Cavity BPMs Analog Output

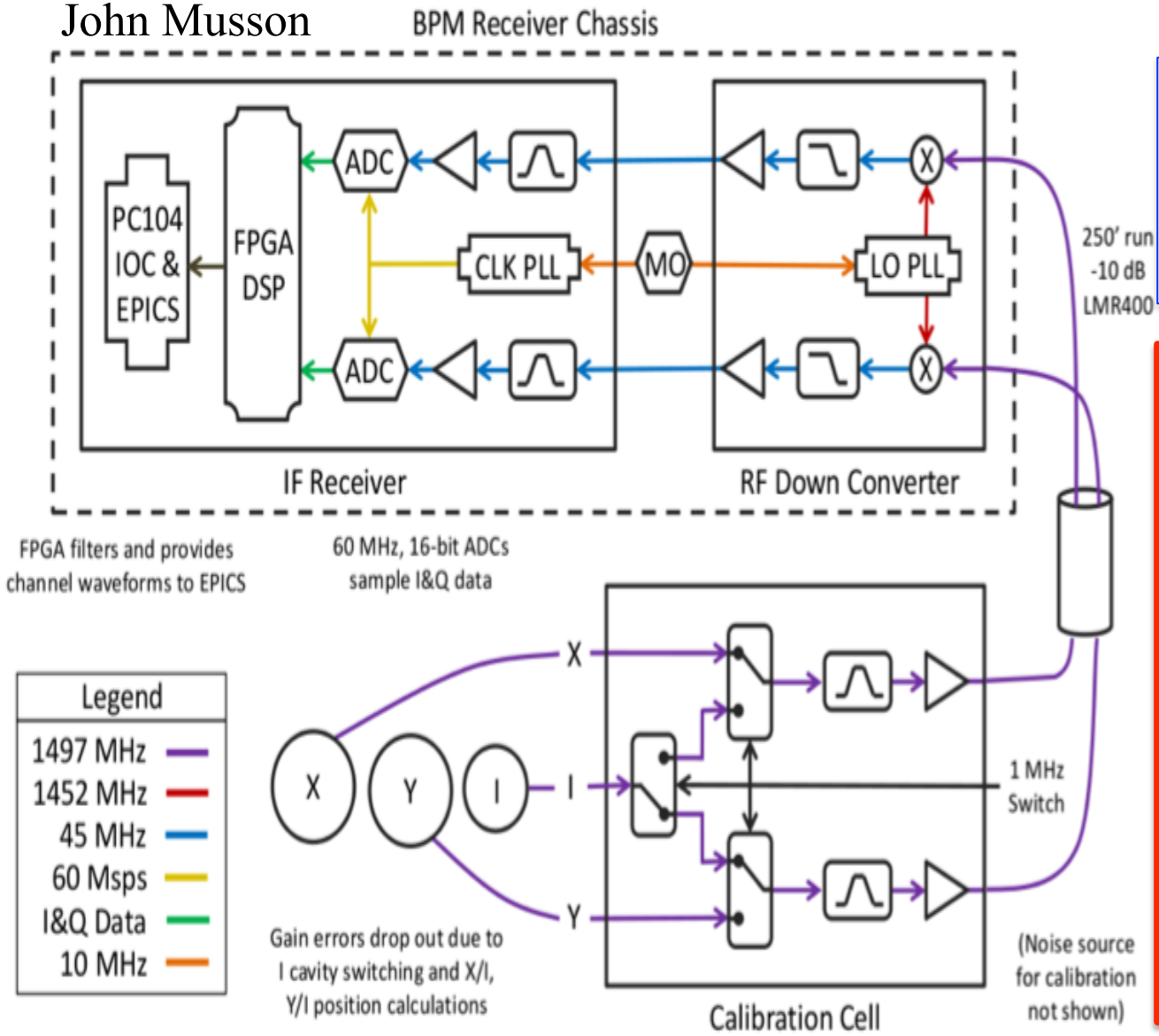
Ye Tian
Syracuse University

- Parasitic Run Analogy Output
- Cavity BPMs Position Calibration
- Milestone and Outlook

2/15/2019

Cavity BPM Electronics

John Musson



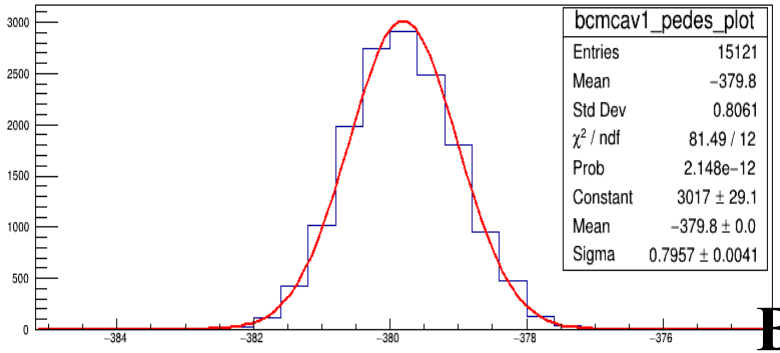
1) EPICS Data:
IPM1H04B*
IPM1H04C*
IPM1H04D*

2) DAC:
Parity DAQ, ADCs
Signal
✔
only noise for cavity signal
Works !
ADC
japan
Plots

Beam Off Pedestal Correction

Beam off
Run 1219

cav4bx.hw_sum_raw/cav4bx.num_samples



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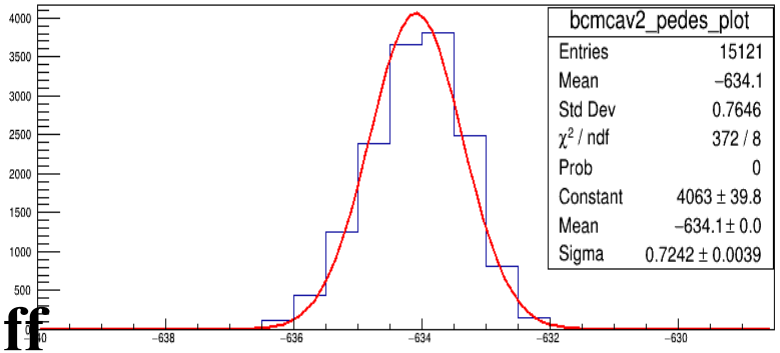

