

# Cavity BPMs Analog Output

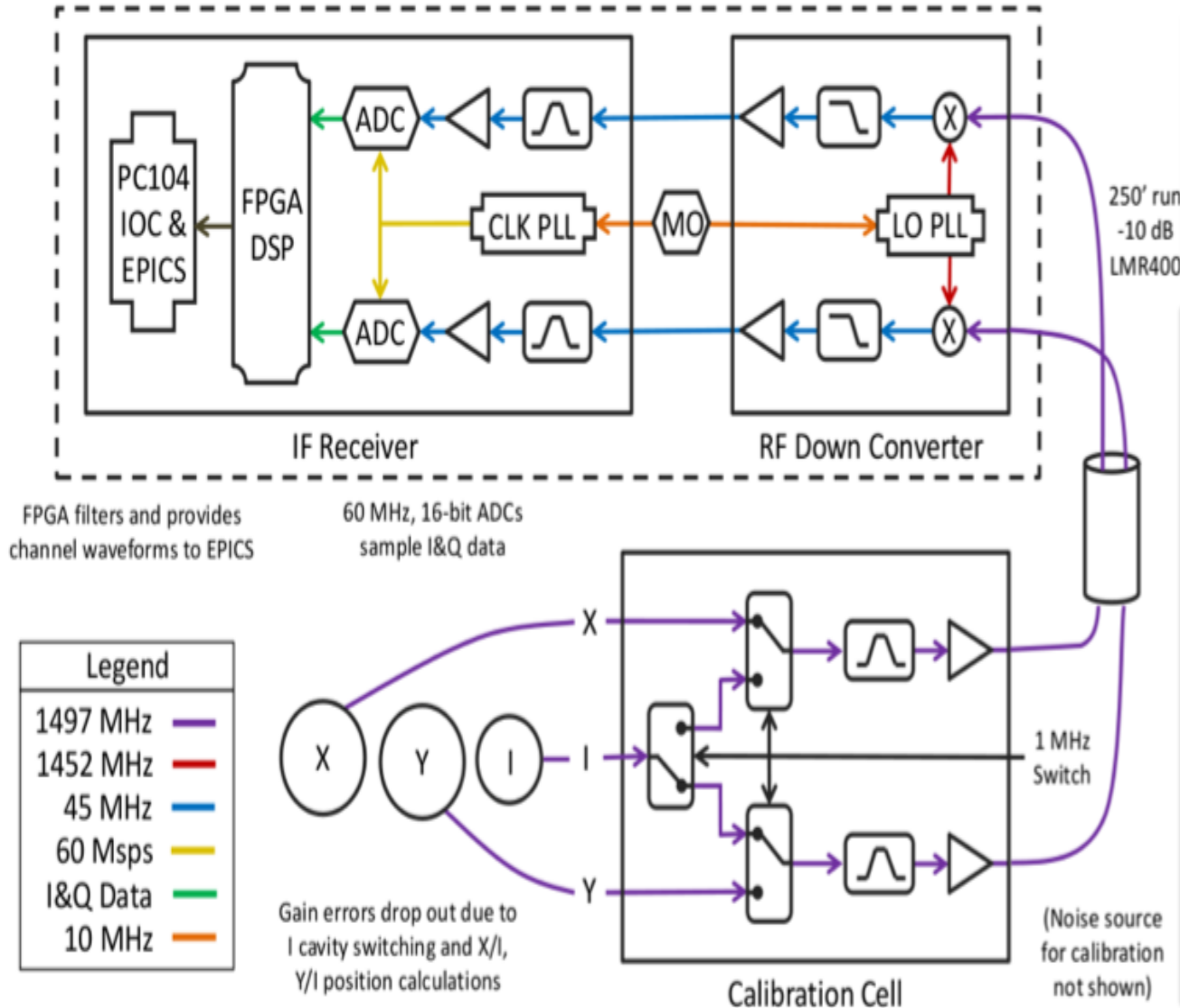
Ye Tian  
Syracuse University

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

# Cavity BPM Electronics

John Musson

BPM Receiver Chassis



## 1) EPICS Data:

IPM1H04B\*

IPM1H04C\*

IPM1H04D\*

## 2) DAC:

Parity DAQ, ADCs

Signal

✓ only noise for cavity signal

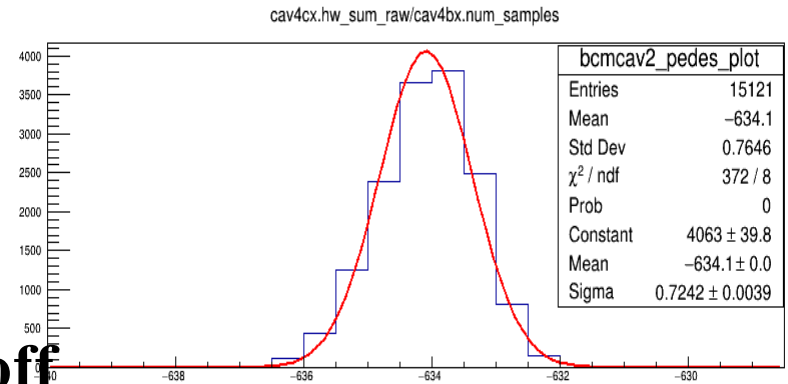
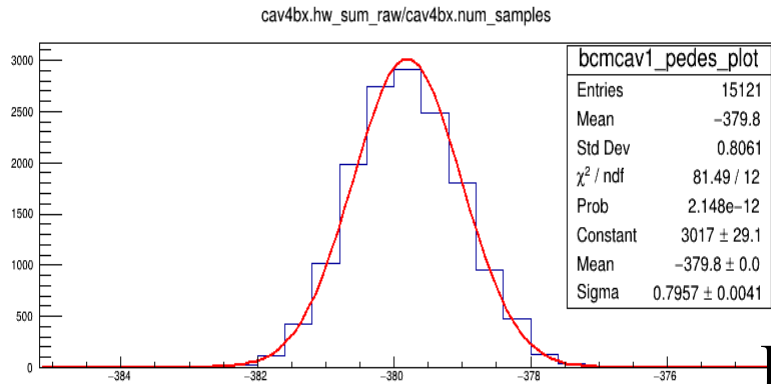
**Works !**

