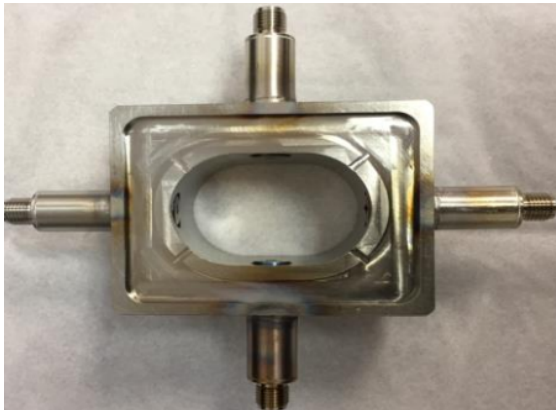
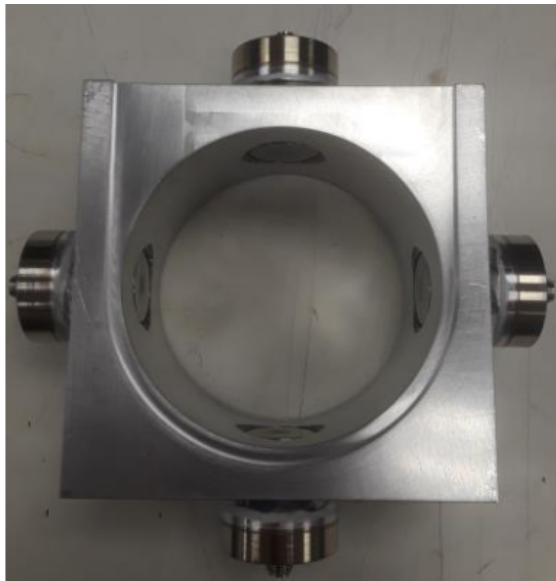