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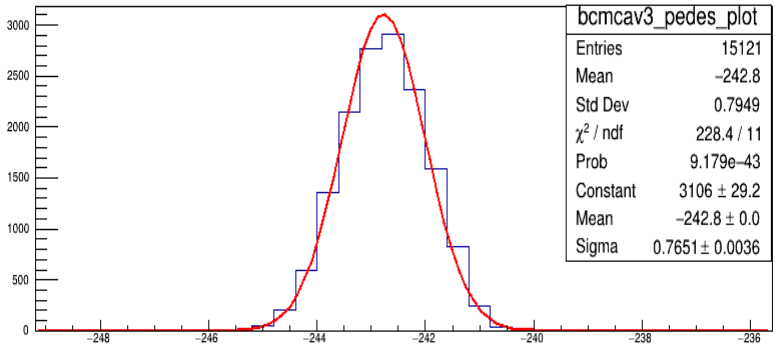
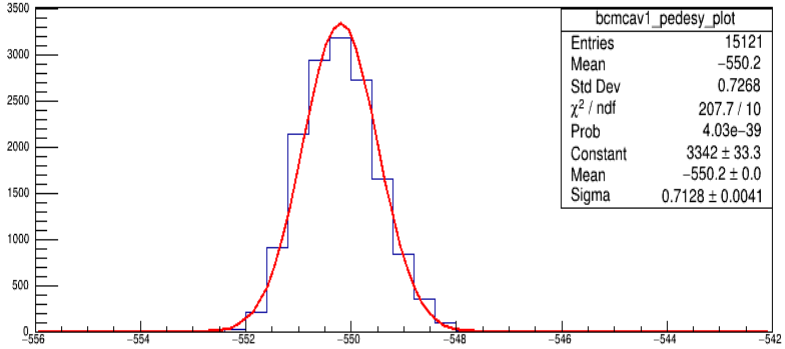
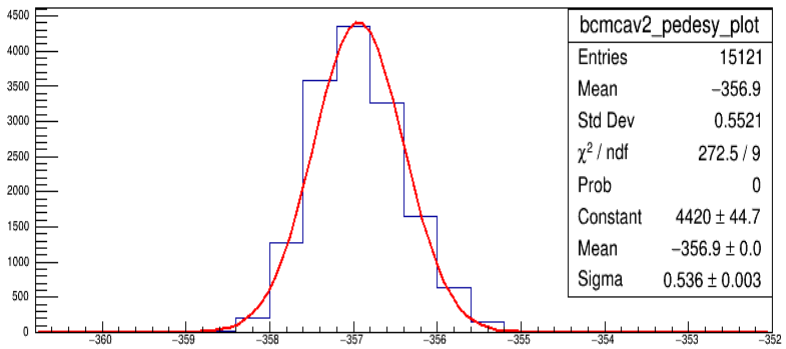