ADC

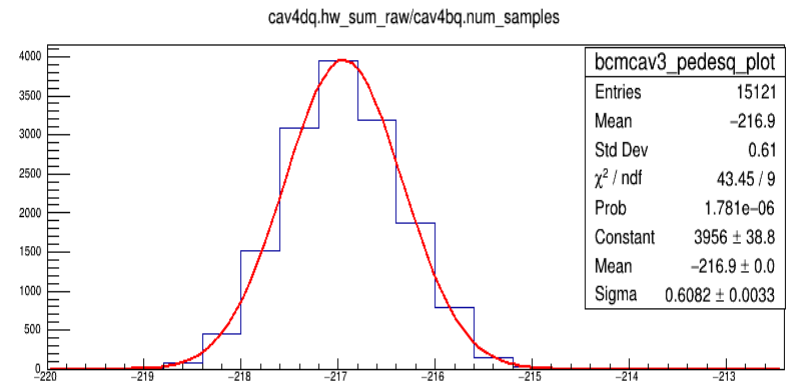
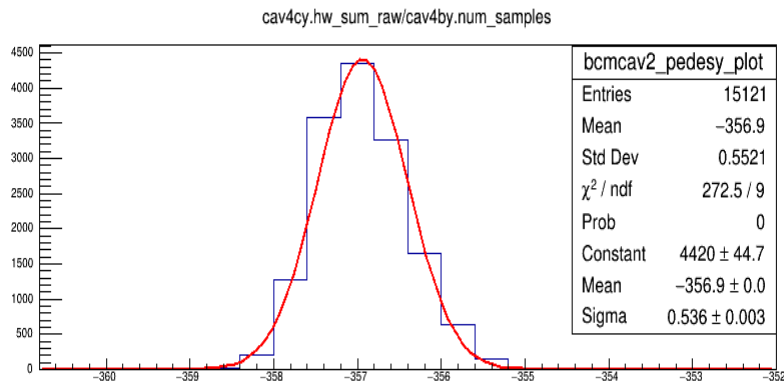
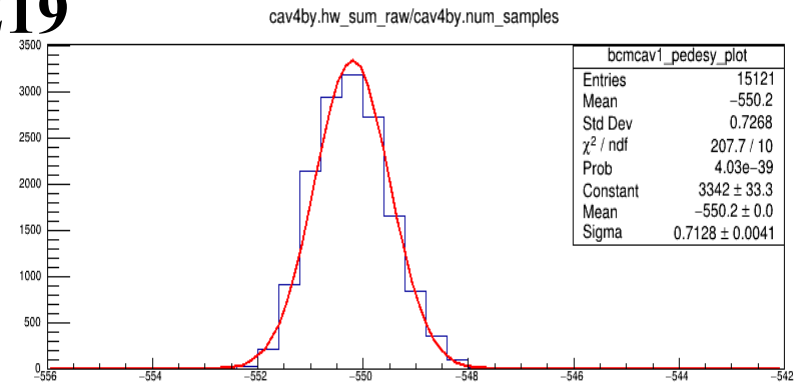
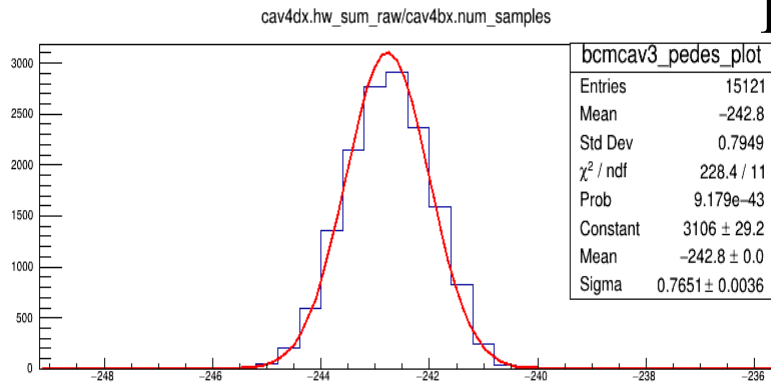
japan

