

Cavity Update

- A brief history.
- New Hardware Installed -- Nov 7, 2007
- Some signals exist
- Test Plans
 - ATLis (ACC division test plan)
 - HAPPEX parasitic checks -- to be done
 - January commissioning

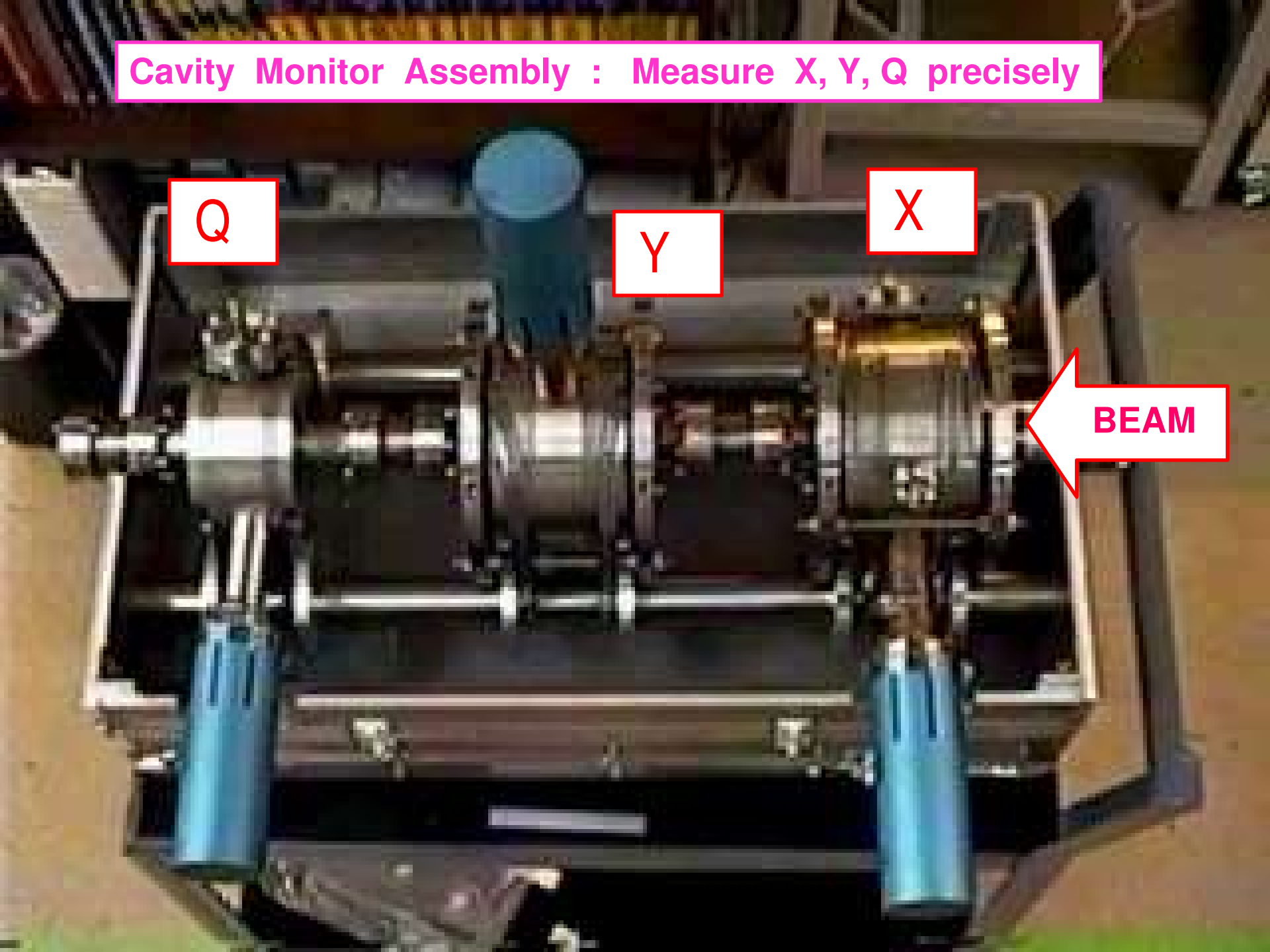
Cavity Monitor Assembly : Measure X, Y, Q precisely

