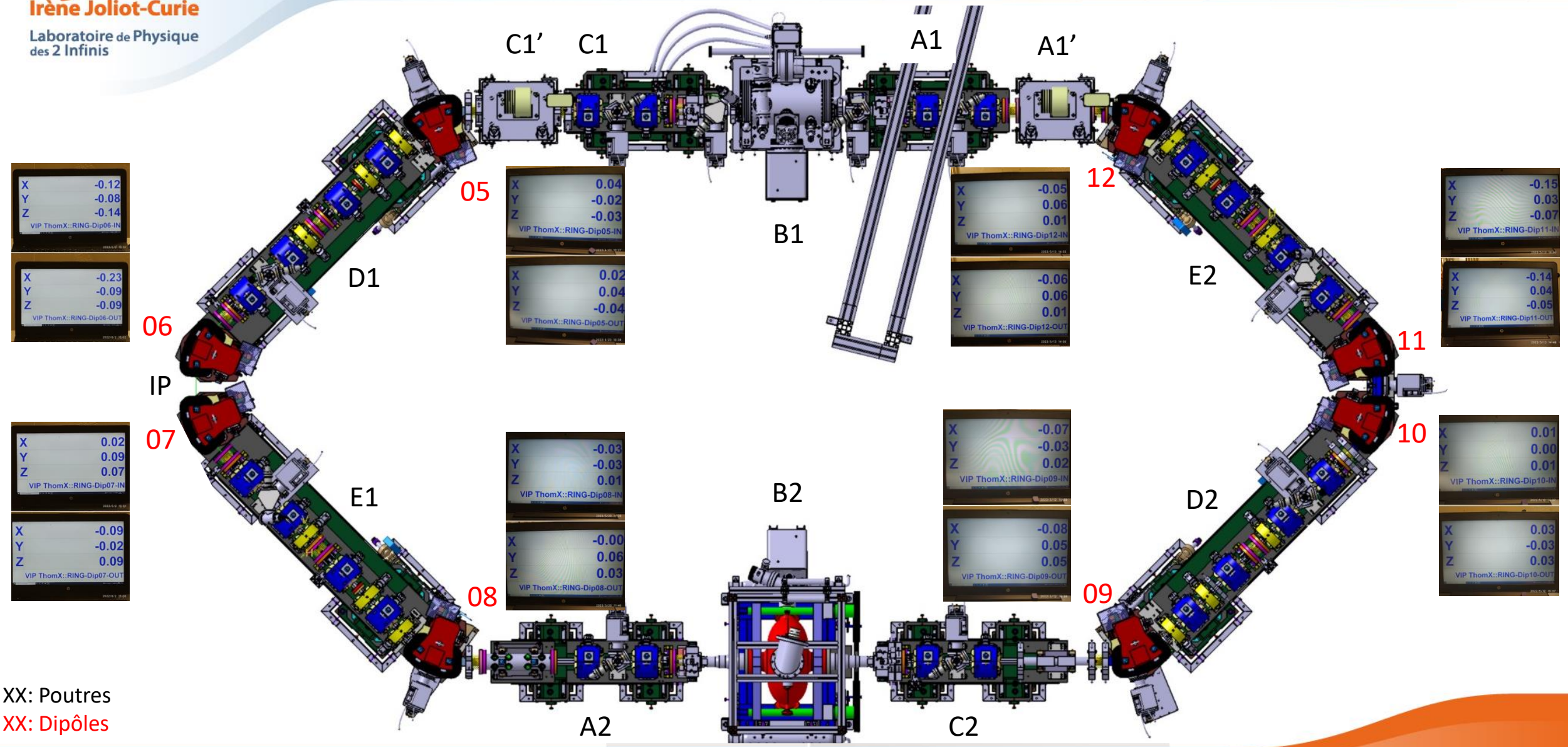
High-precision nuclear physics experiments in storage rings require precise knowledge of the beam energy. In the absence of electron cooling, which provides this information, one can use the frequency of the radio-frequency system in conjunction with knowledge of the circumference of the ring. We investigate to which precision the latter can be determined in the presence of magnet misalignment and orbit correction.

We observe that the presence of RF complicates the dynamics further. If magnet misalignments change the length of the orbit, the beam must adjust its energy in order to maintain the revolution time as dictated by the RF system. A change of momentum $\Delta p/p$ and orbit length Δs causes a change of revolution time ΔT according to

$$\frac{\Delta T}{T} = \left(\alpha - \frac{1}{\gamma^2}\right)\frac{\Delta p}{p} + \frac{\Delta s}{C} \tag{1}$$

where C is the circumference, T is the revolution time, α is the momentum compaction factor, and γ is the beam energy in units of the particle rest mass. Note that the first term on the right-hand side

Dipôles



XX: Poutres
XX: Dipôles