Plots

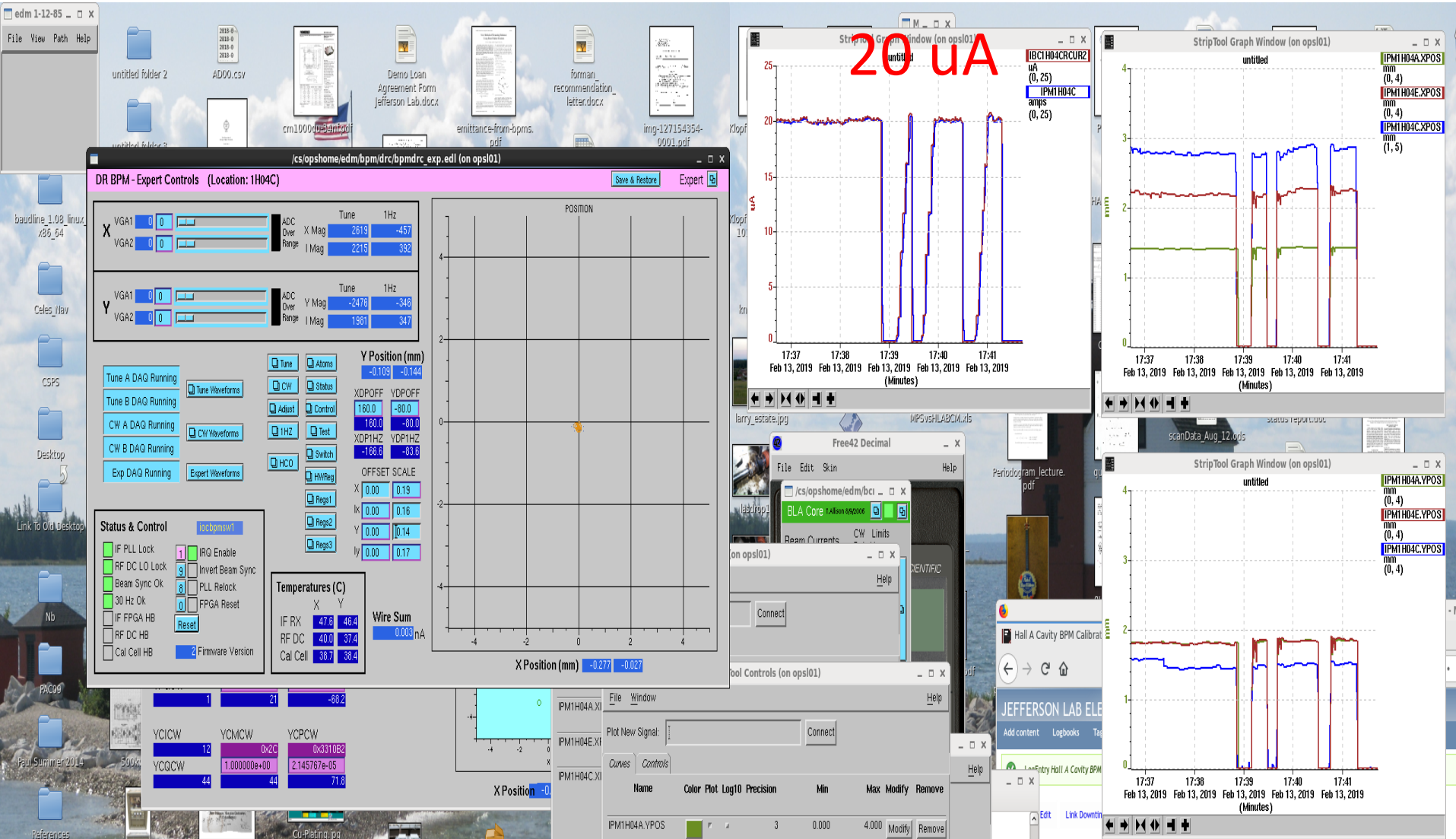
# Beam Off Pedestal Correction



**Beam off  
Run 1219**



# Cavity BPMs Parasitic Calibration

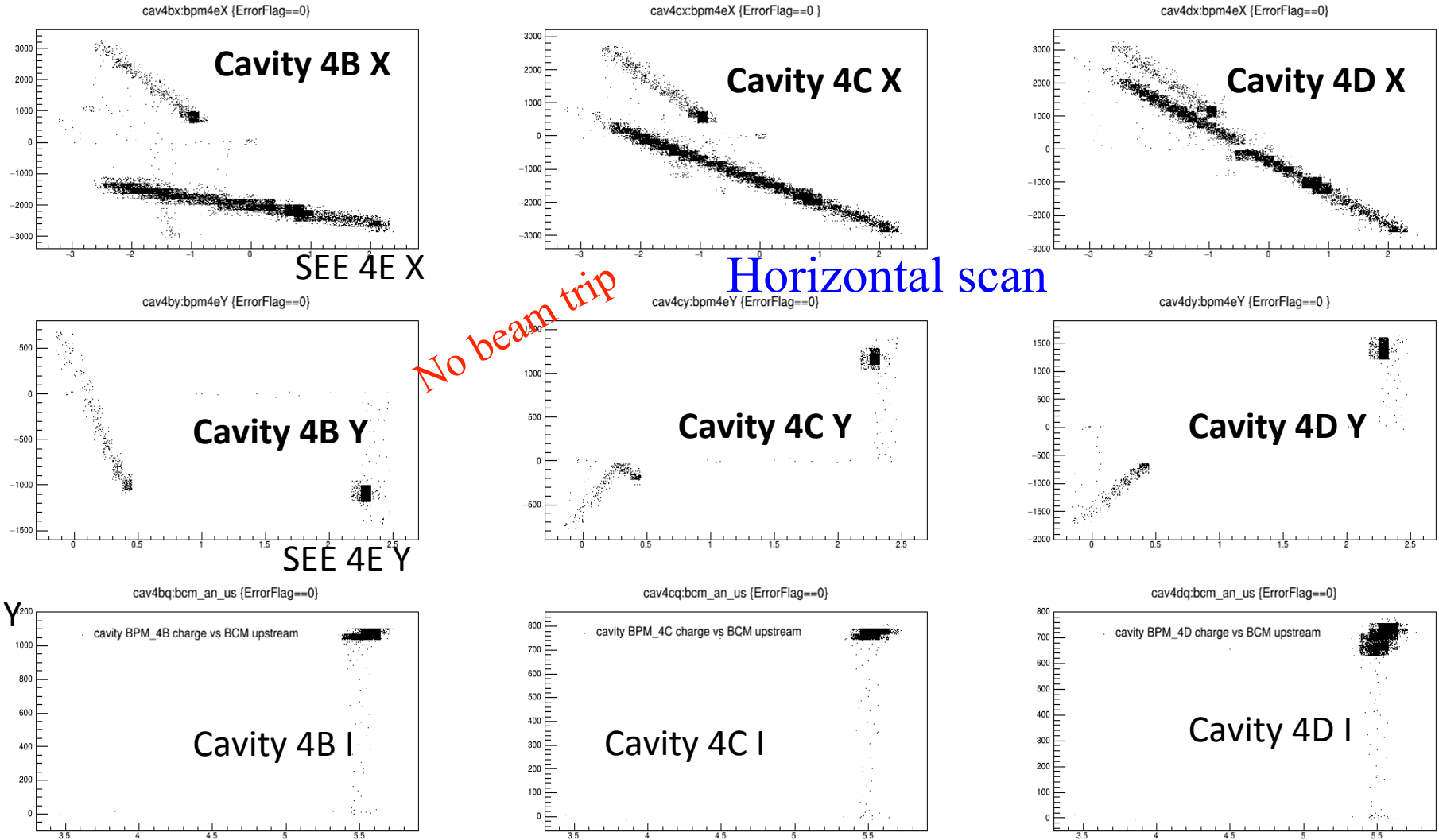


4B and 4C are done, after we satisfy the behavior, John will lock the parameter access.

# Beam Tuning and Steering Test Runs

prexALL\_1225.root

Raw signal without Calibration



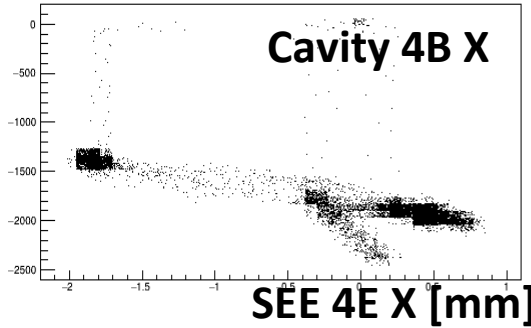
See the correlation between cavity and SEE BPMs