BPMs

SX/RX



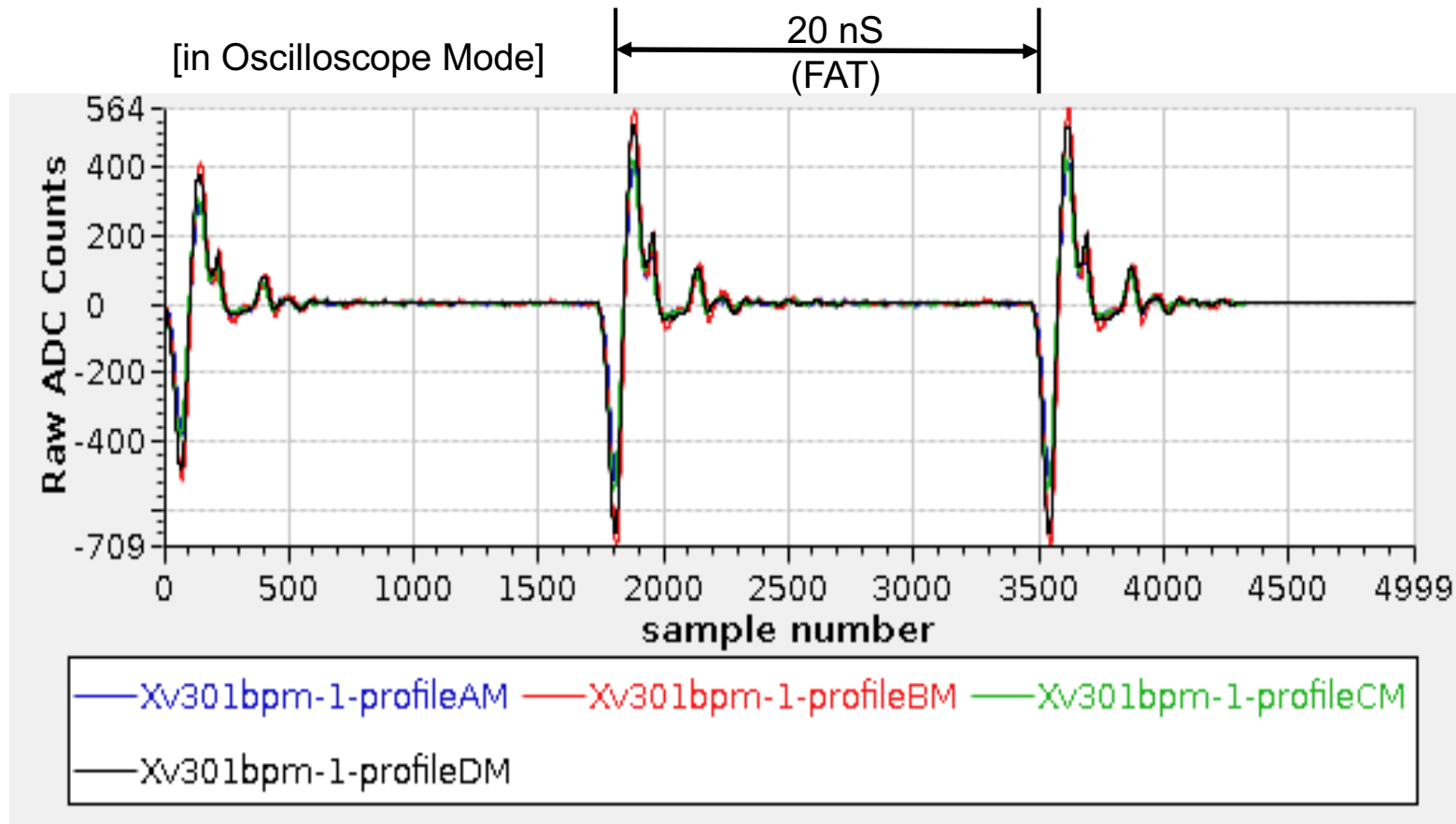
FFA



V301

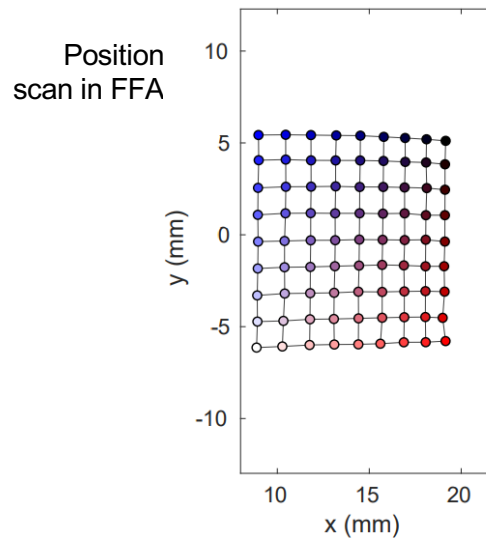
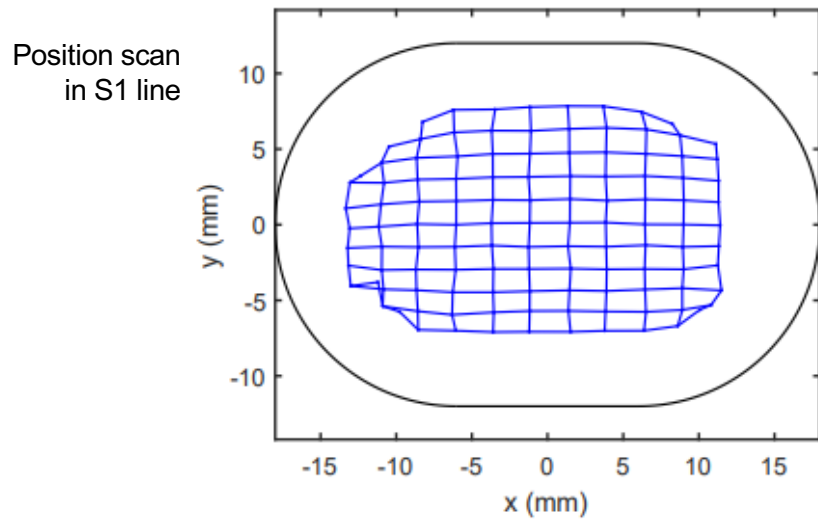
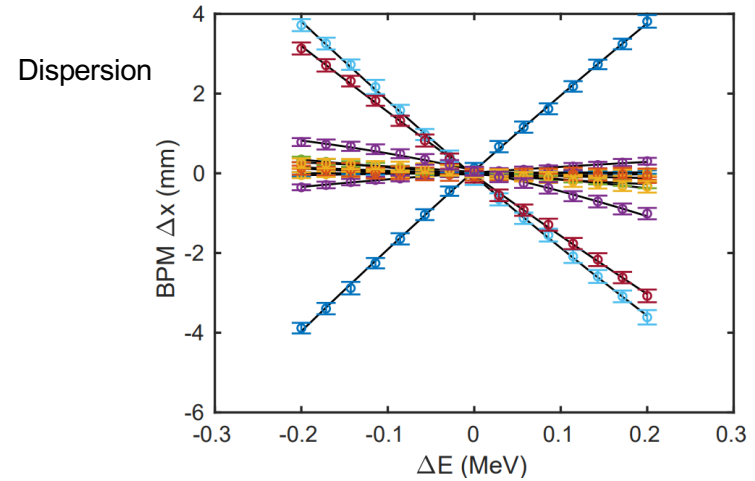
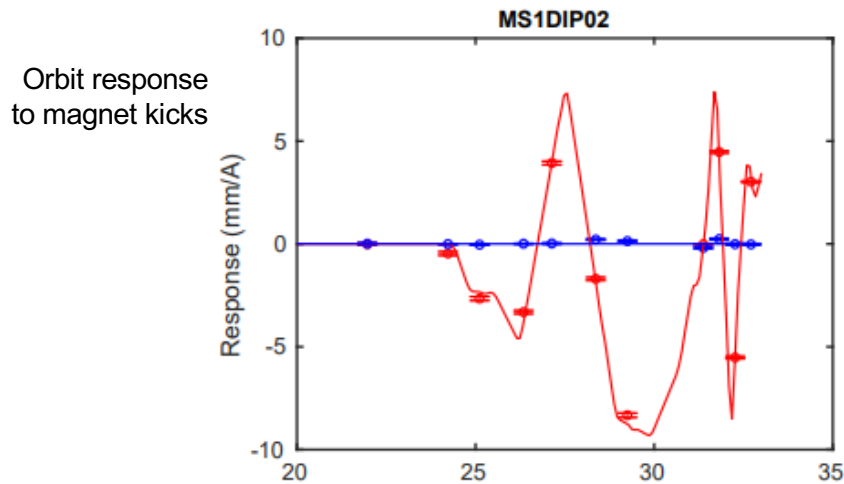


