

Tevatron BPM Upgrade

Stephen Wolbers

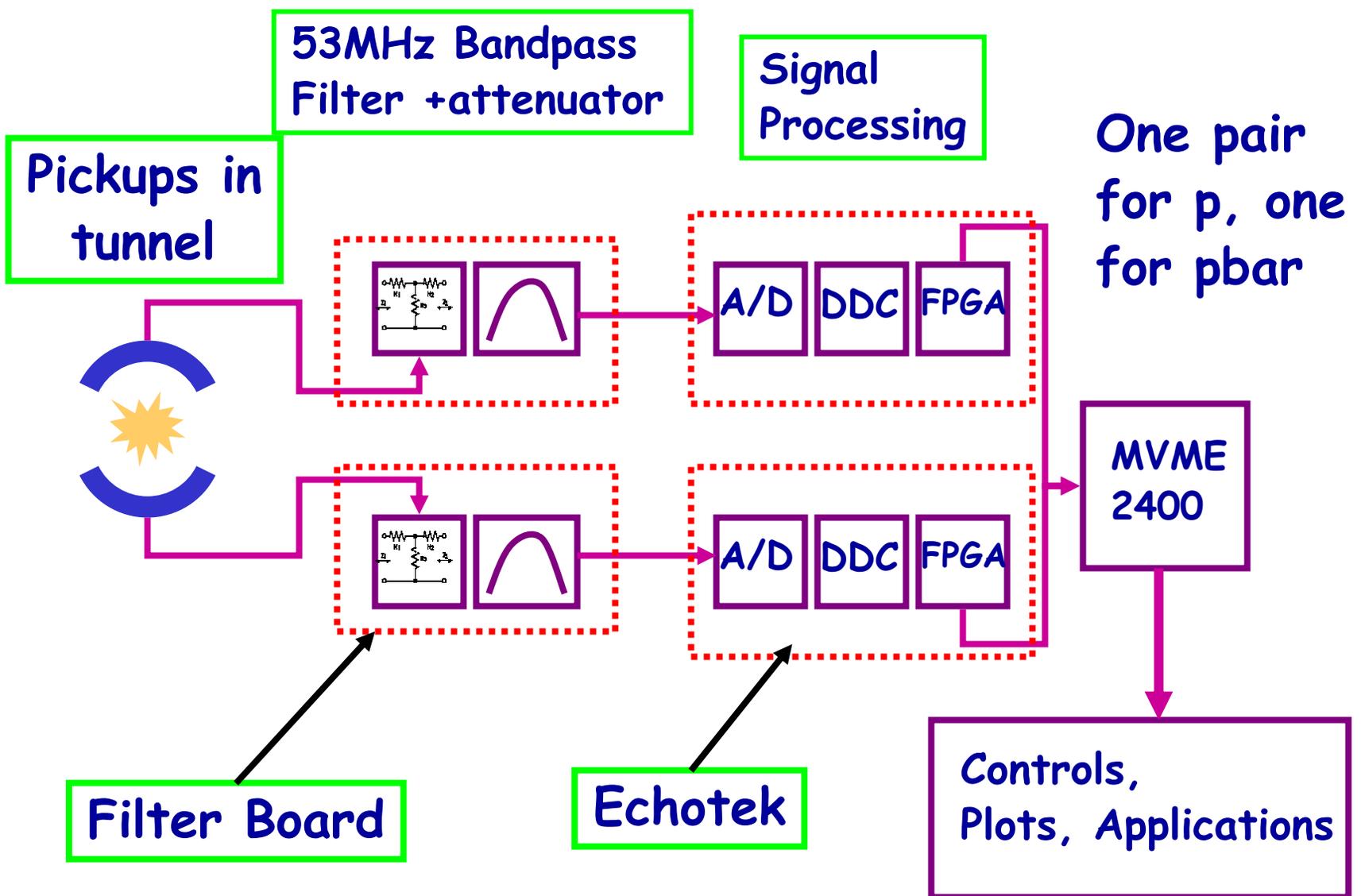
CD Accelerator Activities Coordination
Meeting

January 25, 2005

Outline

- **Current Status**
- **Plan for final installation and commissioning.**

Block Diagram - vertical BPM

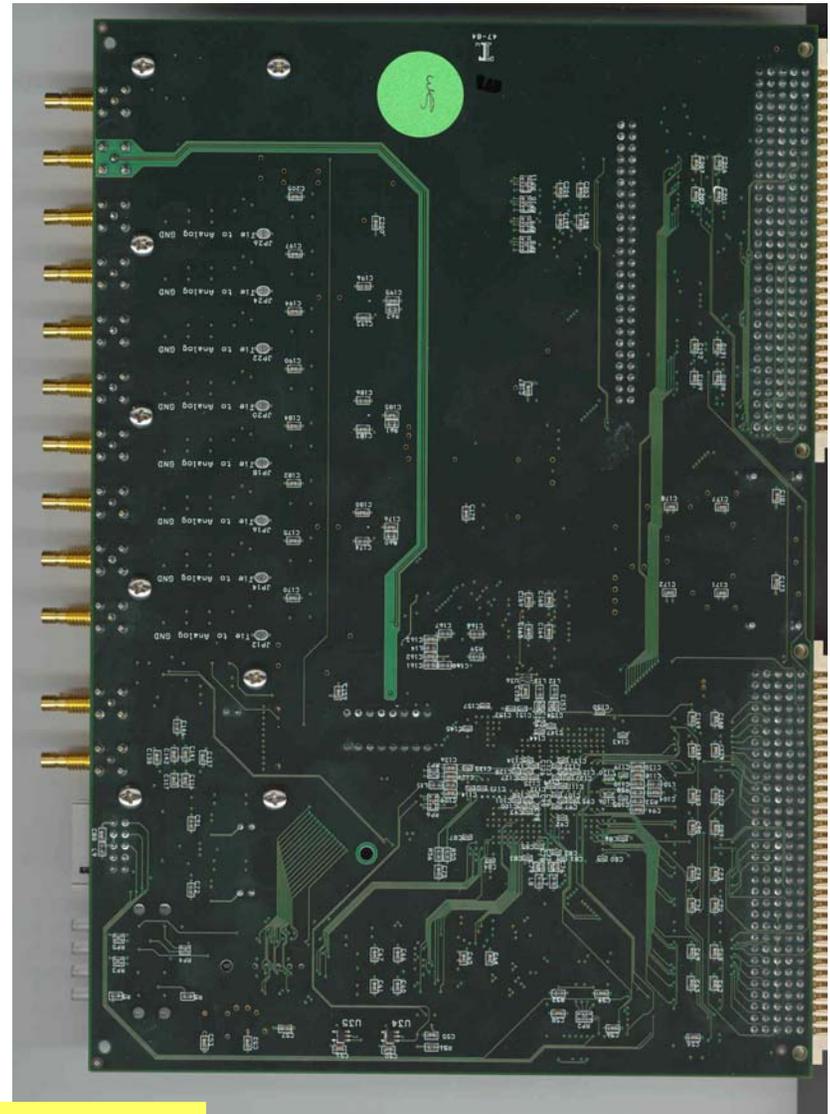
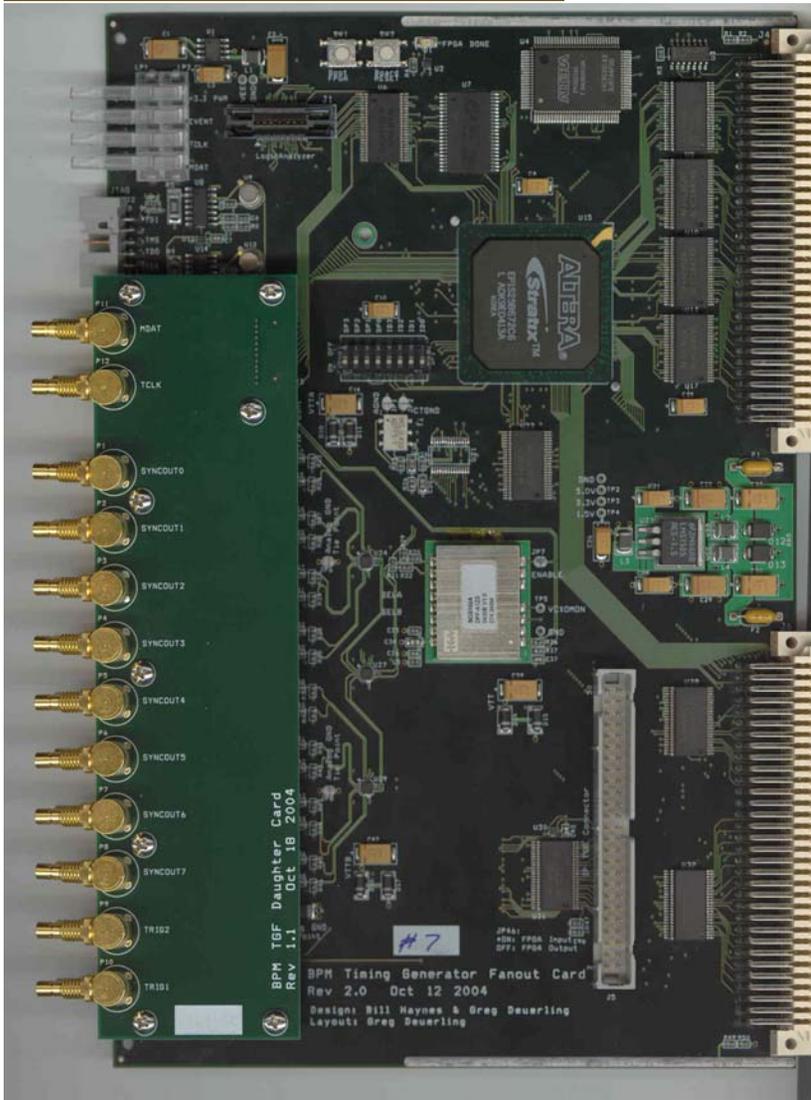