# Beam Tuning and Steering Test Runs

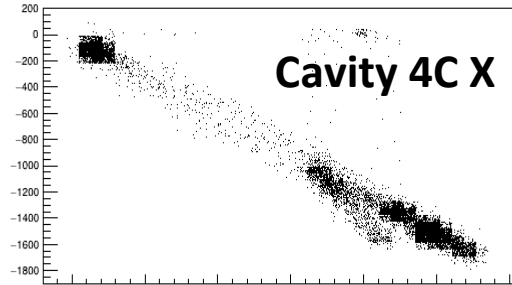
prexALL\_1228.root

Raw signal without Calibration

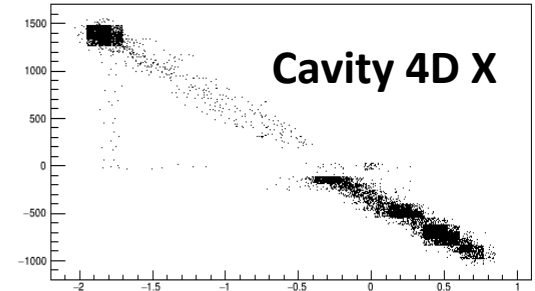
cav4bx:bpm4eX {ErrorFlag==0}



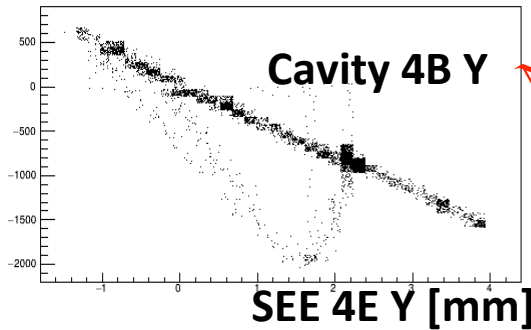
cav4cx:bpm4eX {ErrorFlag==0 }



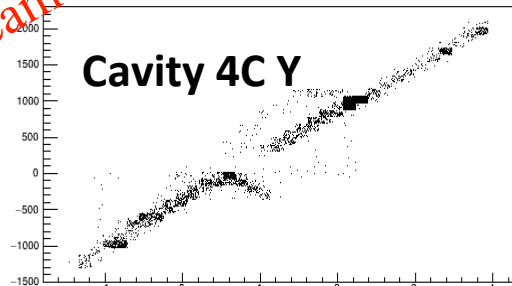
cav4dx:bpm4eX {ErrorFlag==0}



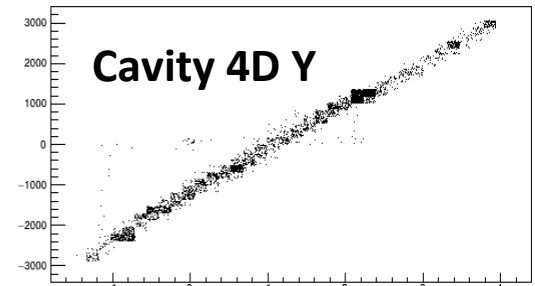
cav4by:bpm4eY {ErrorFlag==0}



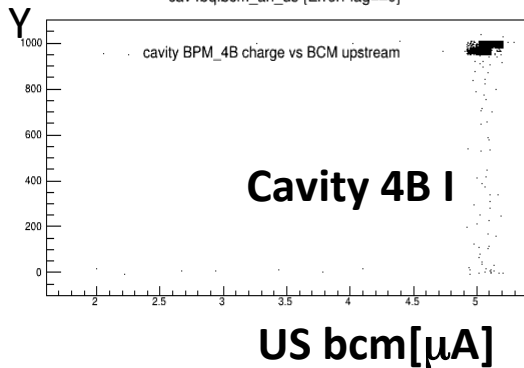
cav4cy:bpm4eY {ErrorFlag==0}