BPMs



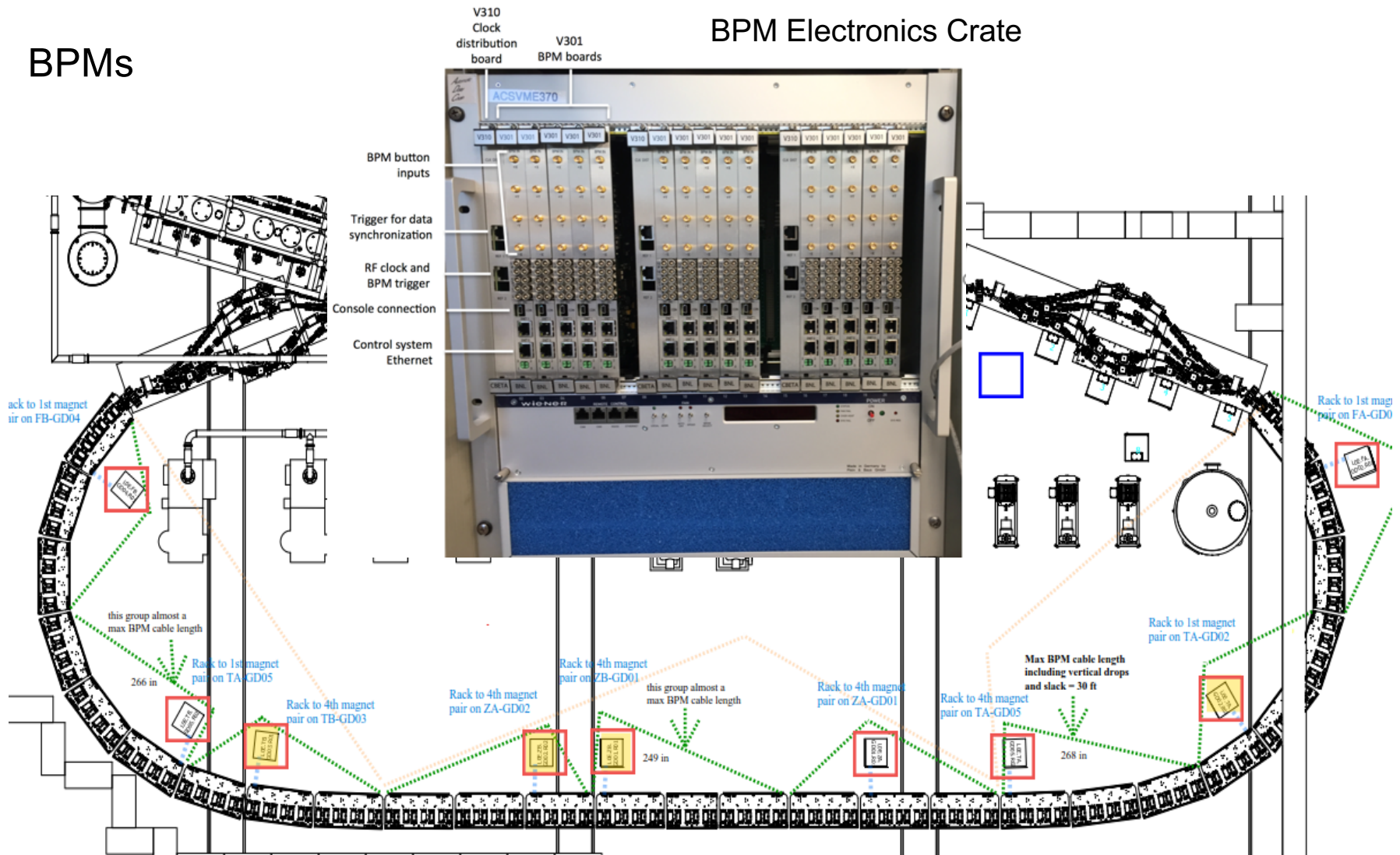
In normal data acquisition mode ADC sampling time is set to peak of waveform.

BPMs Performed well in FAT, used for machine characterization, e.g.