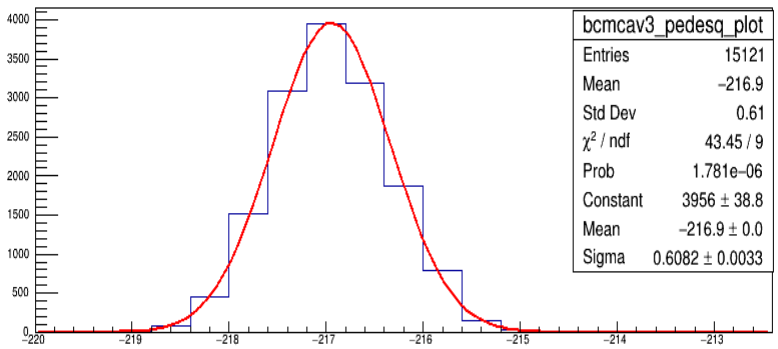
cav4by.hw_sum_raw/cav4by.num_samples



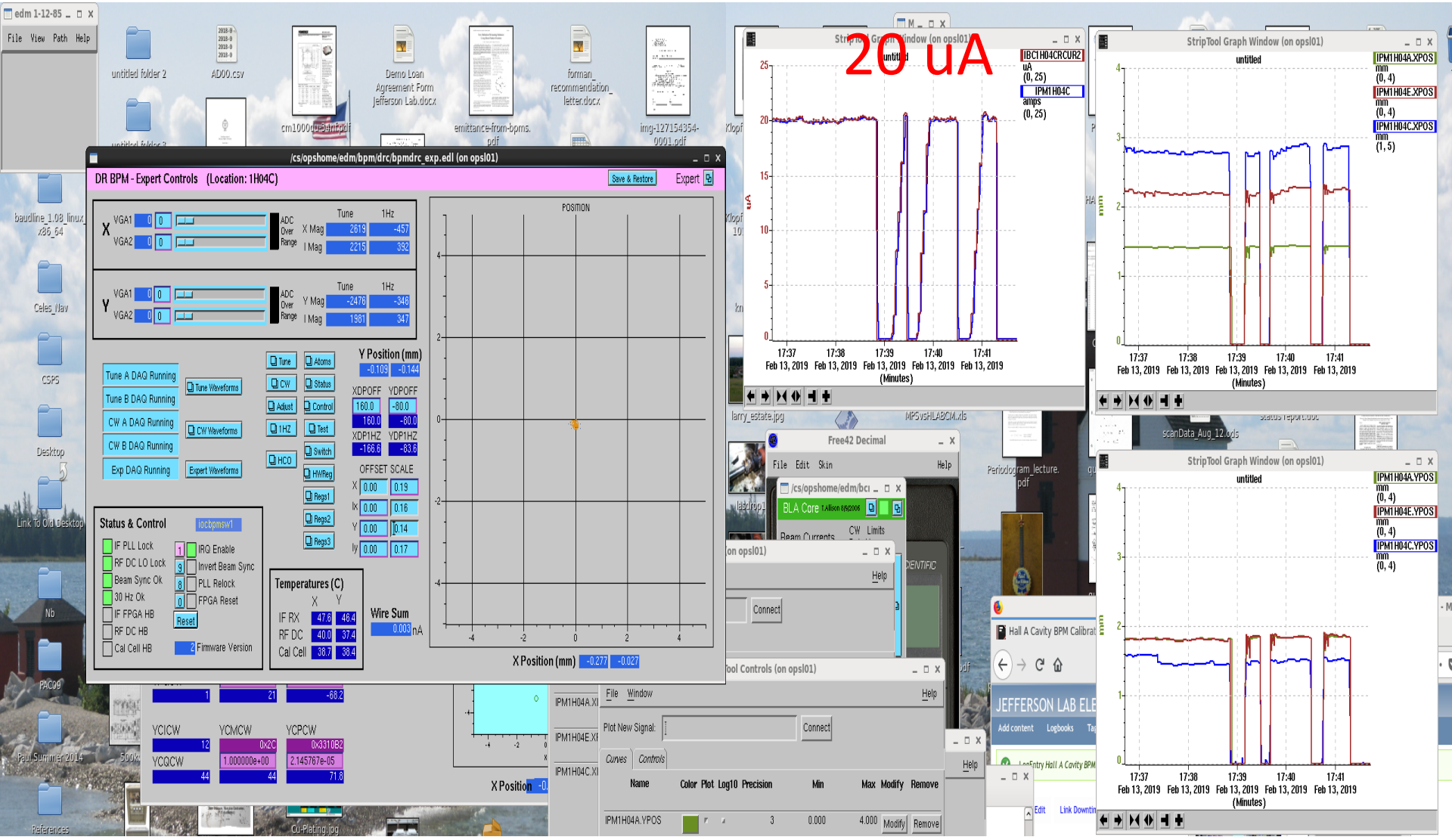
cav4cy.hw_sum_raw/cav4by.num_samples



cav4dq.hw_sum_raw/cav4bq.num_samples



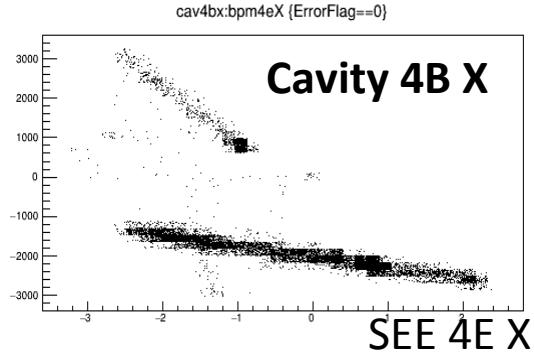
Cavity BPMs Parasitic Calibration

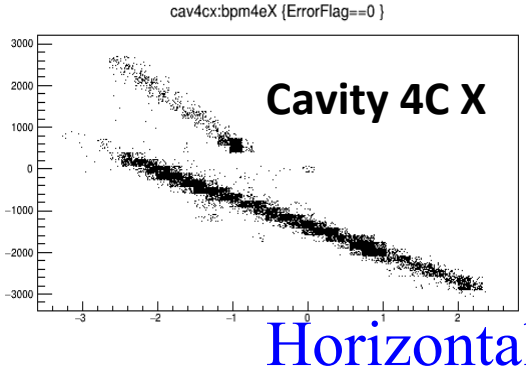


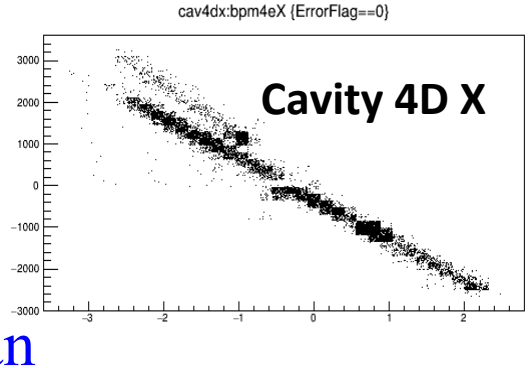
4B and 4C are done, after we satisfy the behavior, John will lock the parameter access.