Q

Y

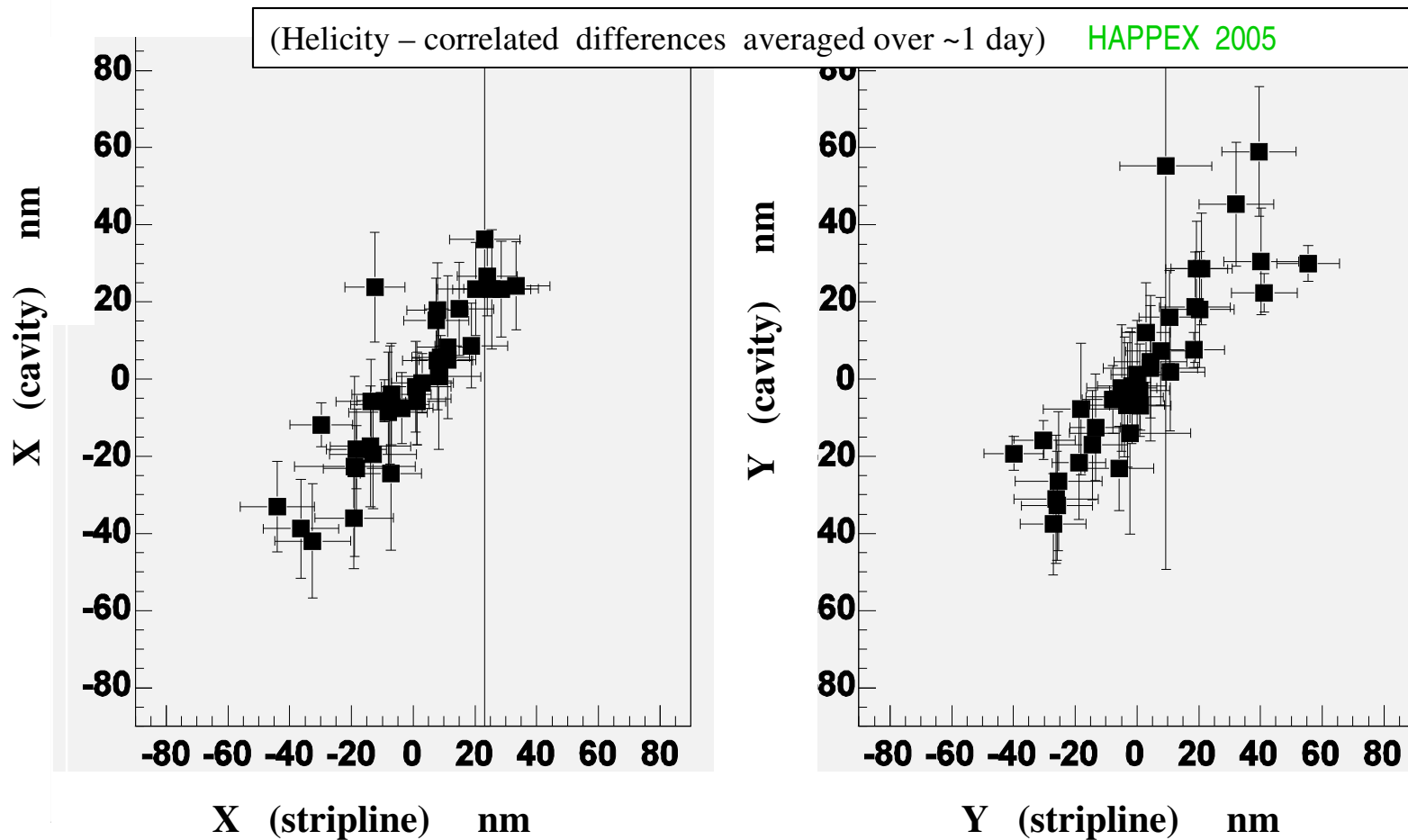
X

BEAM



Why do we need cavities ?