Tev BPM Current Status

- Essentially all hardware is hand, including spares:
 - 150 Echotek digital receiver boards (testing continues).
 - 150 Front-end filter boards (>50 pass).
 - 38 Timing boards (in testing).
 - 31 Crate controllers (MVME 2400)
 - Crates, cables, panels.
 - Optilogic crate monitoring/control - cables are on order.
- All cabling from tunnel to service buildings (27) is in place.
- Space has been identified in all of the service buildings for electronics installation.
 - In a few cases the old system will have to be removed to make room for the new one.
 - The BLM electronics/readout system will remain in place.

Front panels still
"on the way"

Timing Board



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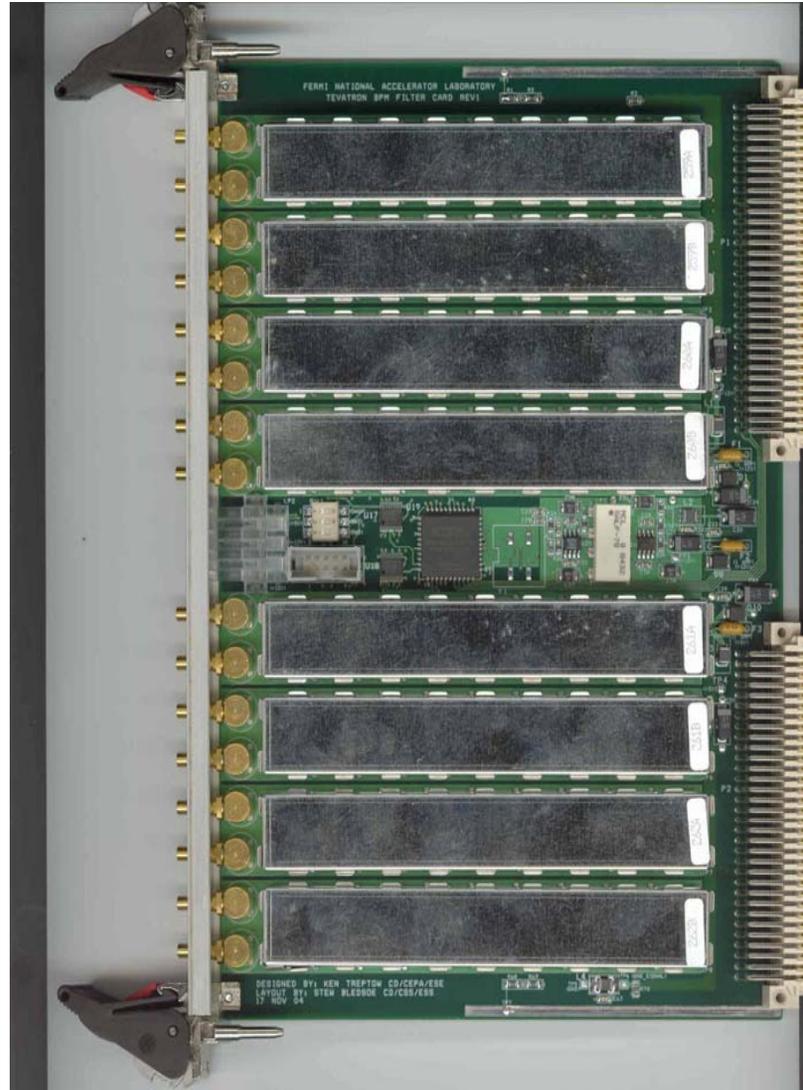
Production Board

CD Accelerator Activities

Filter Board

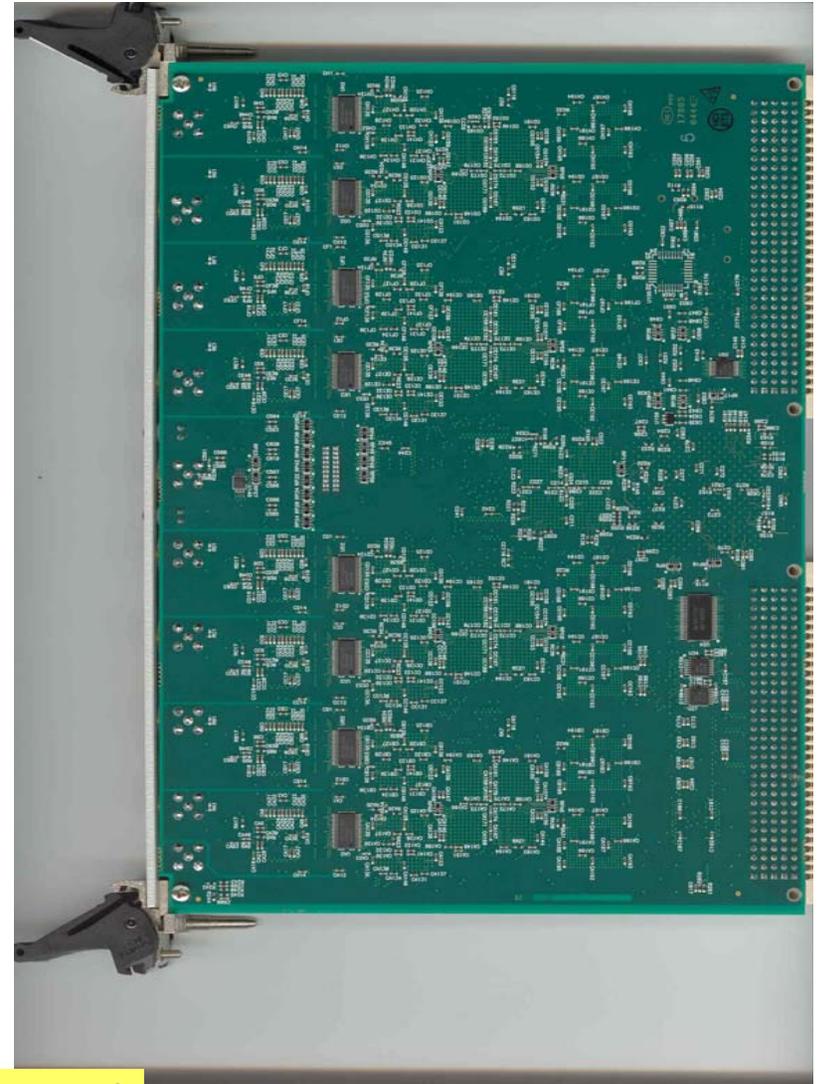
- 8 channels
- 53 MHz band-pass filter
- Attenuation Circuit
- Relays/53 MHz diagnostic signal
- Shielding
- A few "bad boards"