BPMs

BPM Electronics Crate



Electronics racks location around FFA

BPMs

V301 Production status:

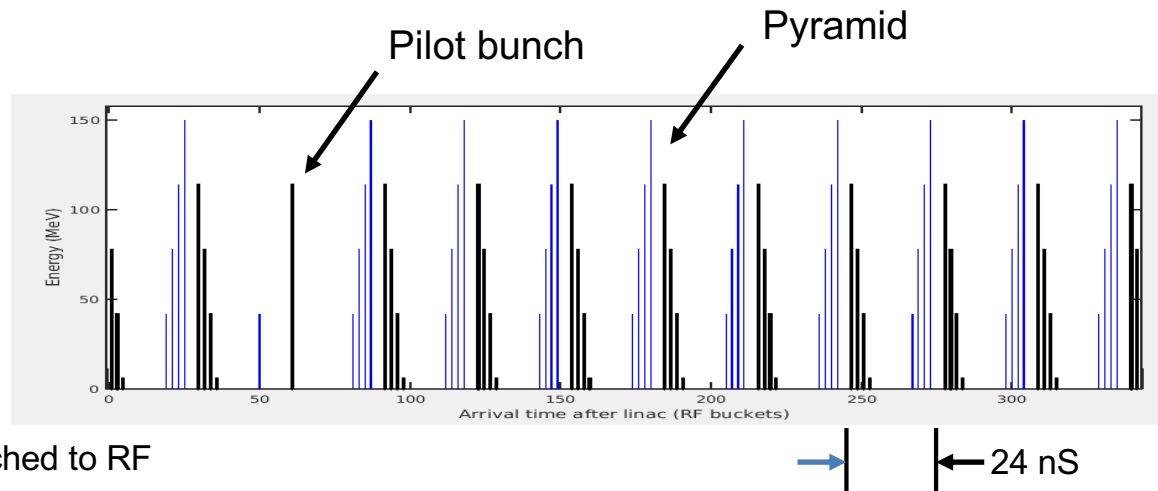
- 160 boards assembled, 100 successfully tested (debug and rework underway on non-functioning boards)
- Likely purchase of additional boards (aspirational goal of instrumenting all BPMs)

Note: original plan called for instrumenting half on BPMs in FFA (54) plus all SX/RX BPMs (40)

- Crates and racks in hand
- Order of cables (assembled) imminent

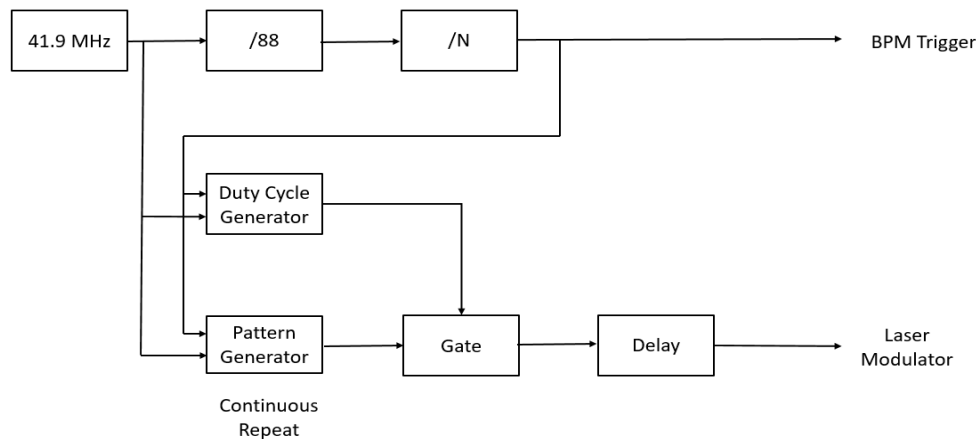
BPM Timing

Example fill pattern in CBETA. This is achieved with injecting at 41.9 MHz and blanking selected pulses.



1. Requires 41.9 MHz laser synched to RF

Existing laser synchronization system has multiple legacy dependencies. We are planning a new synchronization system but this is not done yet.