Beam Tuning and Steering Test Runs

prexALL_1225.root Raw signal without Calibration

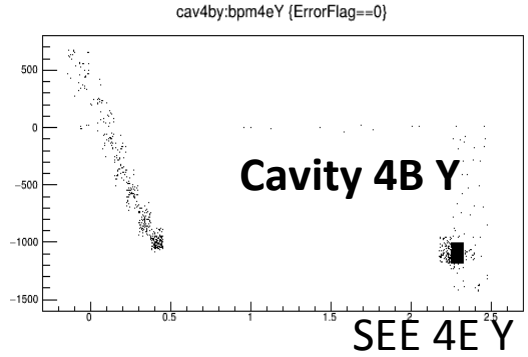


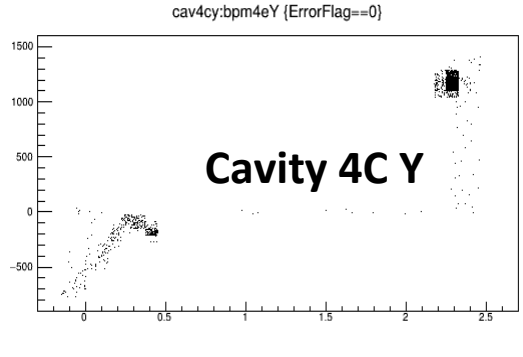


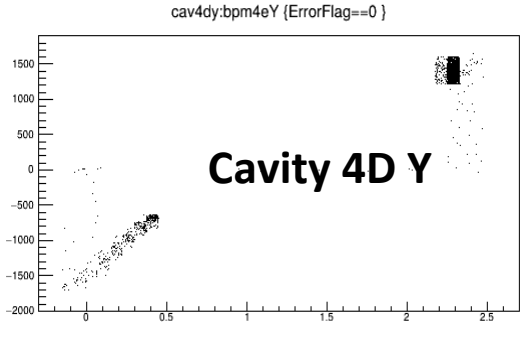


SEE 4E X

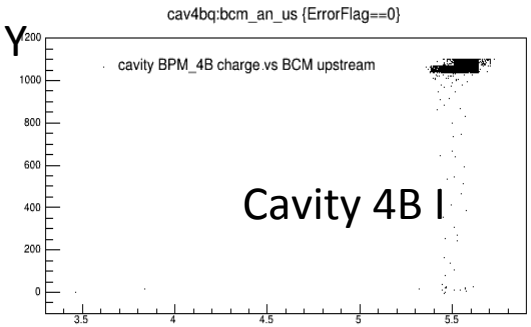
Horizontal scan

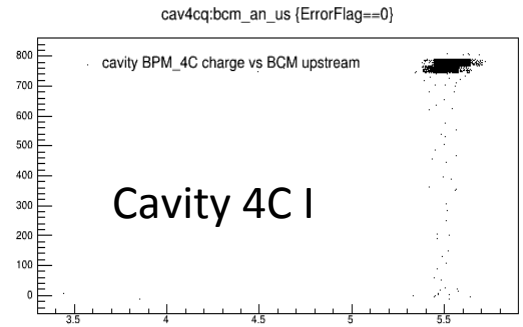


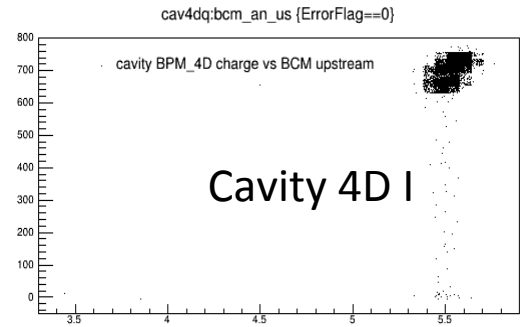




SEE 4E Y





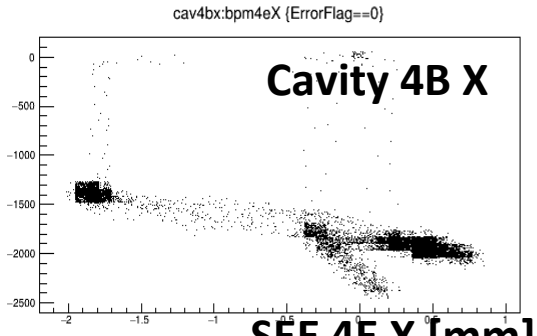


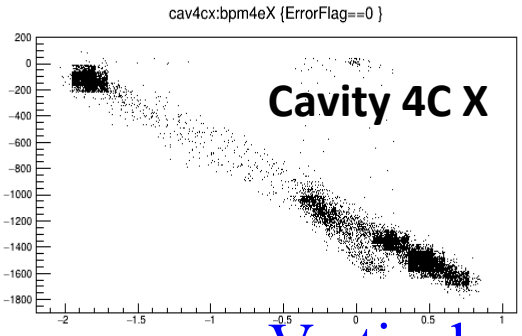
Y

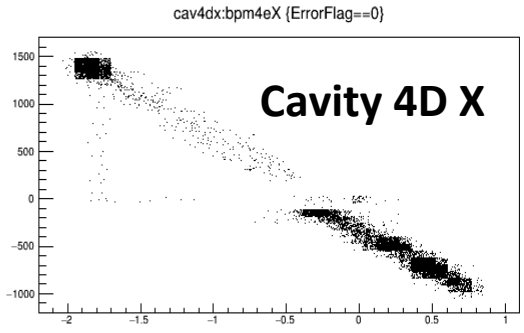
See the correlation between cavity and SEE BPMs

Beam Tuning and Steering Test Runs

prexALL_1228.root Raw signal without Calibration

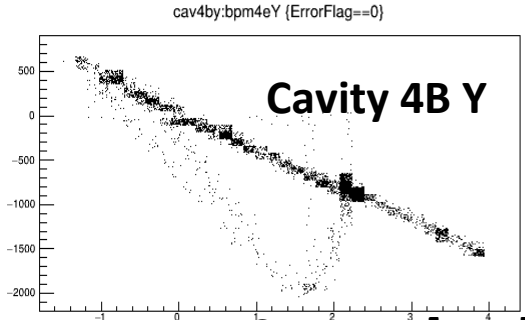


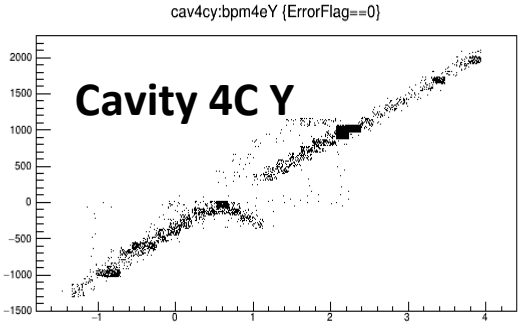


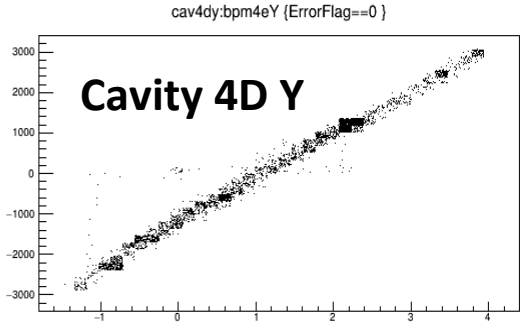


SEE 4E X [mm]

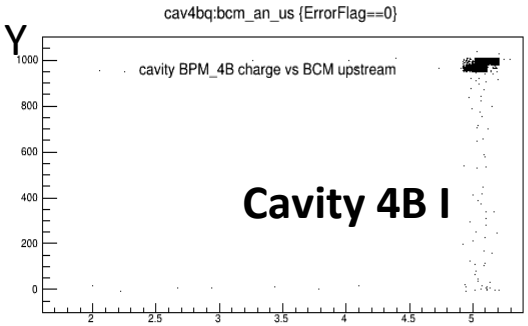
Vertical scan

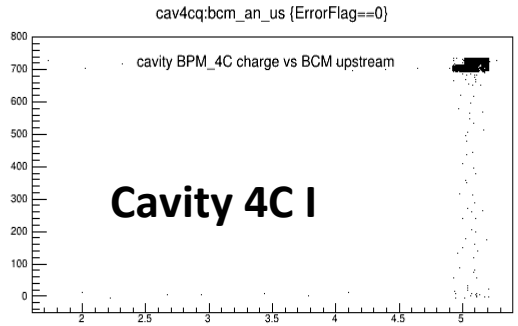


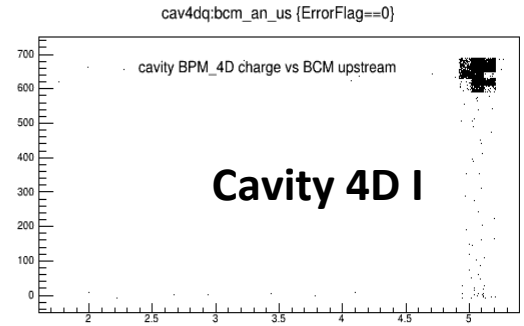




SEE 4E Y [mm]