Production Board



Still an issue of
Input impedance of SYNC
input

Echotek Board



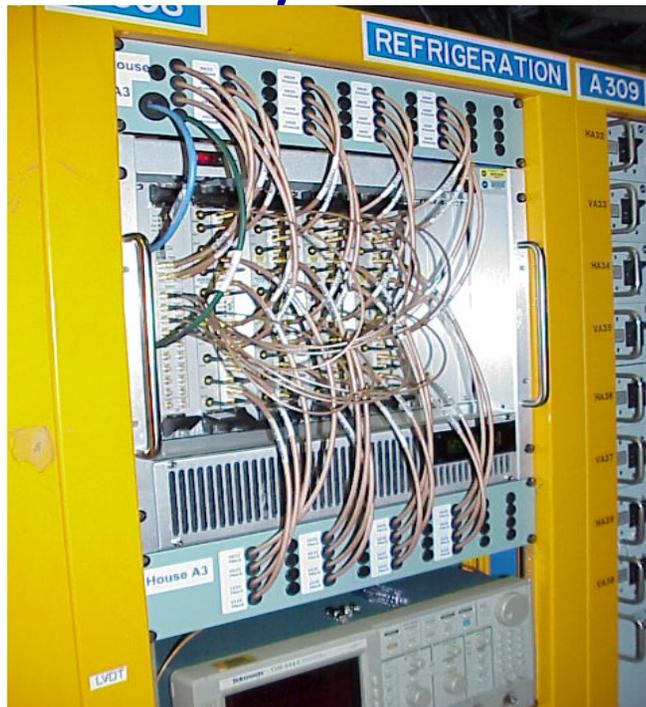
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Production Board

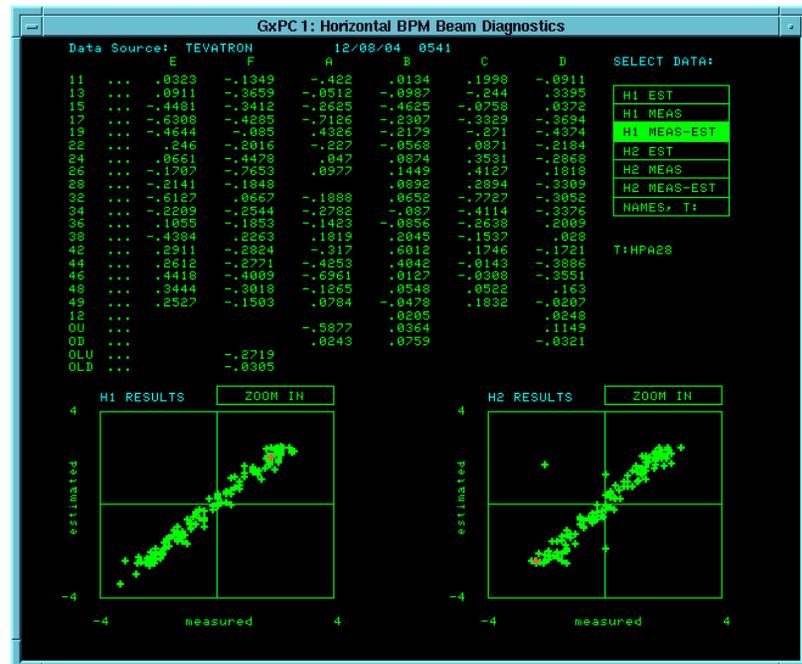
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Current Status

- A3 system was constructed in FCC3 and installed in A3 on November 23.
- Currently commissioning closed orbit, TBT, first turn and pbar measurements. Many things have been checked, including scale, polarity, resolutions, pbar measurements, system reliability and stability.