Laser Injection Pattern Generator

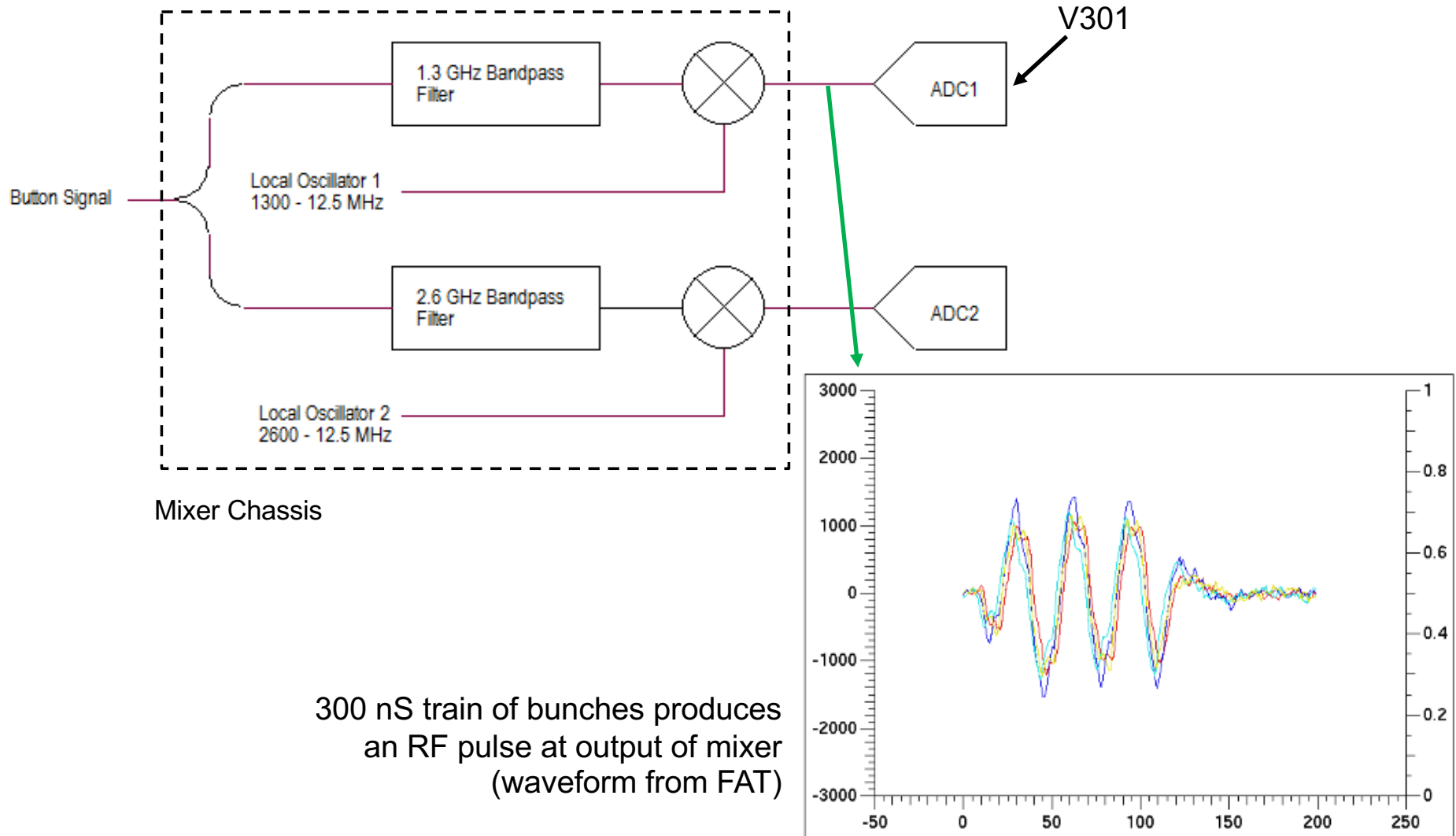
2. Requires pattern generator for laser modulator

Module design begun using off-the-shelf hardware. Additional hardware programming and packaging required.

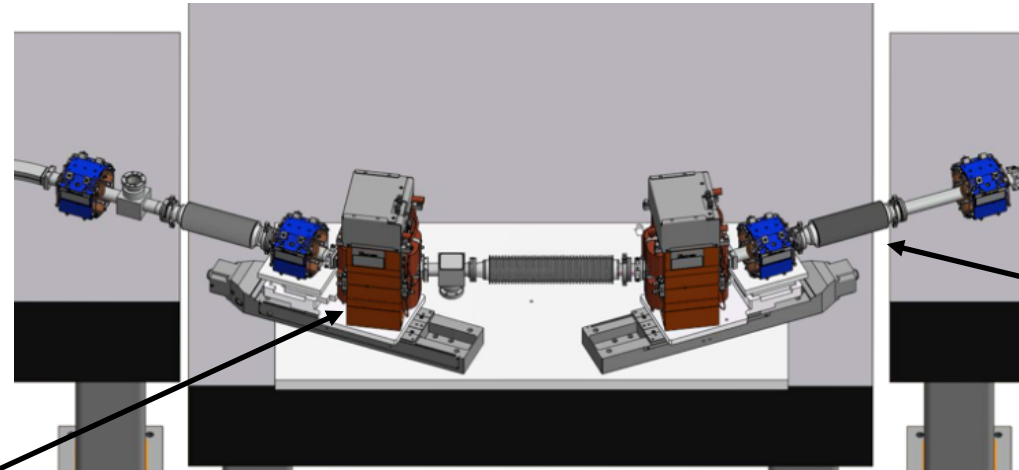
3. Requires BPM trigger fan-out module and cables

Not yet done.