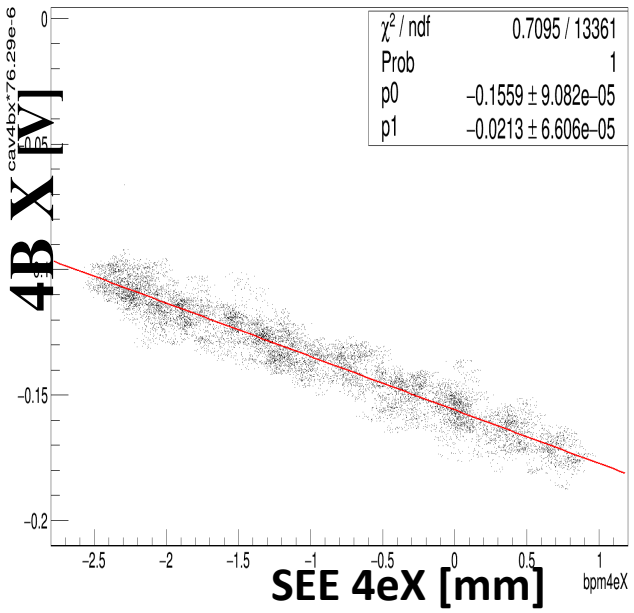


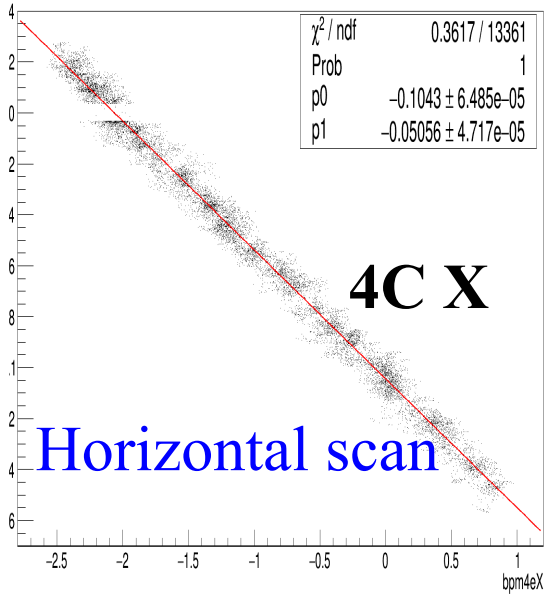
Y

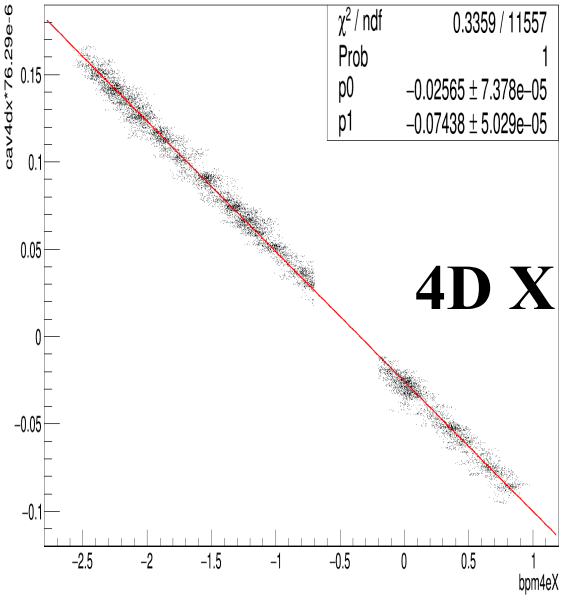
US bcm[μA]

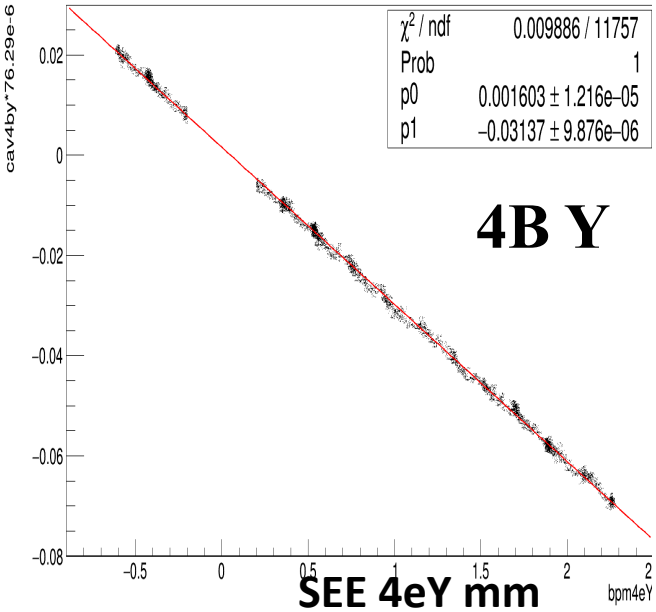
See the correlation between cavity and SEE BPMs