- (i) Position Sensitivity at 10 – 50 nA (needed for Q^2 runs, etc)
- (ii) Redundant Position Measurements at the ~1 nm level !!

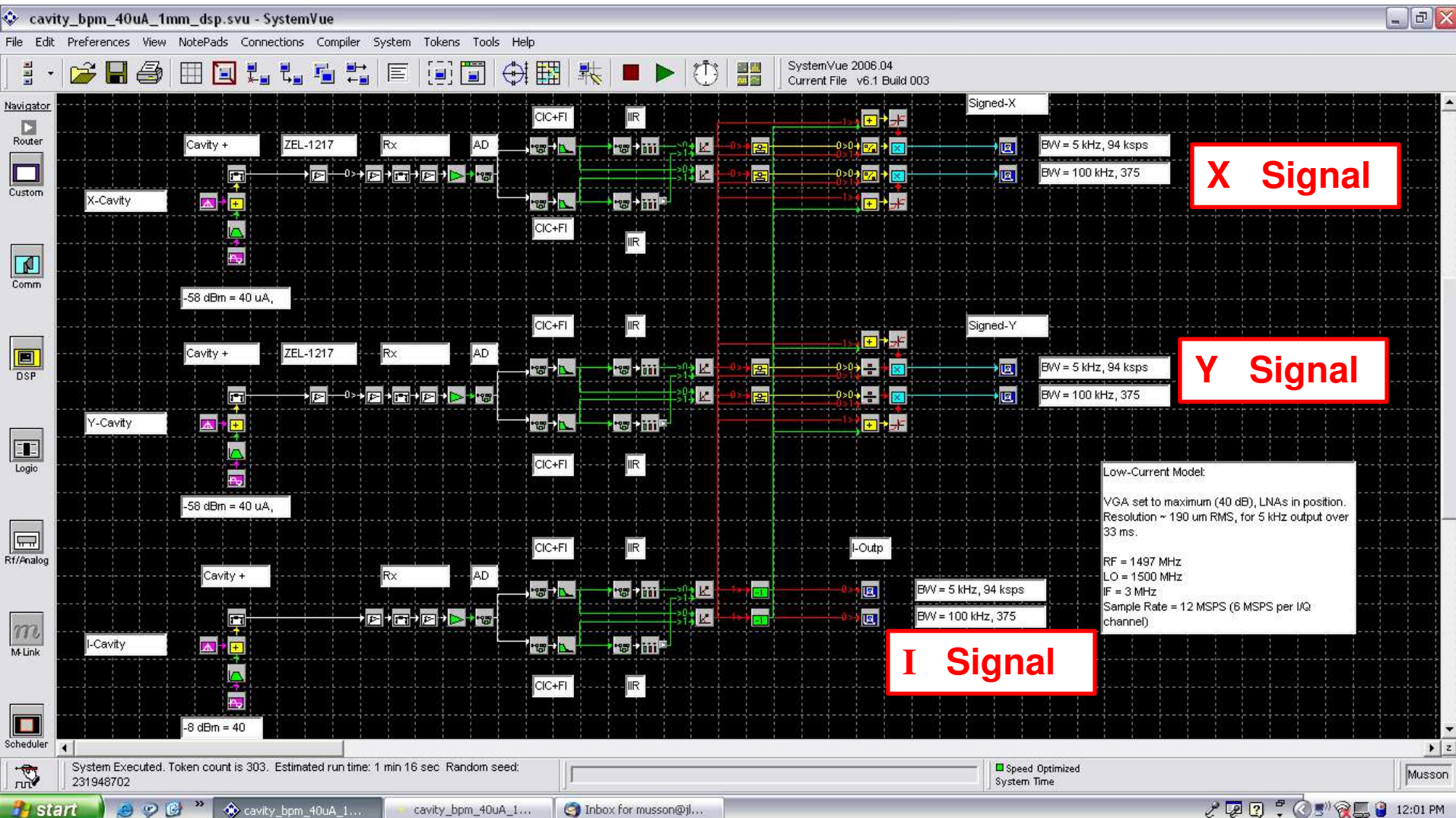


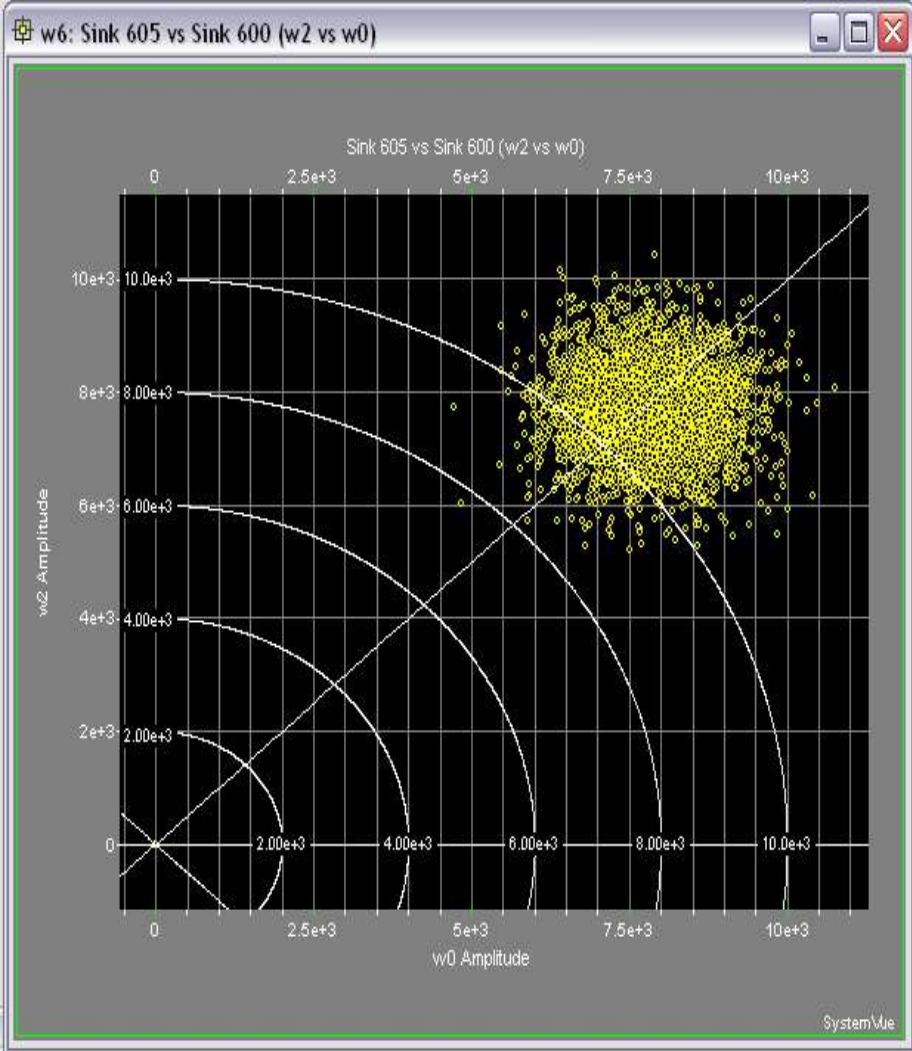
Recent Improvements

- 50 nA Sensitivity
 - Accomplished with new firmware
 - Tradeoff: 5 kHz bandpass = “SLOW”
(normally 100 kHz = “FAST”)
 - Both SLOW and FAST outputs available
- Several Hardware fixes -- version was used happily by G0.
- Installed in Hall A -- Nov 7, 2007
- Thanks to John Musson's group !!