Bunch Arrival Monitors (BAMs)

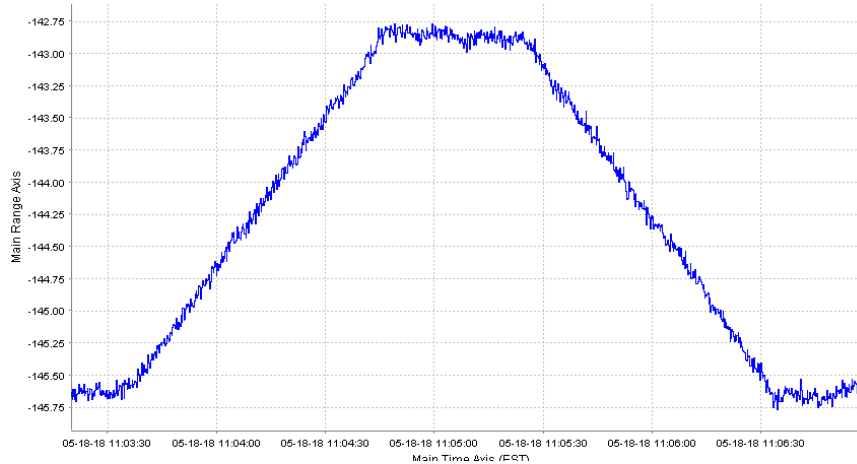


BAMs



Dipole on moveable stage (x2)

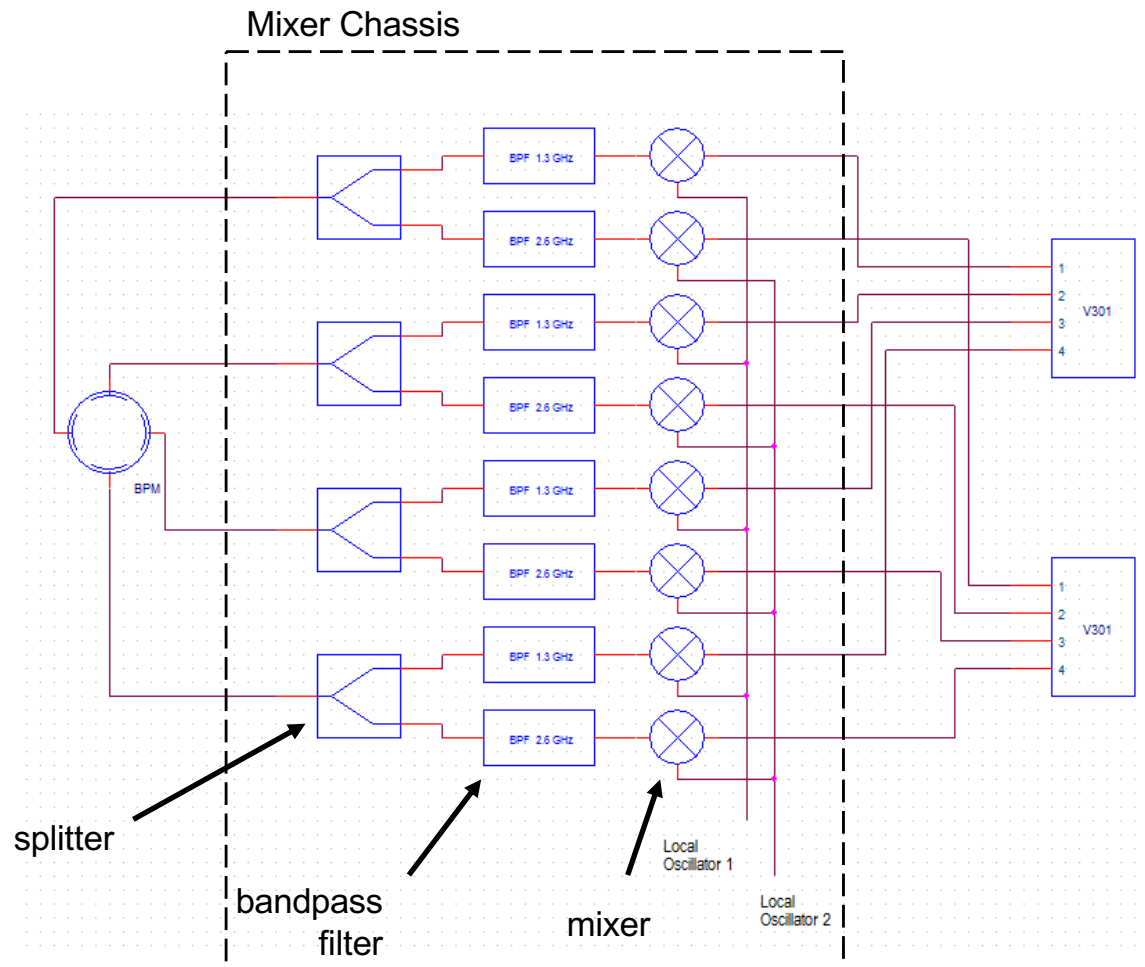
Bellows with sliding joint (x3)



3° (of RF wavelength)