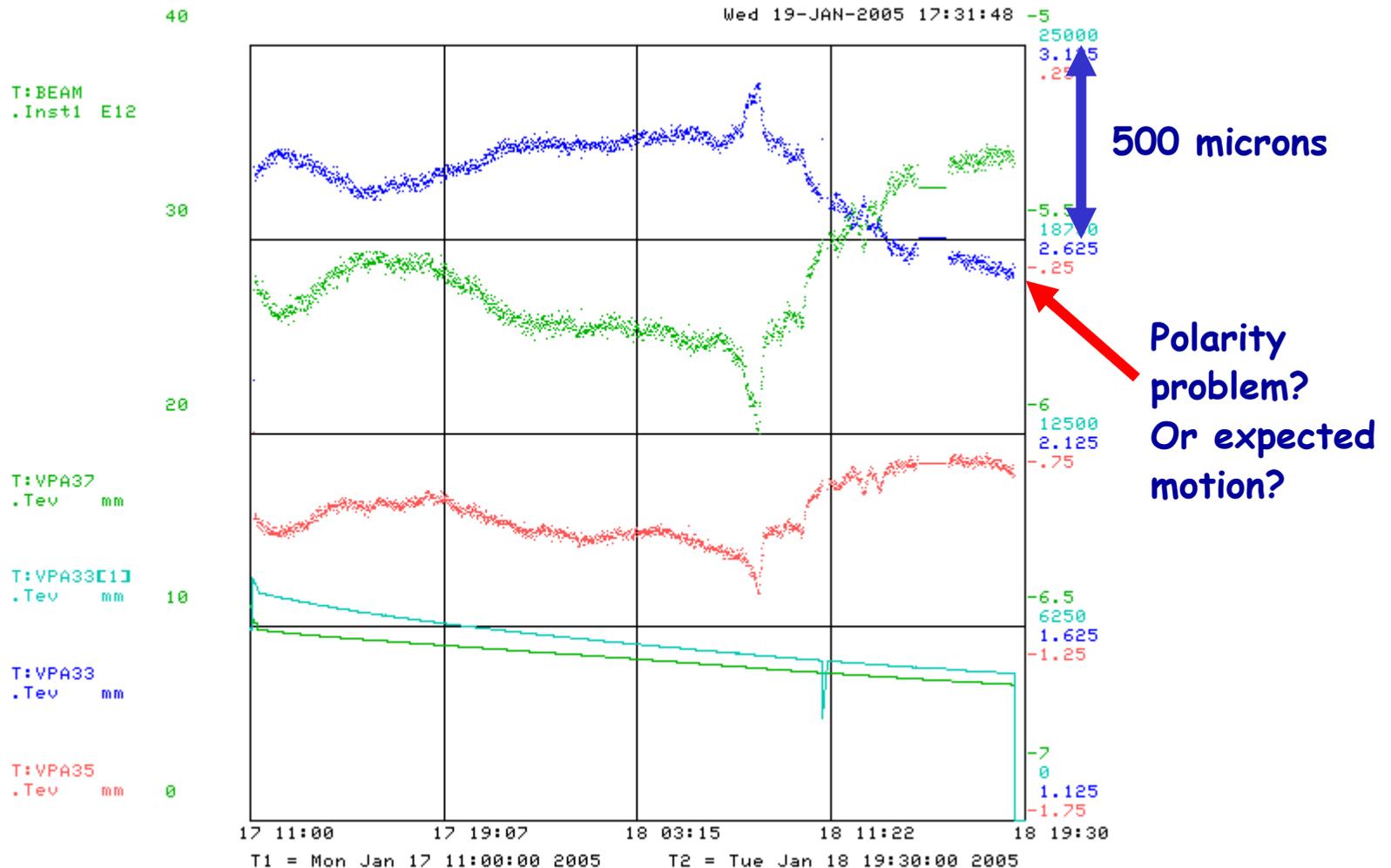
Scale Check



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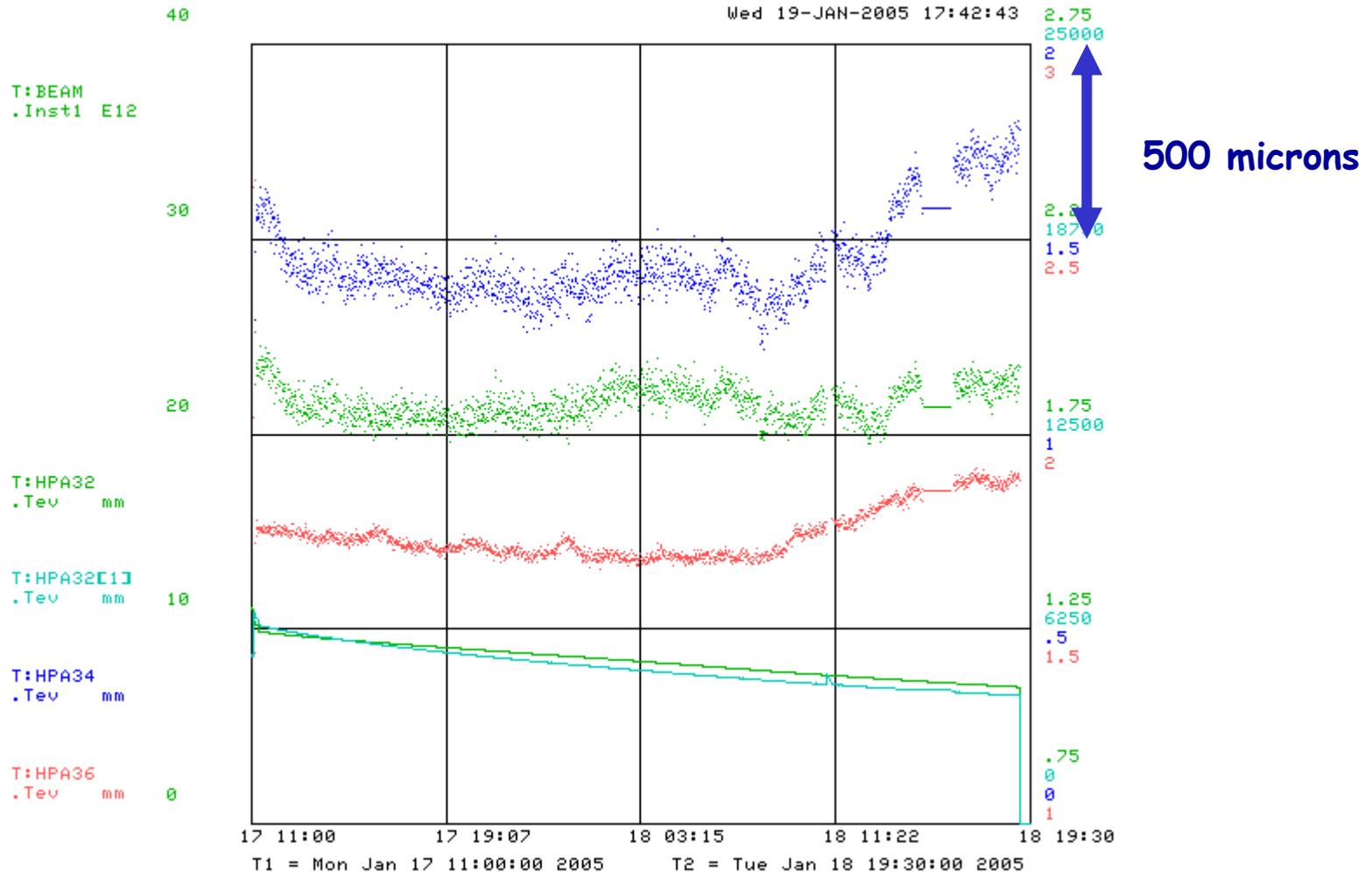
Recent Store (Monday 1/17/05) Vertical



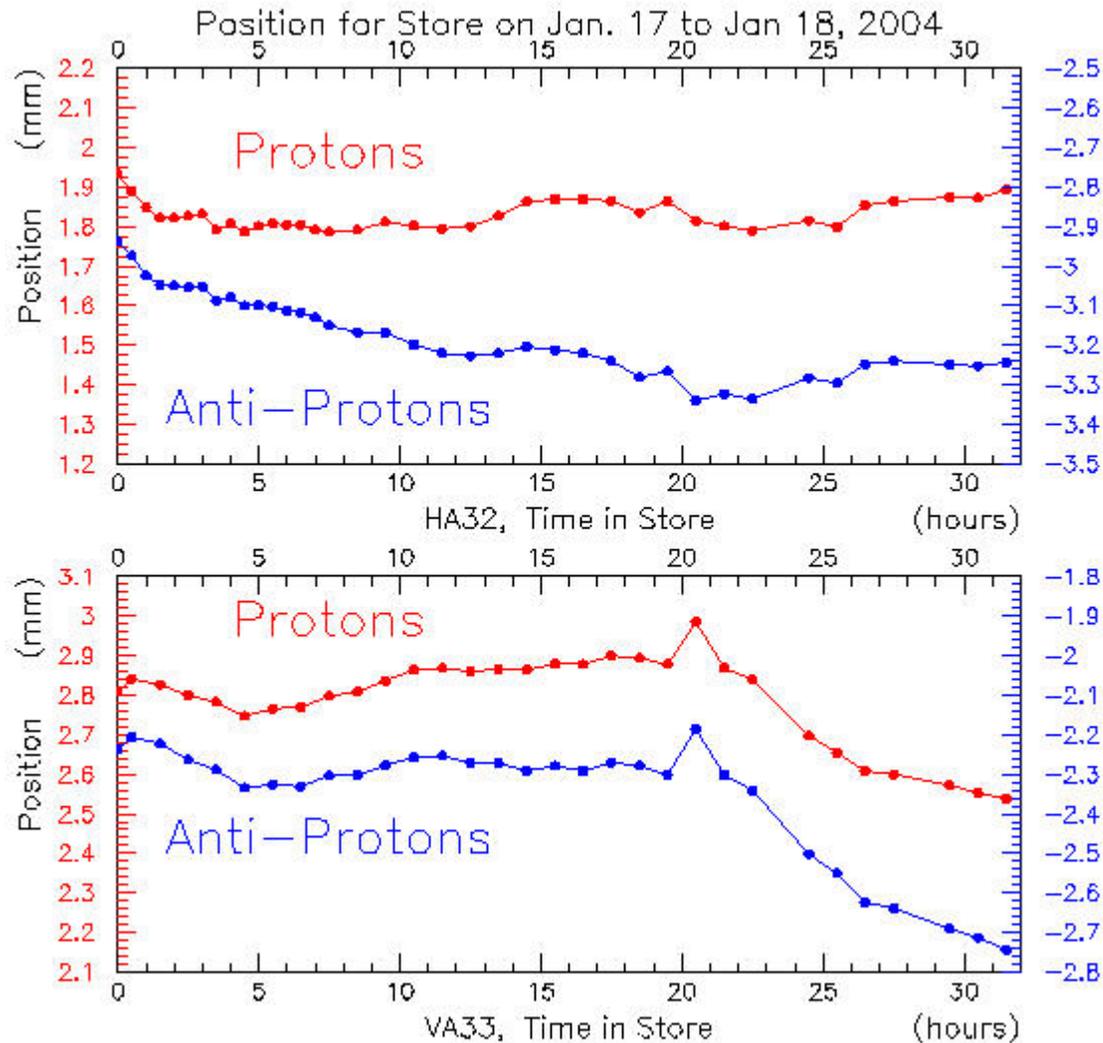
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Same store - horizontal



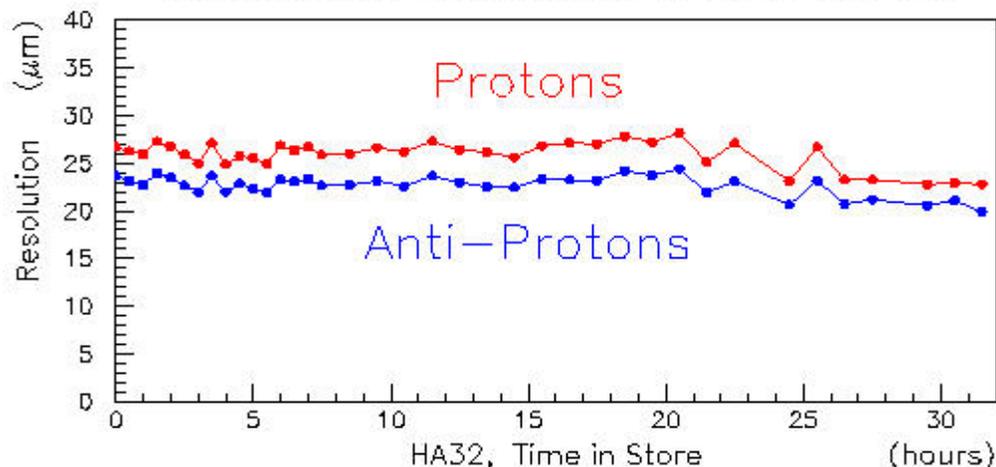
p and pbar positions during 1/17/05 store



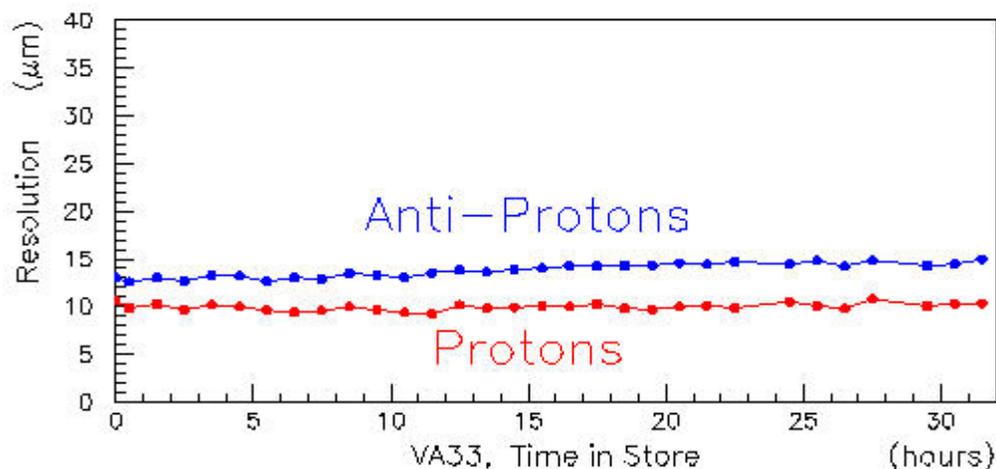
**Early results-
Still need to
Analyze to see
If it makes
Sense.**

P and pbar resolutions (closed orbit) during 1/17/05 store

Resolution for Store on Jan. 17 to Jan 18, 2004



Horizontal
~20-25 μm
(thought to be due to beam motion)



Vertical
~10-15 μm

A3 Results-TBT resolution

Caveat: still being debugged

Bob Webber:
Presentation of TBT
measurements is OK,
but should be qualified
as data from a system
not yet well tested,
characterized, or optimized
even in controlled conditions.