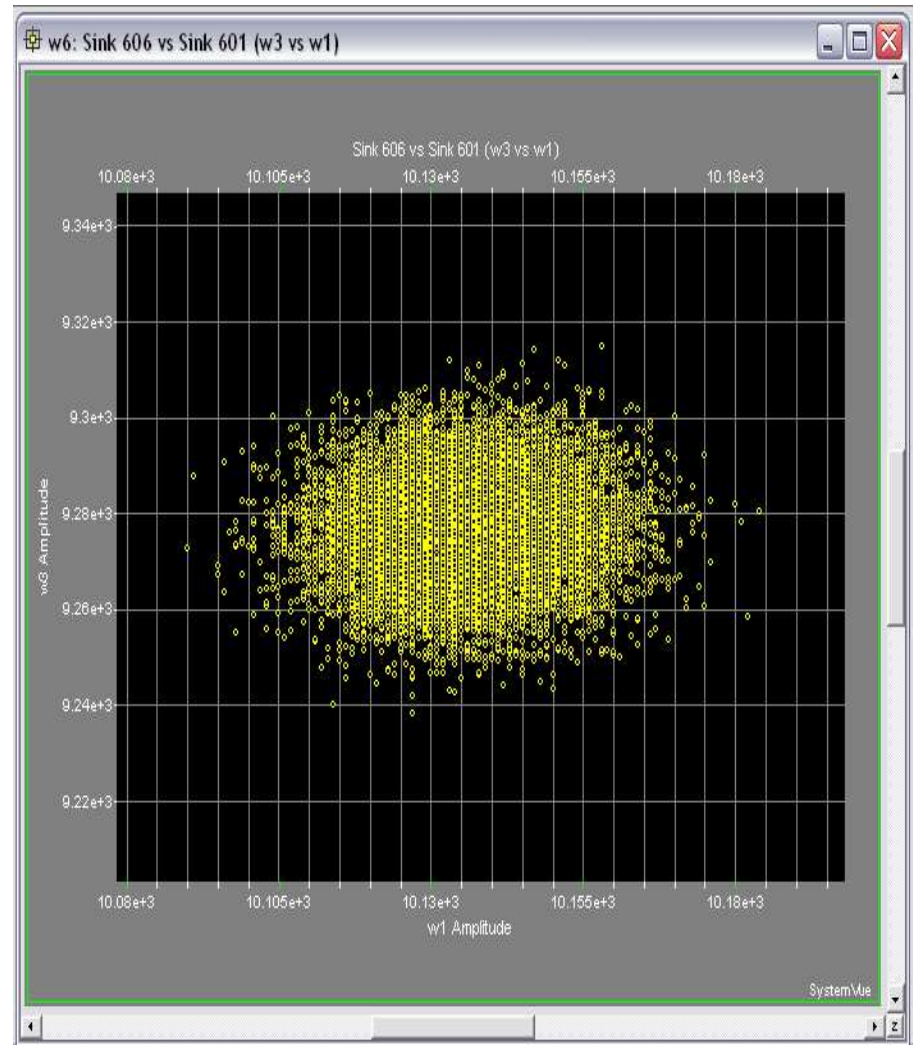
New, Improved Firmware

Signals are processed on-board, and an analog output produced for our ADCs





Simulations of firmware predict good resolution (~1 mm in << 1 sec) at 50 nA (maybe even ~10 nA)