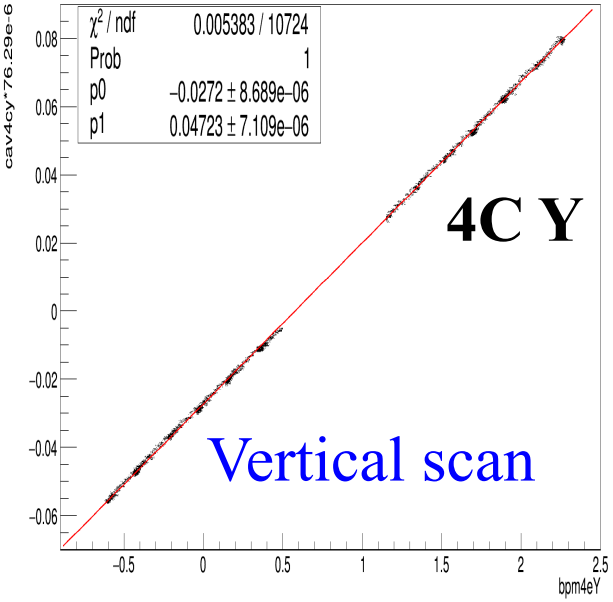
Calibration for Cavity BPMs Signals

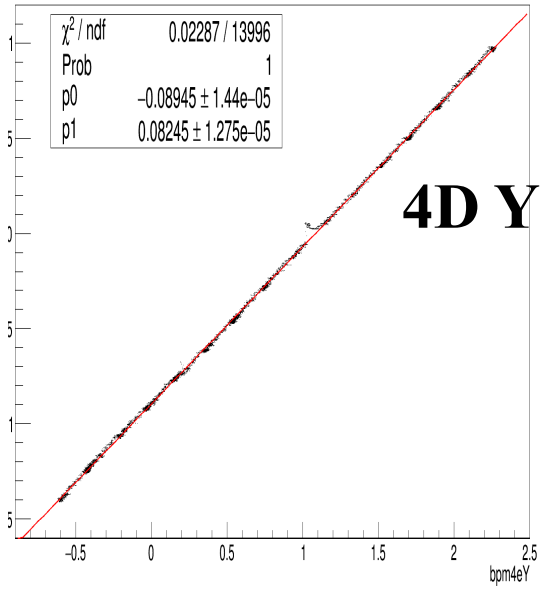




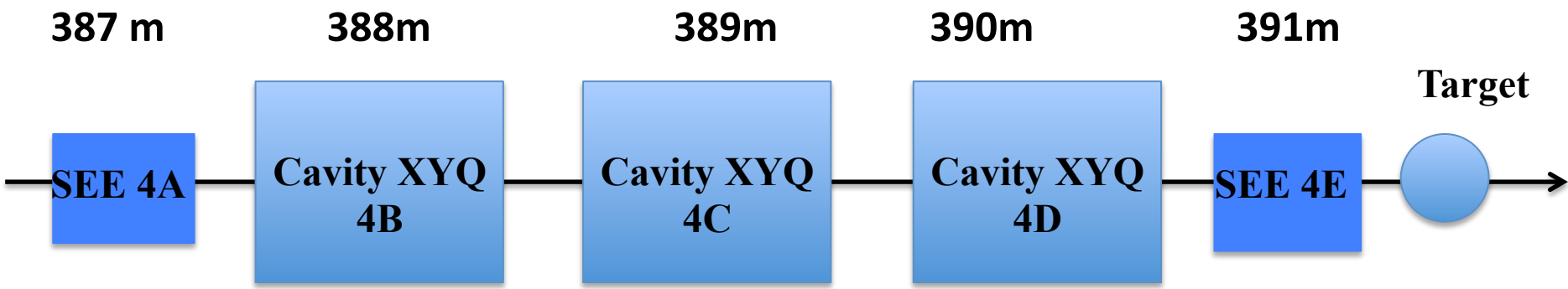








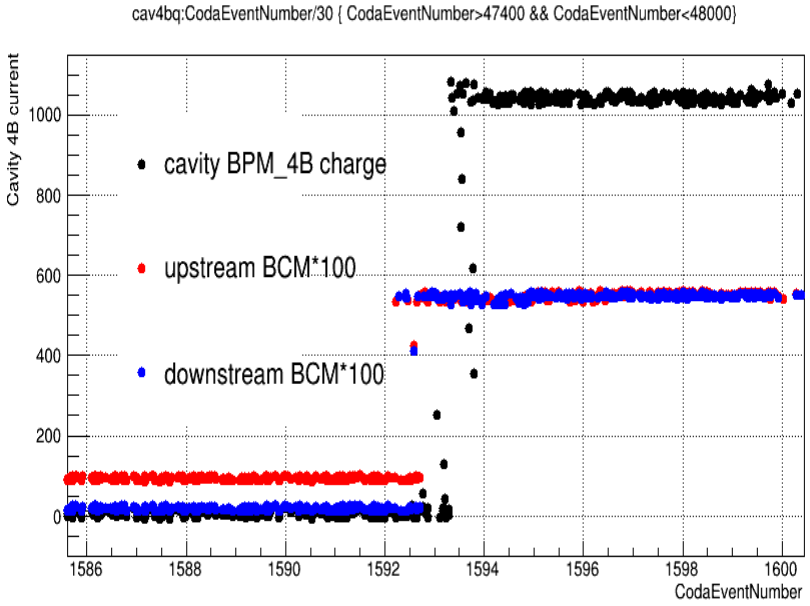
Cavity BPMs Position Calibration

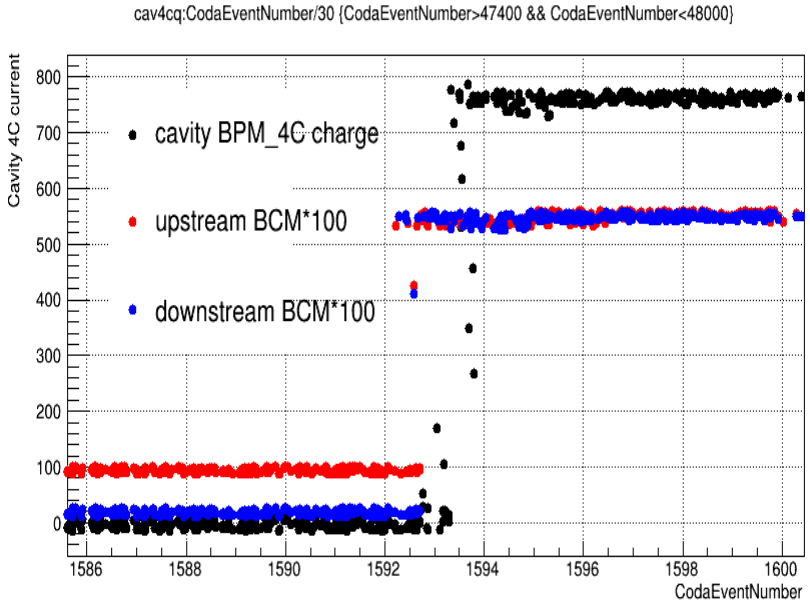


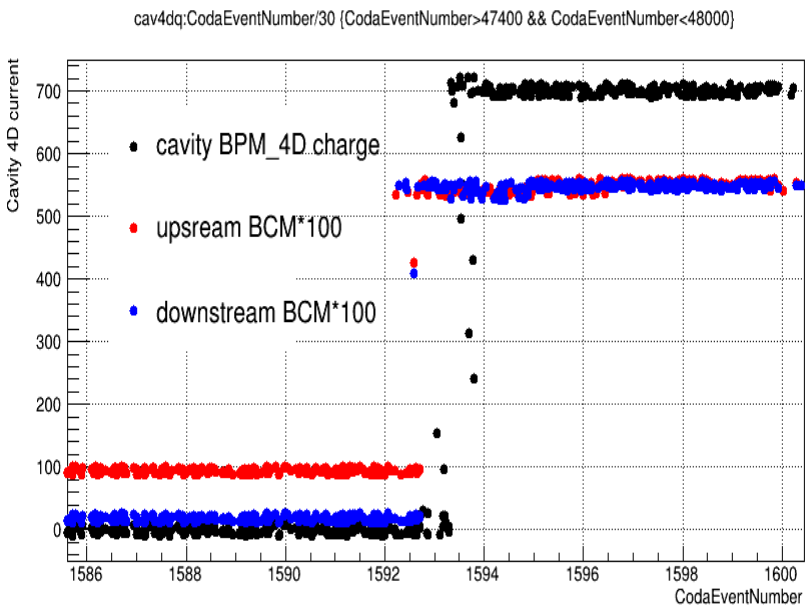
Position corrected

Cavity	X V/mm	Y V/mm
4B	**0.0852**	**0.1254**
4C	**0.1011**	**0.0944**
4D	**0.0991**	**0.1099**