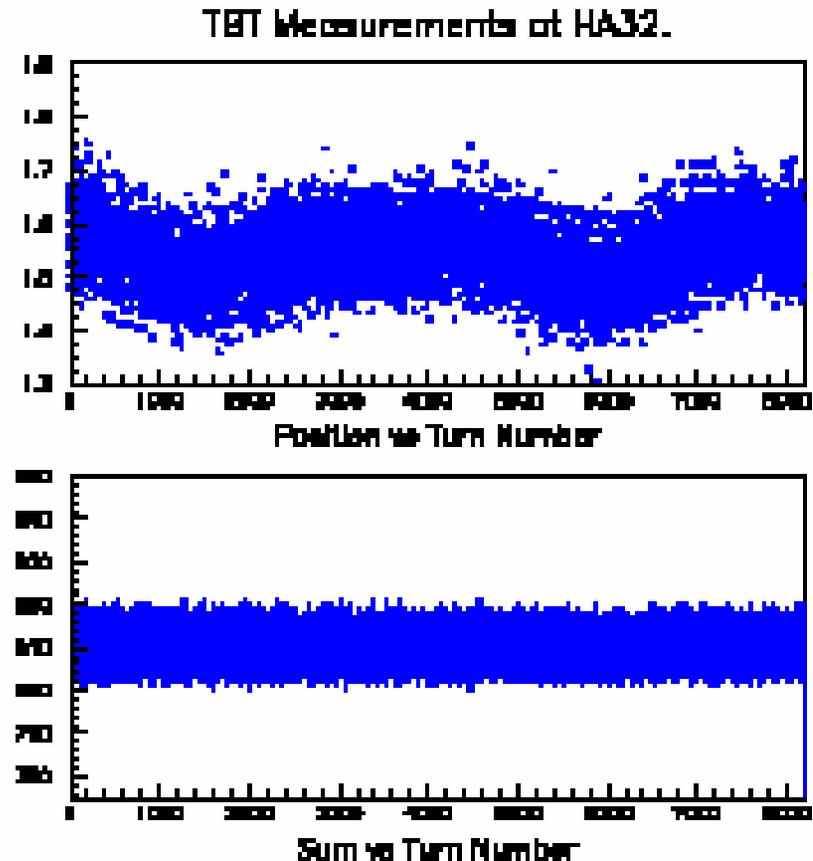


Figure 11-10

A3 Results-TBT resolution

Caveat: still being debugged

- **Good:**
 - 8000 turns
 - Not completely crazy
- **Bad:**
 - Still some phase/timing issues
 - Position correct?

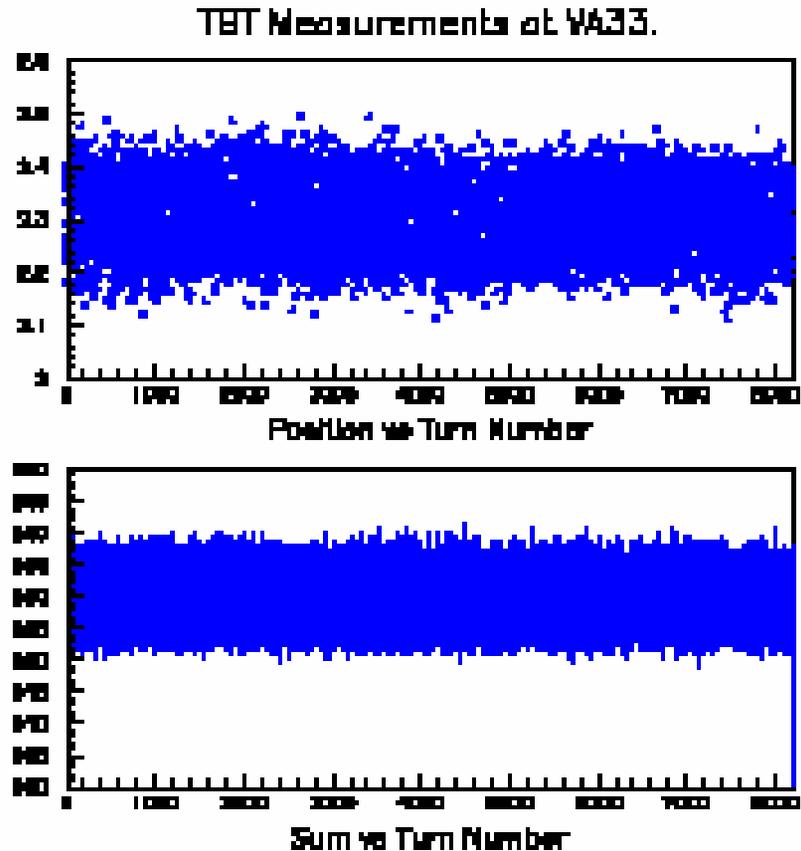
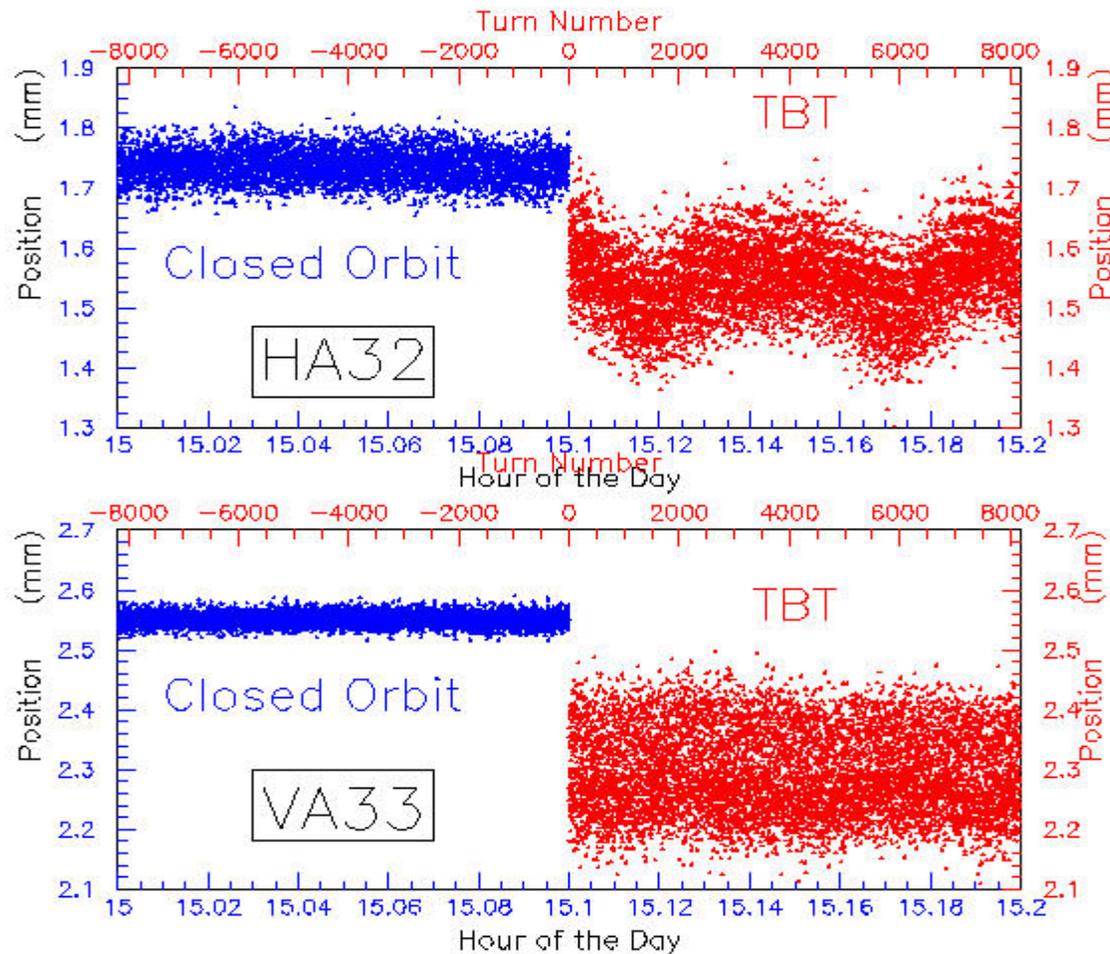