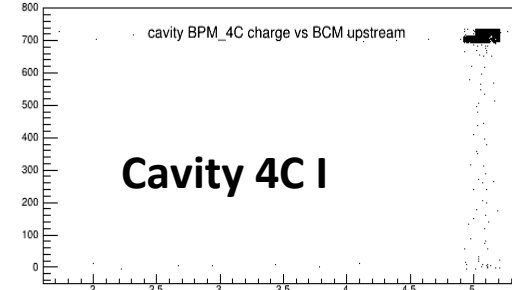
cav4dy:bpm4eY {ErrorFlag==0 }



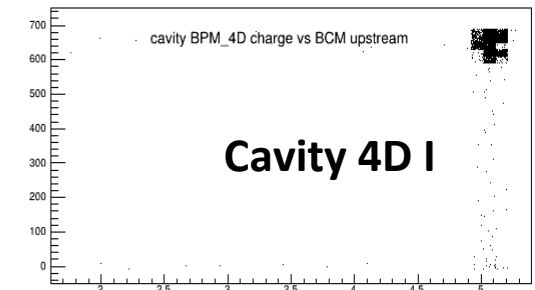
cav4bq:bcm\_an\_us {ErrorFlag==0}



cav4cq:bcm\_an\_us {ErrorFlag==0}



cav4dq:bcm\_an\_us {ErrorFlag==0}

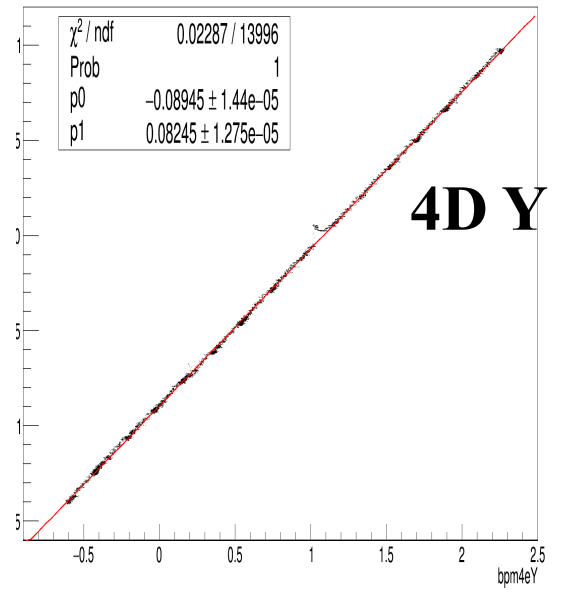
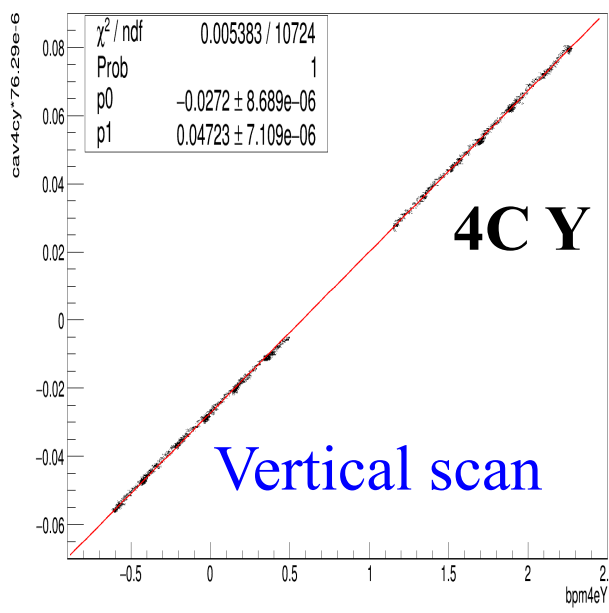
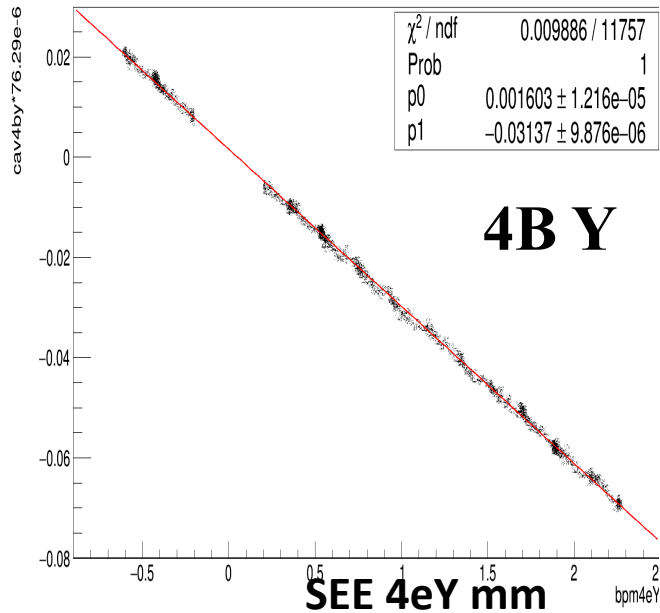
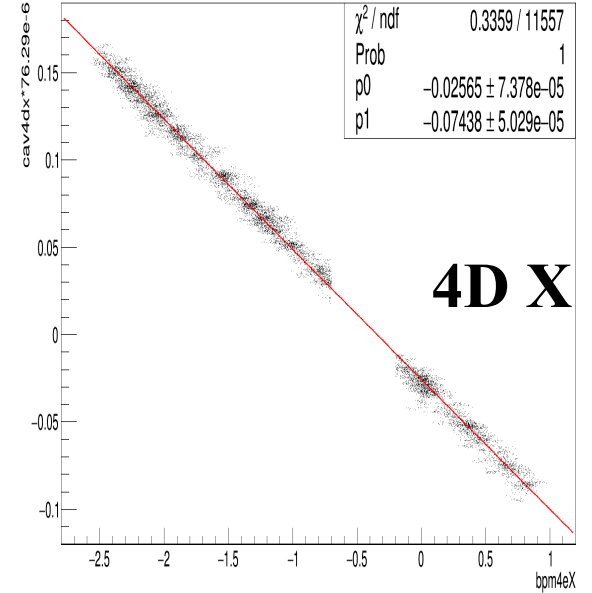
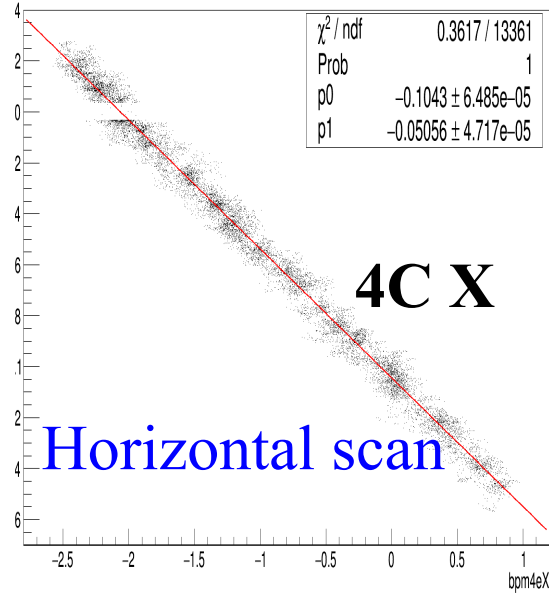
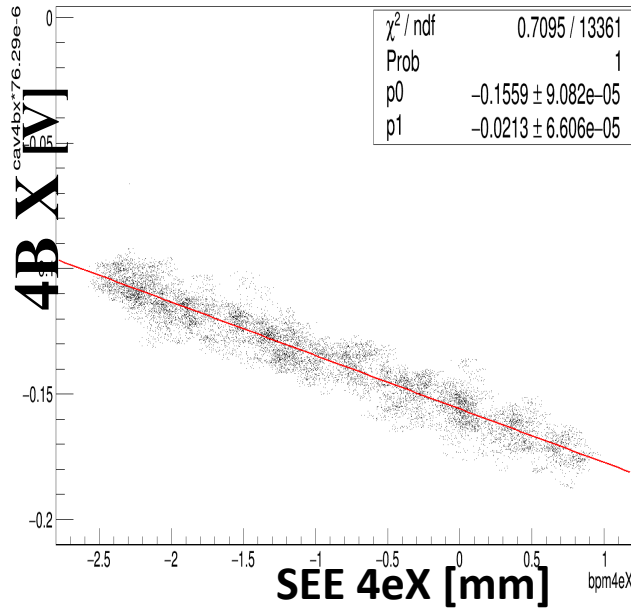