C Pre Gain Ovr
 Mid

SLOW
 Magnitude
 Intensity
 Phase

FAST
 Magnitude
 Intensity
 Phase

X Pre Gain Ovr
 Mid
 Post Gain S
 Post Gain F
 Phs Shft Slow
 Phs Shft Fast

Magnitude
 Position
 Phase

Magnitude
 Position
 Phase

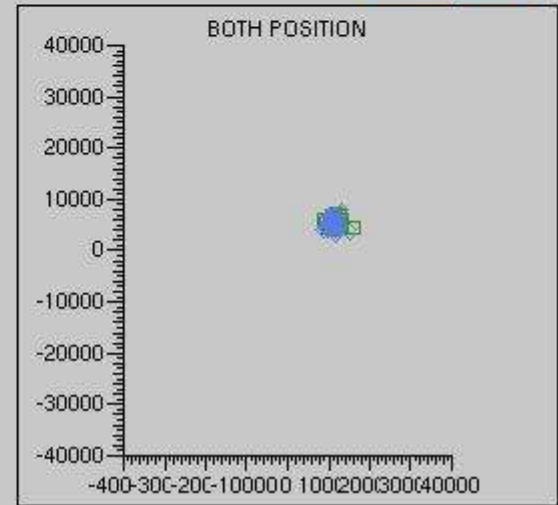
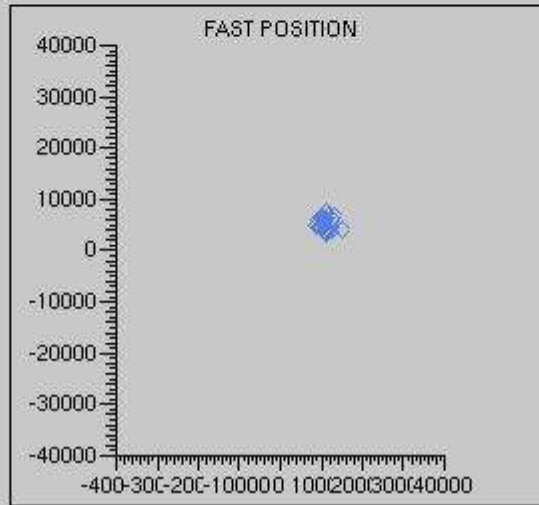
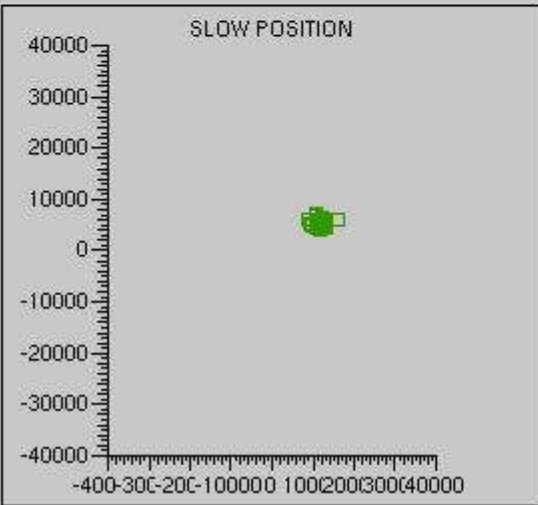
EPICS interface developed