Signal Delay Issues







1 second delay ⟶ trouble

Group Delay≈ 1/BW

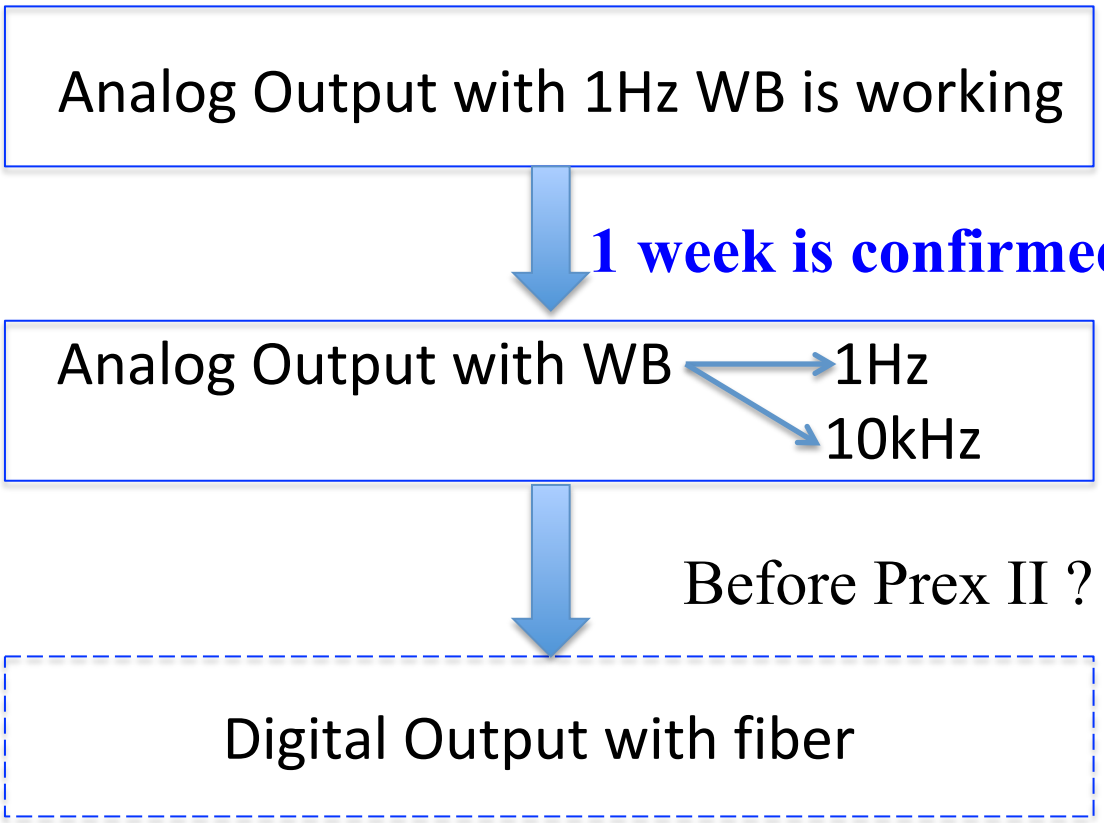
Current receiver frame setting:
BW=1Hz

T_{settle} = 100μs-500μs

BW = 10kHz?

Cavity BPMs Milestone

Low current beam centering is achieved



Paul King will talk to Evan about this

Discussion and Outlook

- Send the required BW and position calibration factors v/mm to John by this afternoon.
  ------applying the calibration factor to japan

- 1 Week Parasitic APEX beam time to test John's new cavity BPMs receiver frame.
  ------10kHz BW delay time and the switch ability.

- Complete low current cavity BPMs beam test?
  ------- with the new receiver frame

Thank you !

Thanks to John, Chad, Bob, Paul King, and …..

Back Up

Typical Analog Superhet Receiver

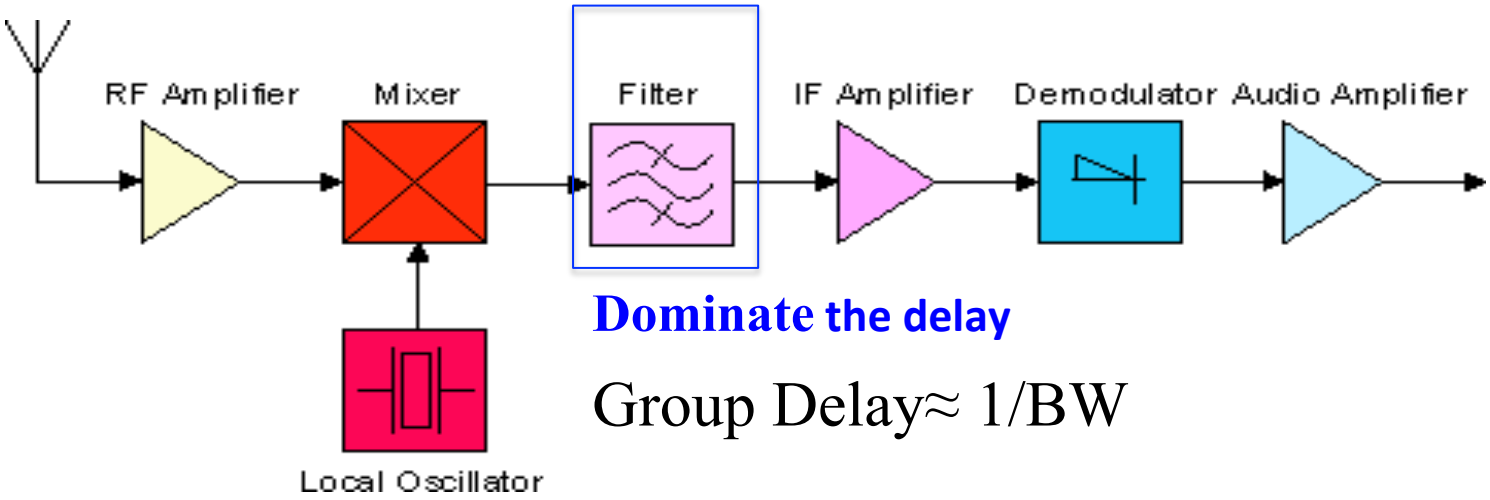
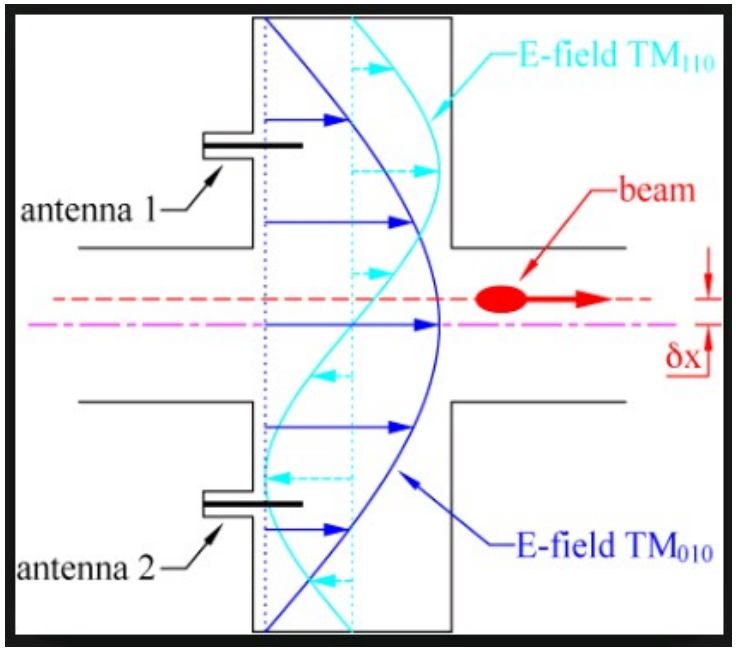
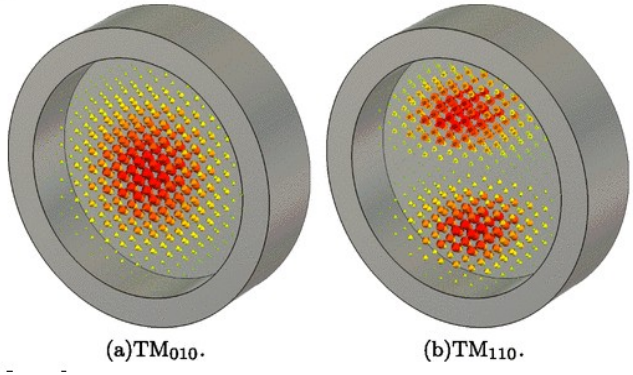