No beam trip

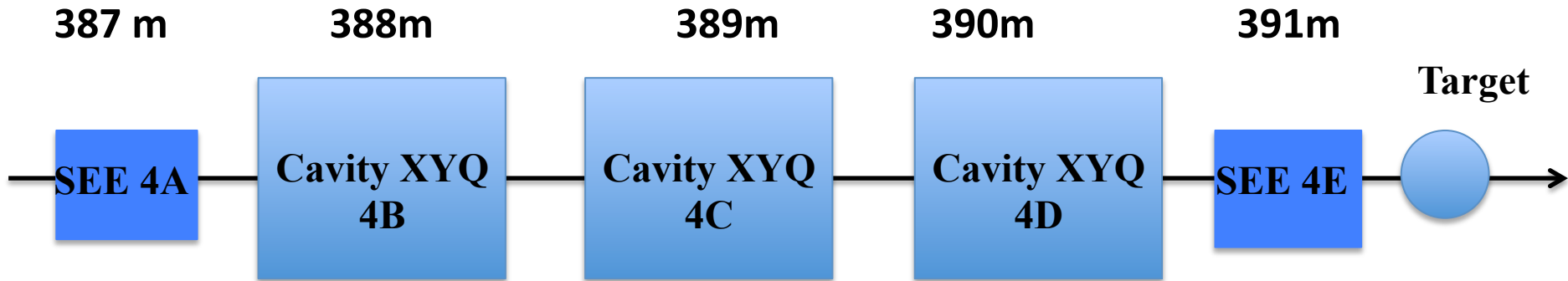
Vertical scan

See the correlation between cavity and SEE BPMs

# Calibration for Cavity BPMs Signals



# Cavity BPMs Position Calibration

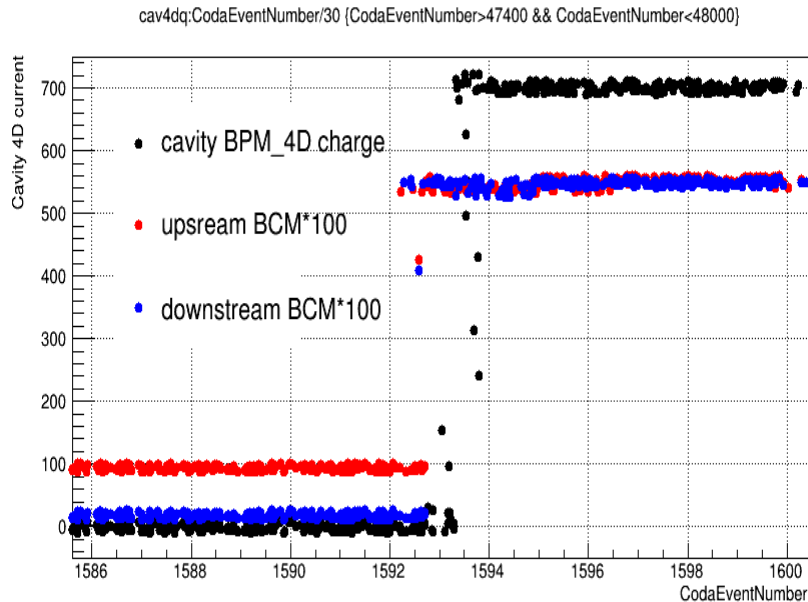
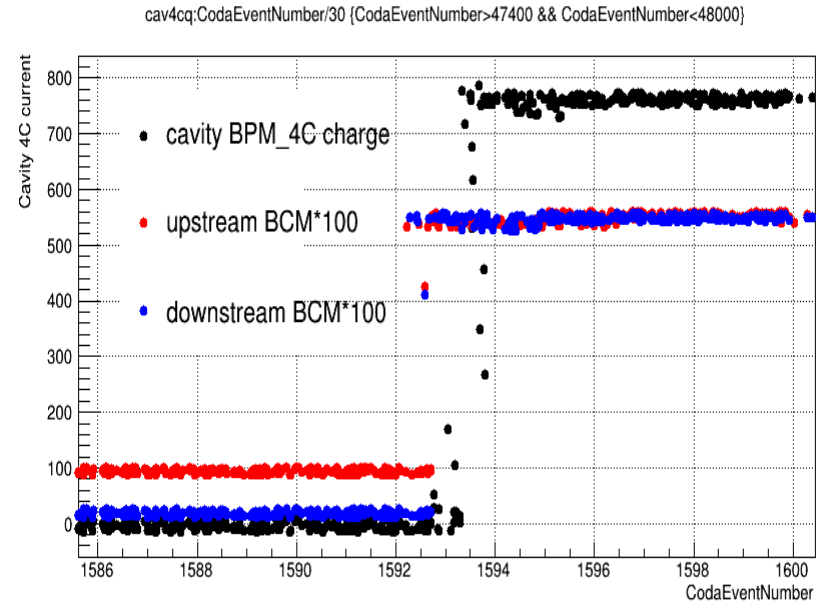
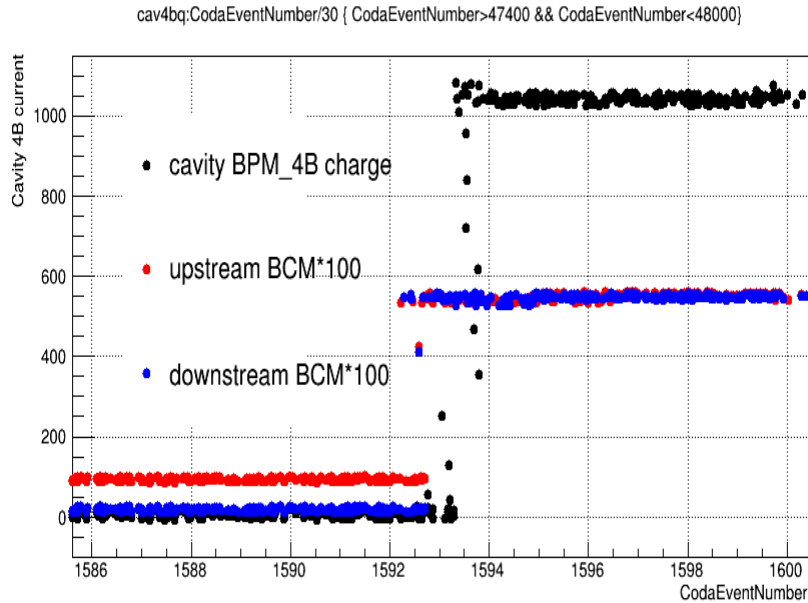


Position corrected

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  $\approx 1/\text{BW}$

Current receiver frame setting:  
 $\text{BW} = 1\text{Hz}$

$$T_{\text{settle}} = 10\mu\text{s} - 500\mu\text{s}$$

**BW = 100kHz?**

# Cavity BPMs Milestone

Low current  
beam centering  
is achieved

Analog Readout with 1Hz WB is working



**1 week is confirmed with John**

Analog Readout with WB → 1Hz  
→ 100kHz



Before Prex II ?