Y Pre Gain Ovr
 Mid
 Post Gain S
 Post Gain F
 Phs Shft Slow
 Phs Shft Fast

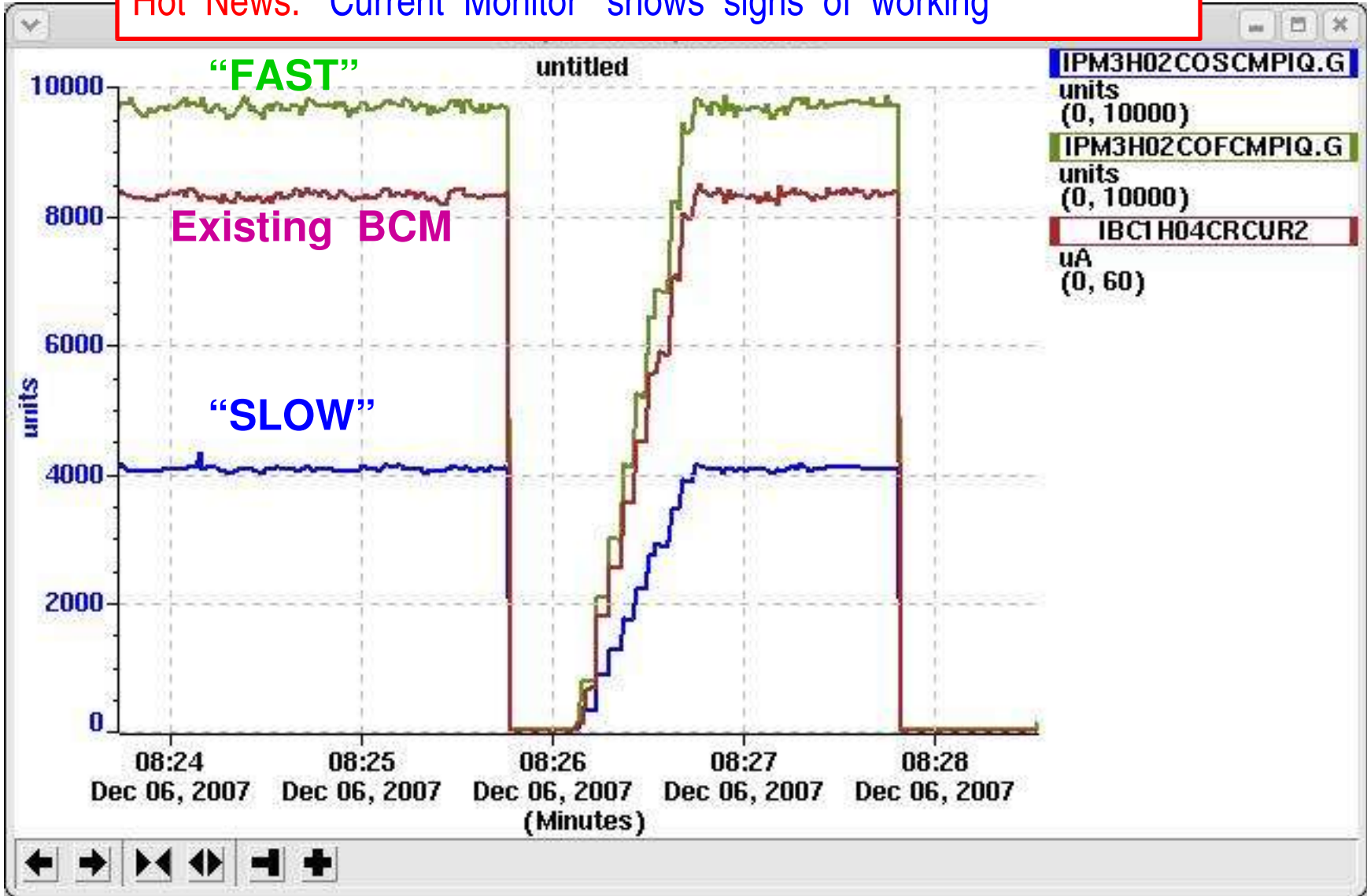
Magnitude
 Position
 Phase

Magnitude
 Position
 Phase

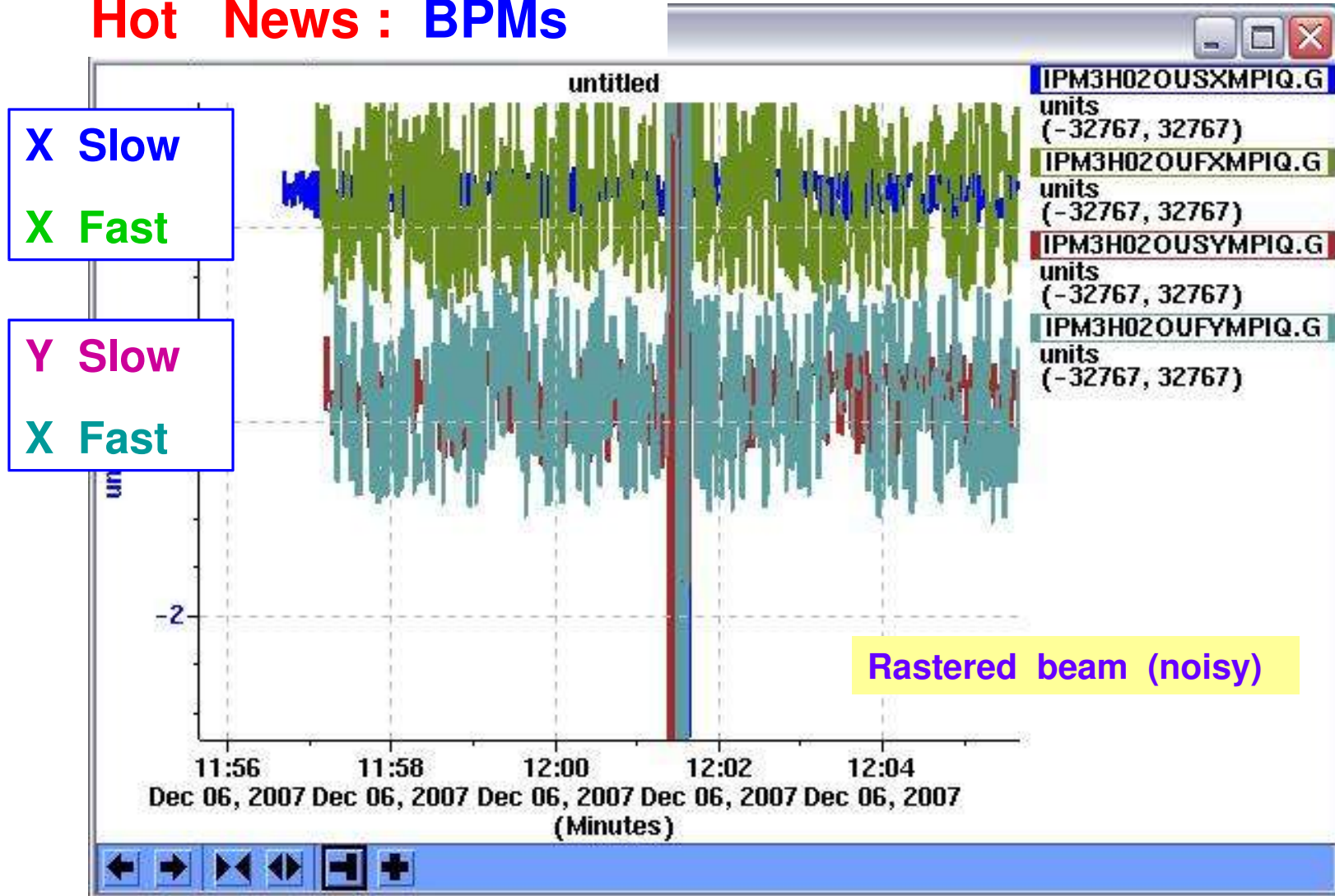
DAC SEL



Hot News: Current Monitor shows signs of working



Hot News : BPMs



Cavities are ready for ATLis (commissioning test plan)

Cavity Test Plans

- ATLis (beam studies in Dec)
 - EPICS DAQ
 - Beam scan X, Y at high & low I, raster off and on.
 - Fine - tune phase adjustment
- Check with HAPPEX DAQ (Dec / Jan)
- January beam with HAPPEX & HRS DAQ's
 - Beam scans X, Y at high & low I, raster off and on.
 - Calibrate steering coils $\rightarrow = \frac{x}{I_{coil}}$
 - Measure x at 50 – 1000 nA
 - Deduce Resolution and Absolute Accuracy
 - Need 2 chunks of 3 hours (6 hrs total)