Figure 4.10

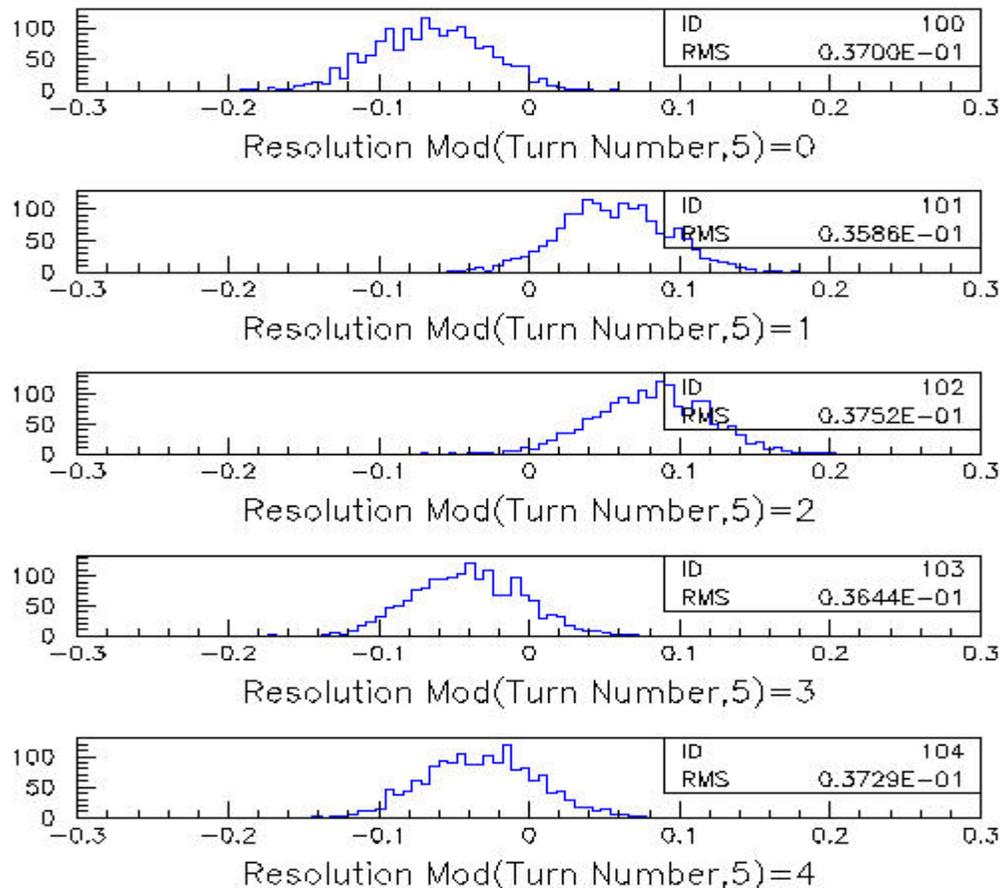
A3 Results-TBT resolution

Caveat: still being debugged



TBT Resolution

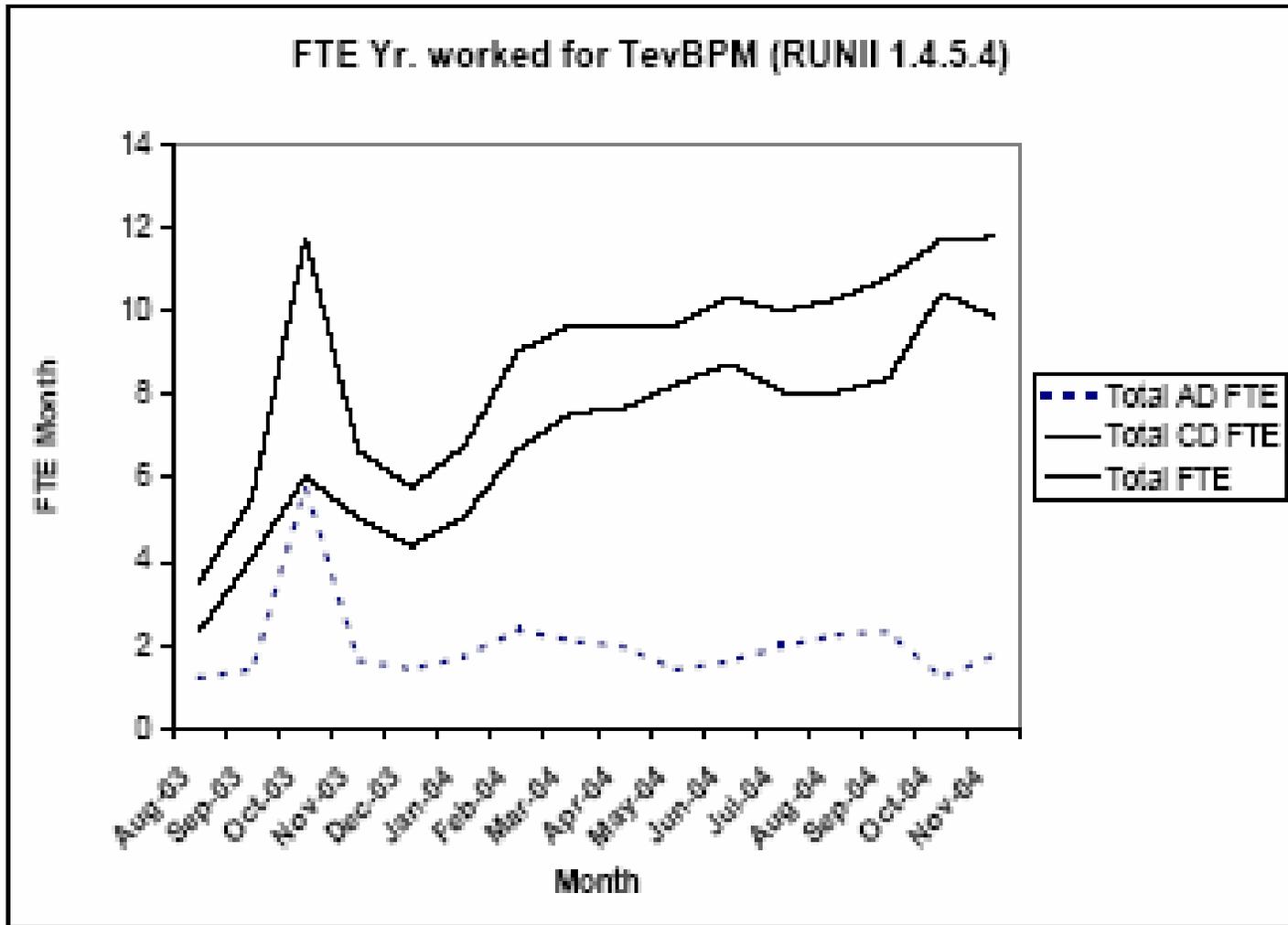
Resolution for Different Clock Phases



Schedule/Plan

- The plan is to commission houses one at a time (so as not to interfere with Tevatron operations) and to do so as quickly as possible.
 - Proposal for commissioning order:
 - A3, B3, C3, D3, E3, F2, B0, D0, A2, B2, C2, D2, E2, A4, B4, C4, D4, E4, A1, B1, C1, D1, E1, A0, F3, F4, F1
- Step 1: Finish commissioning A3 and get sign-off from Tevatron Department
- Week 1: B3
- Week 2: C3
- Two or three houses per week after that
- Finish in April, 2005.