Measured bunch phase at start of FFA as S1 path length adjusted

BAMs



Production Status:

1. New mixer design tested, ready for assembly.



2. Band-pass filter quotes in hand, ready to order.

3. Chassis/Packaging details remain.

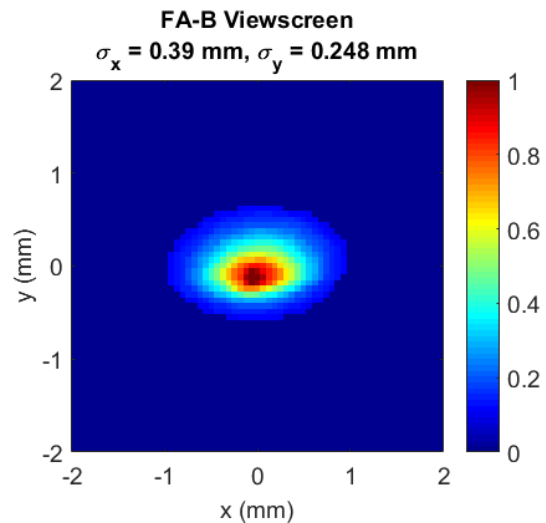
BAM local oscillator

FAT injection rate was at 50 MHz. Existing master oscillator provided local oscillator signal for BAM mixers. Intermediate frequency = 12.5 MHz

New BAMs requires new local oscillator signals phased locked with 41.9 MHz laser. The source for new local oscillator frequencies is in design.

* Wiggle room : both single pass and single turn ERL can be accomplished with 50 MHz laser

Viewscreens



First 42 MeV beam in FFA

Cameras in hand.

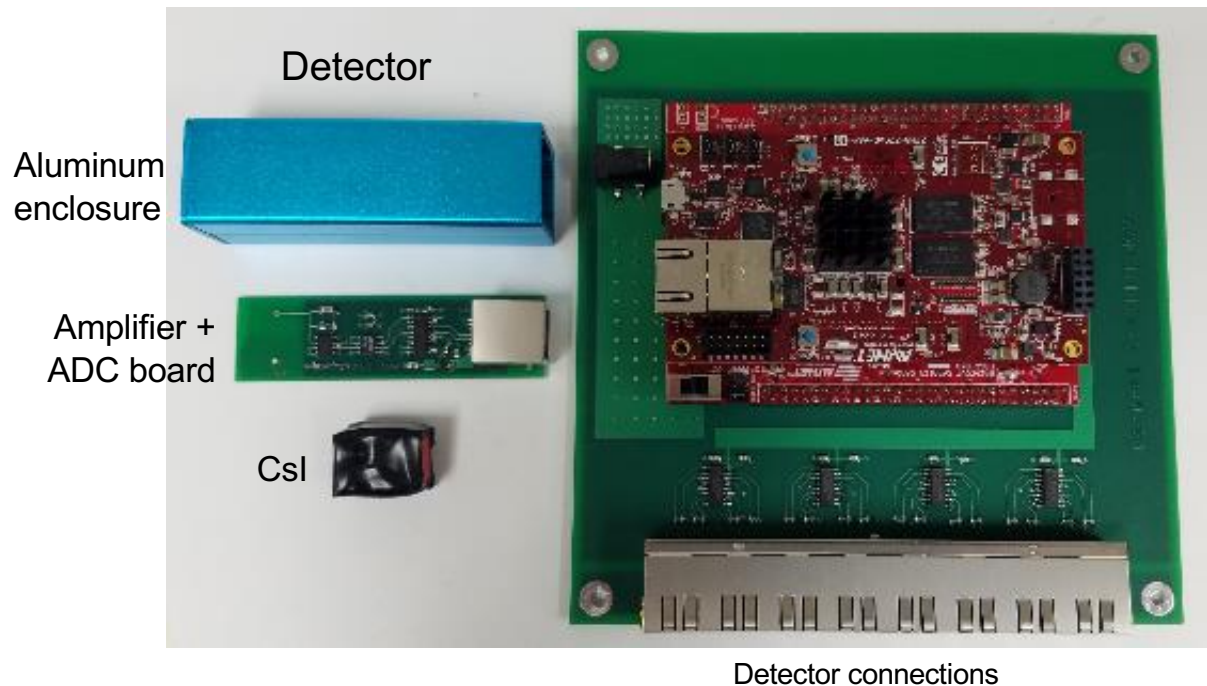
Lenses ordered.

Video network switches selected.
(Testing of Power-over-Ethernet yet to be done. This is a convenience feature.)

Beam Loss Monitors

CsI based slow loss monitor

Data Acquisition (hosts 8 detectors)



Tested in FAT.