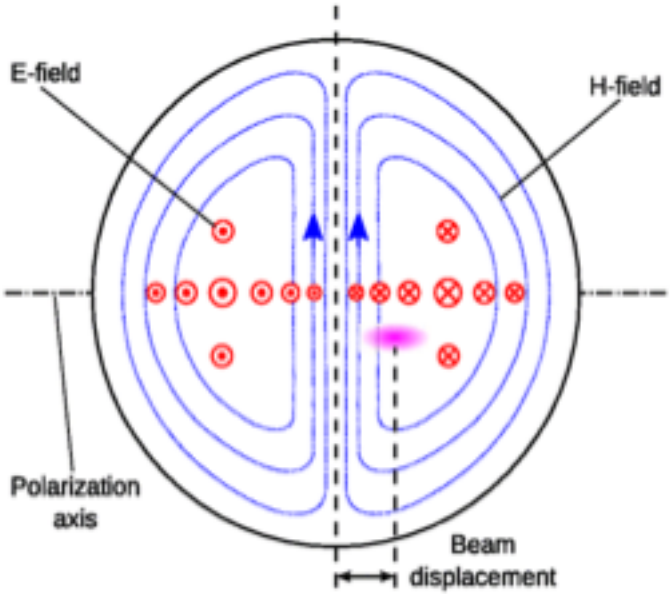
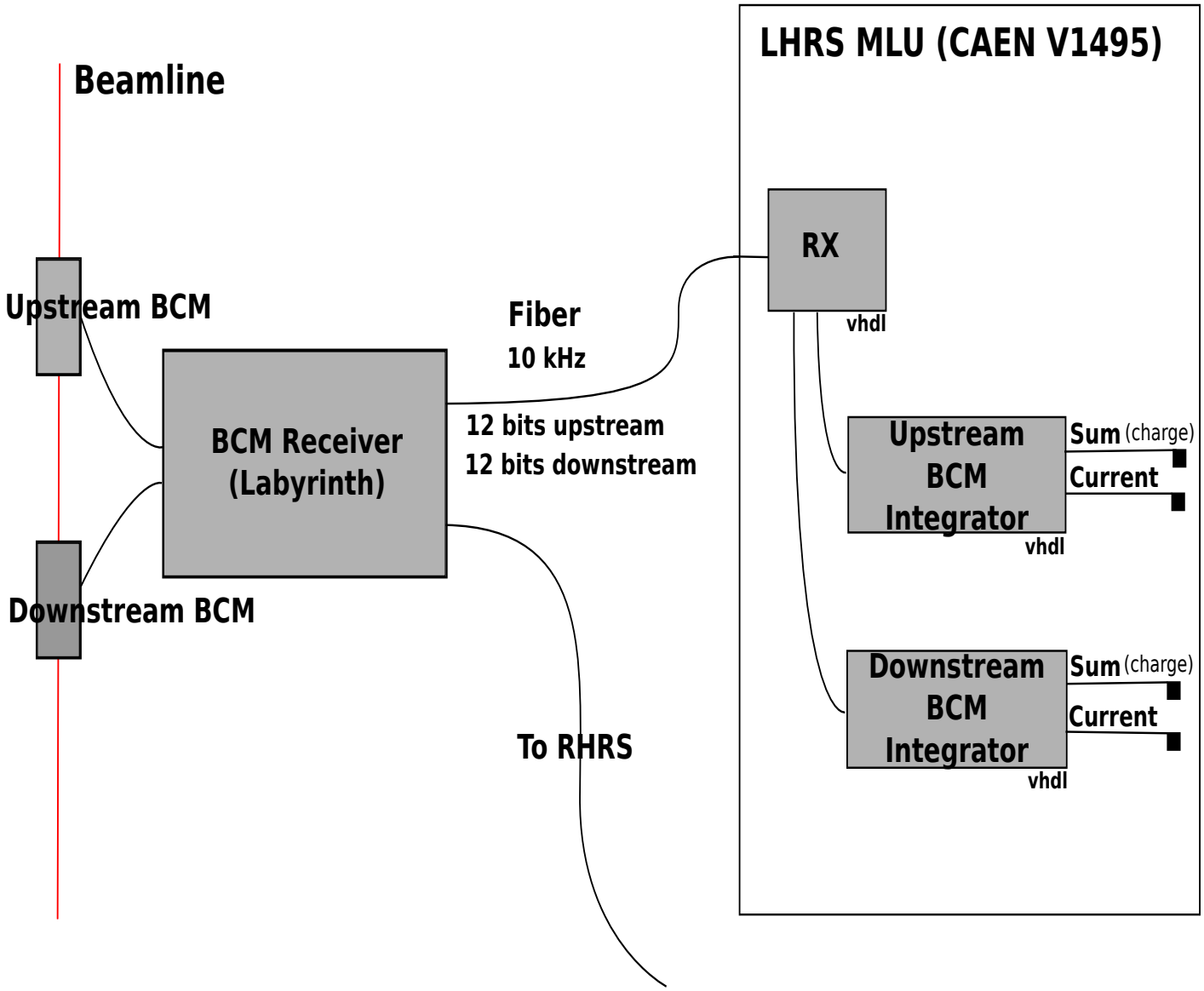
Figure 1. Functional block diagram of a basic superhet receiver, describing major subsystems.

Cavity Modes



- TM010 is the mode for I
- TM110 is the mode for X/I and Y/I





New Hall A BCM Digital Readout