Effort

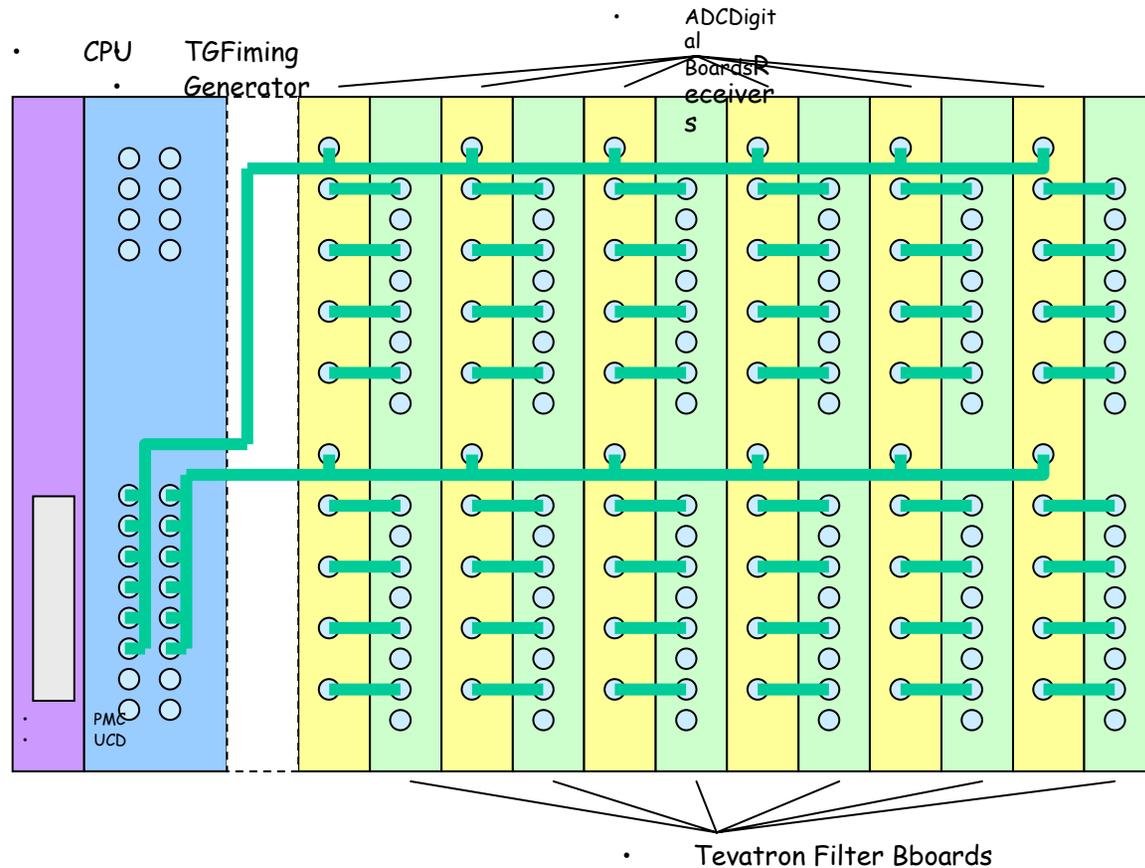


Summary

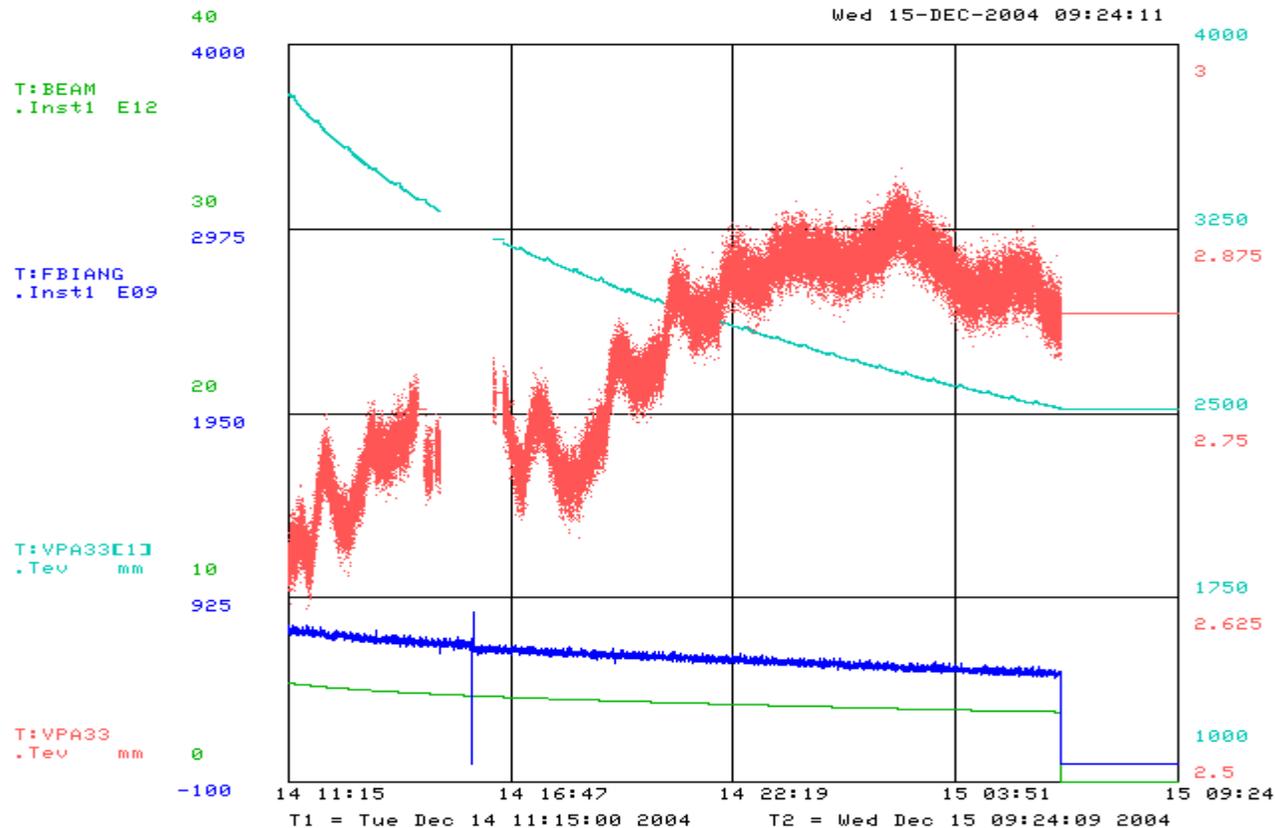
- The TeV BPM Upgrade project is moving to final commissioning of all 27 houses, replacing the old system with a more modern, reliable, and precise system.
- This has been made possible by the efforts of many people (~35 individuals) from CD and AD who contributed over the past 1.5 years.