Digital Readout with fiber

Paul King will talk to Evan about this

# Discussion and Outlook

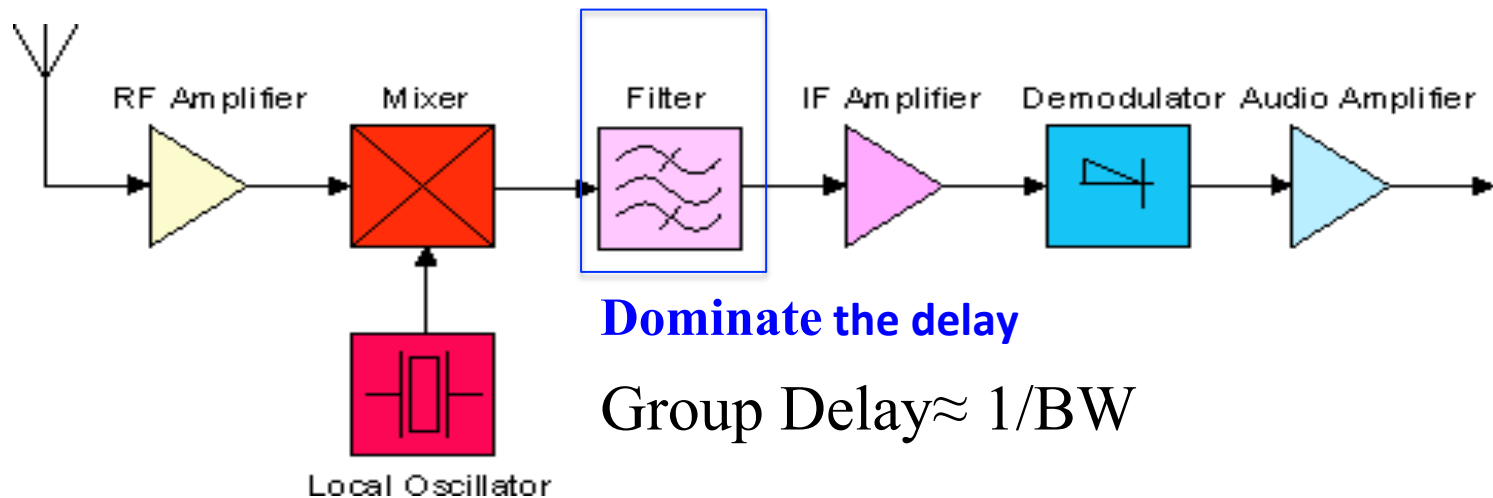
- Send the required BW and position calibration factors v/mm to John by this afternoon.  
-----applying the calibration factor to japan
- 1 Week Parasitic APEX beam time to test John's new cavity BPMs receiver frame.  
-----10kHz BW delay time and the switch ability.
- Complete low current cavity BPMs beam test?  
----- with the new receiver frame

# Thank you !

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

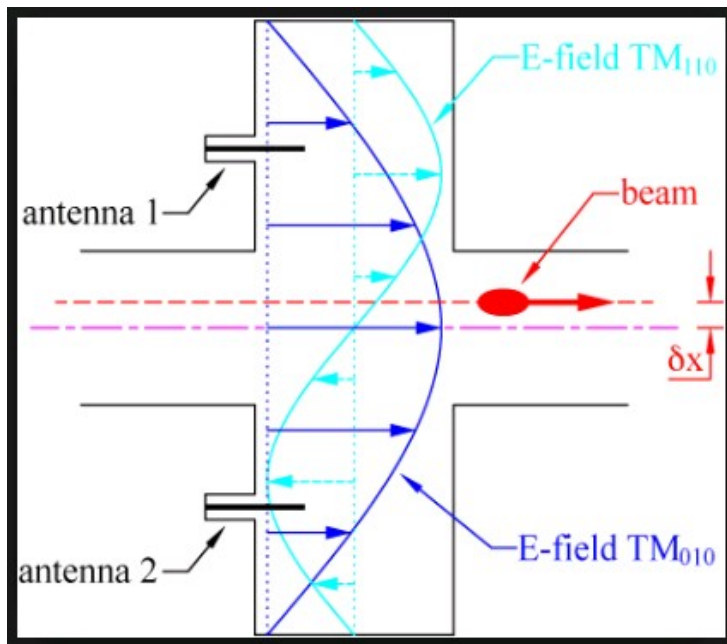
Back Up

# Typical Analog Superhet Receiver

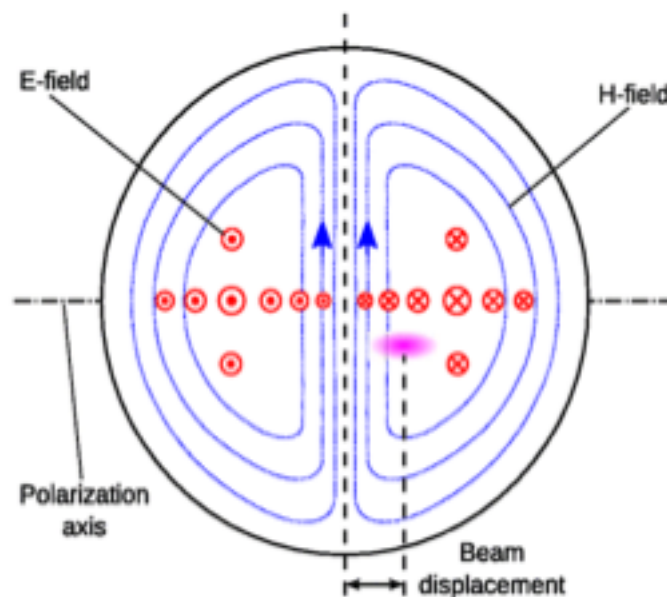
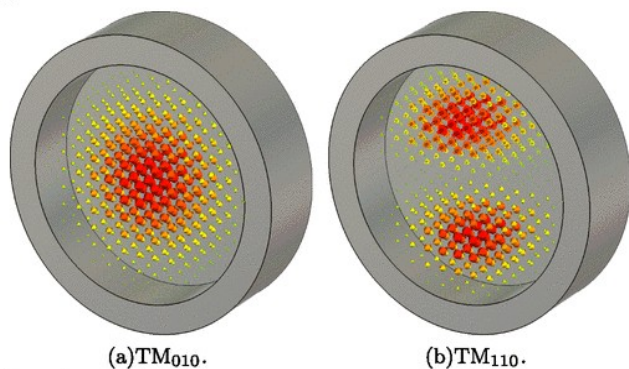


**Figure 1.** Functional block diagram of a basic superhet receiver, describing major subsystems.

# Cavity Modes



- $TM_{010}$  is the mode for I
- $TM_{110}$  is the mode for X/I and Y/I



# New Hall A BCM Digital Readout