- wide range (10 mR/hr ~ 1K R/hr)
- B field OK
- easily relocated (100 total)
- 7.5 Hz update rate

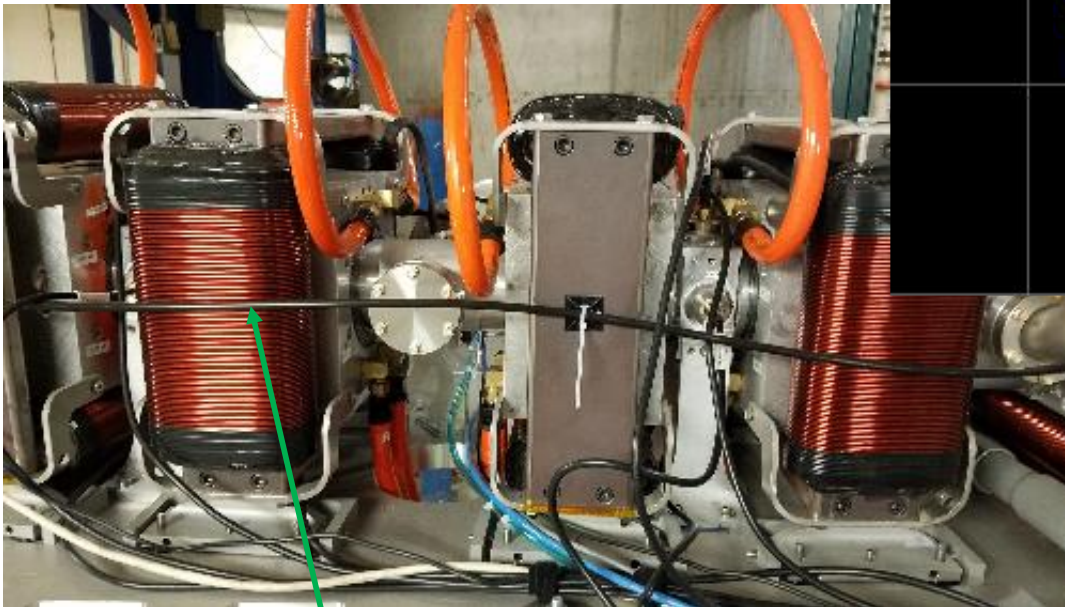
Production Status:

Printed circuit boards in assembly

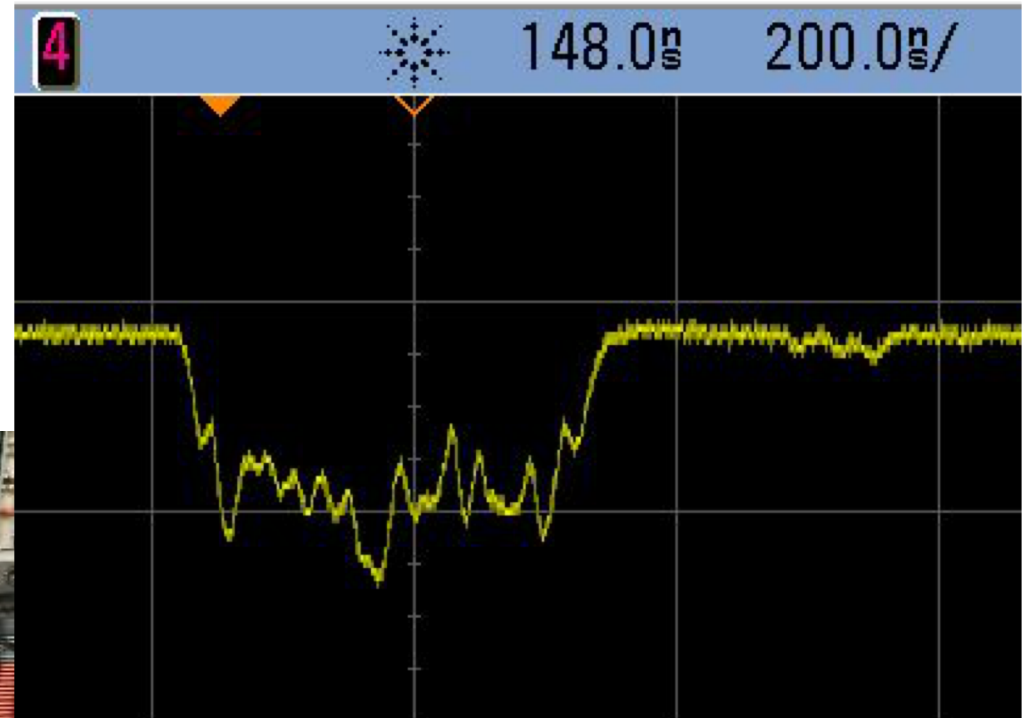
Chassis for data acquisition board needed

Beam Loss Monitors

PMT based fast loss monitor



Scintillating fiber (2 m long) inside black plastic tubing, both sides of magnets



FAT PMT output for 300 ns train of 10 pC bunches @ 50 MHz

Beam Loss Monitors

PMT based fast loss monitor

Production Status:

- Scintillating fiber in hand
- PMT + enclosure parts, tubing need to be procured and assembled
- Data acquisition board chassis required
- Data acquisition board requires additional programming