Backup Slides

VME Crate Layout



Results from A3 system - closed orbit, complete store



A3 Result - Turn-by-turn and closed orbit comparison

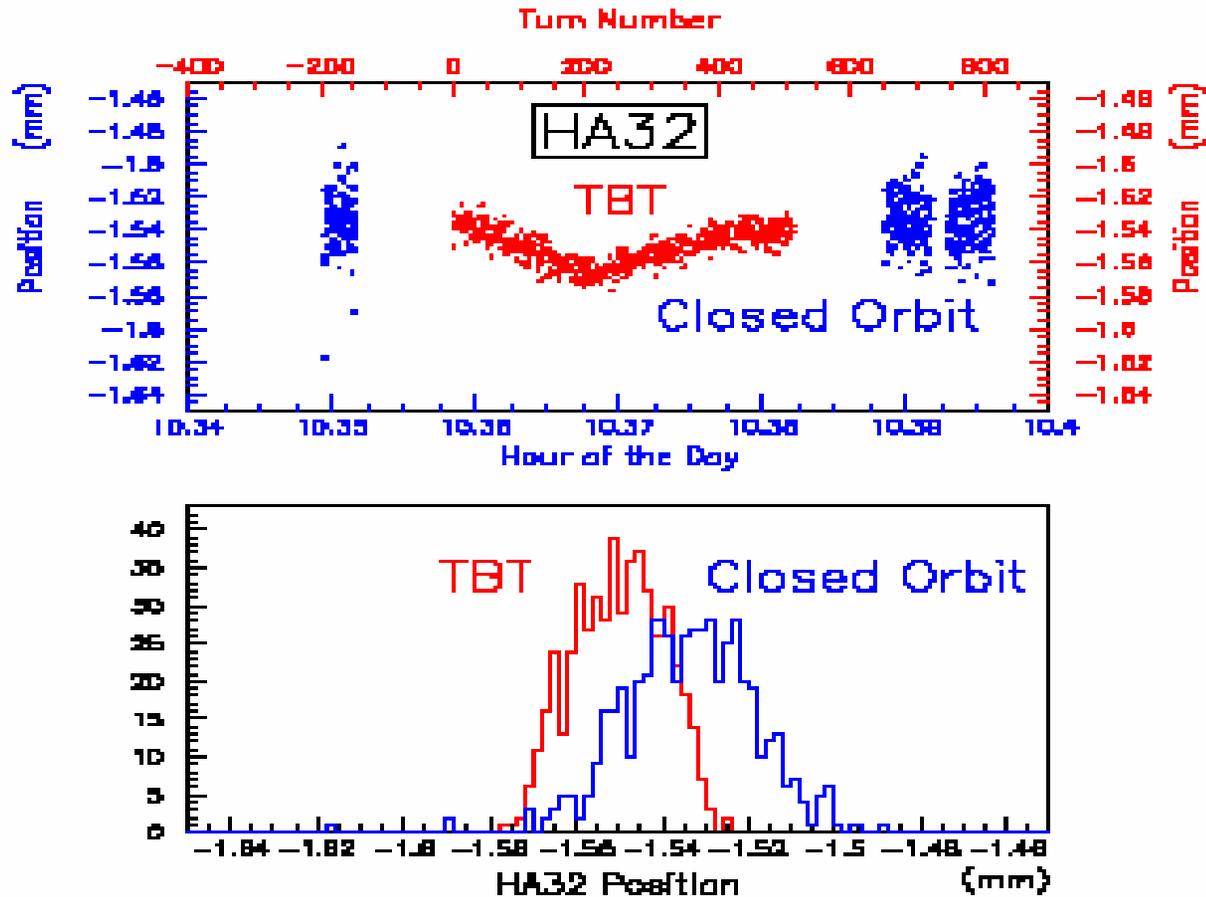


Figure 7: cc

A3 Results-TBT resolution

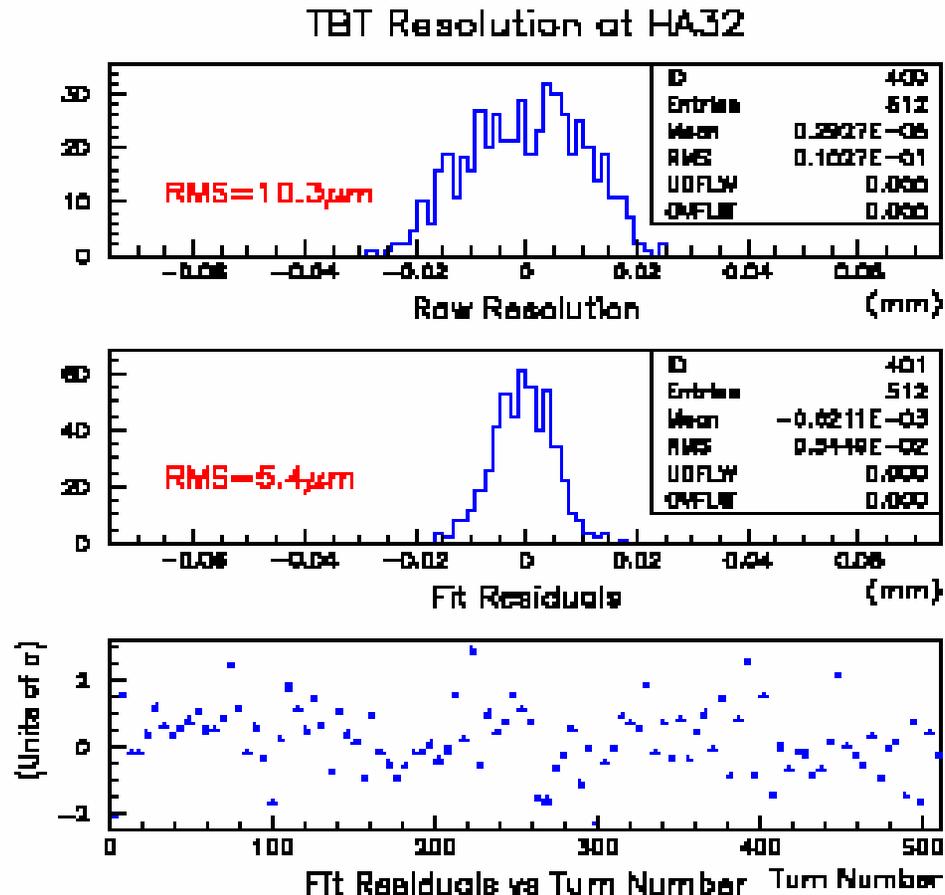
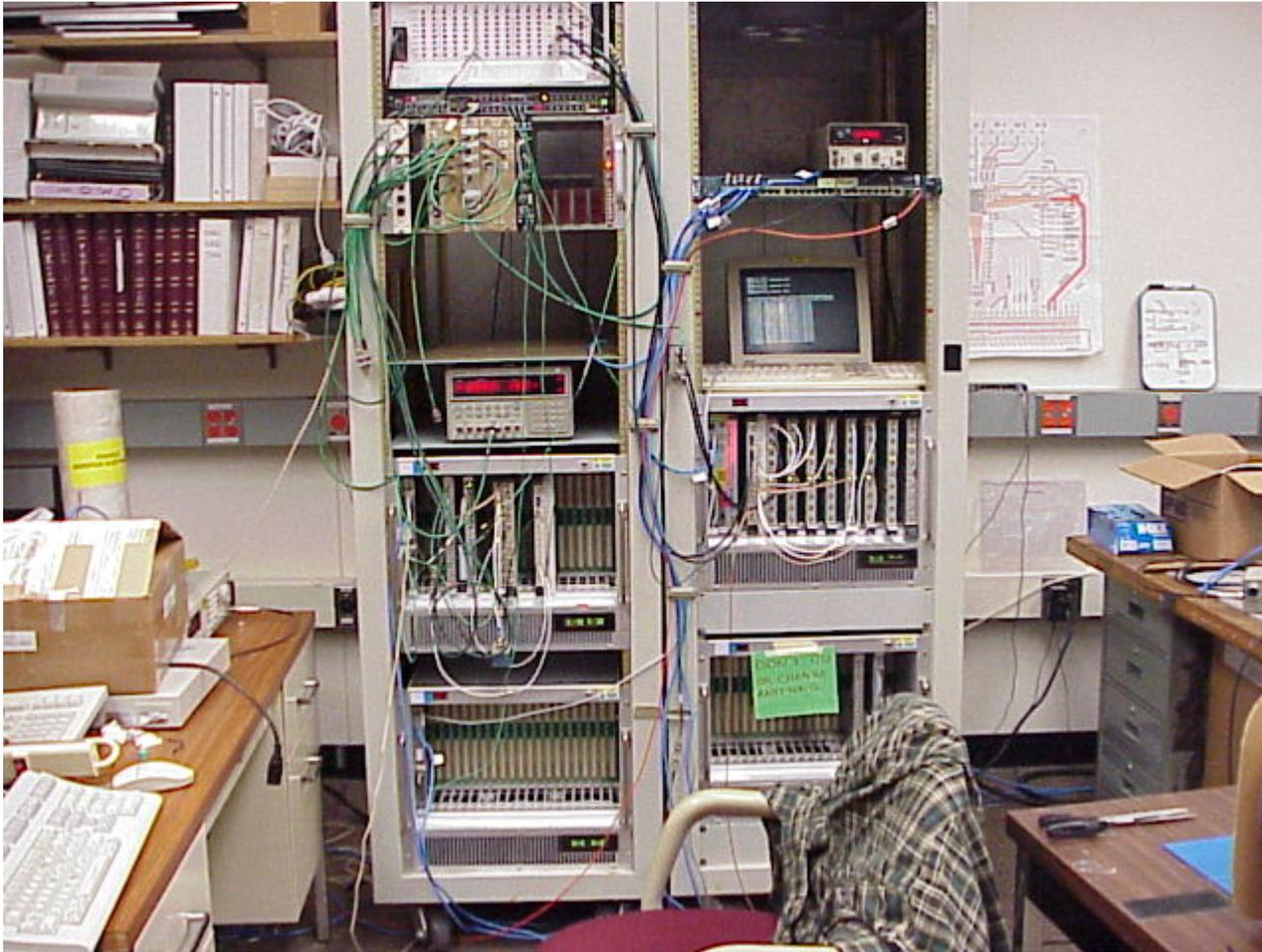


Figure 2: cc

Problems/Issues/Recent Progress

- We must commission the A3 BPM system before moving into commissioning of the other 27 houses.
- Major work to debug and solve issues related to:
 - Timing and triggers
 - Echotek board processing
 - Front-end software
 - Applications “seeing” new data

FCC Teststand

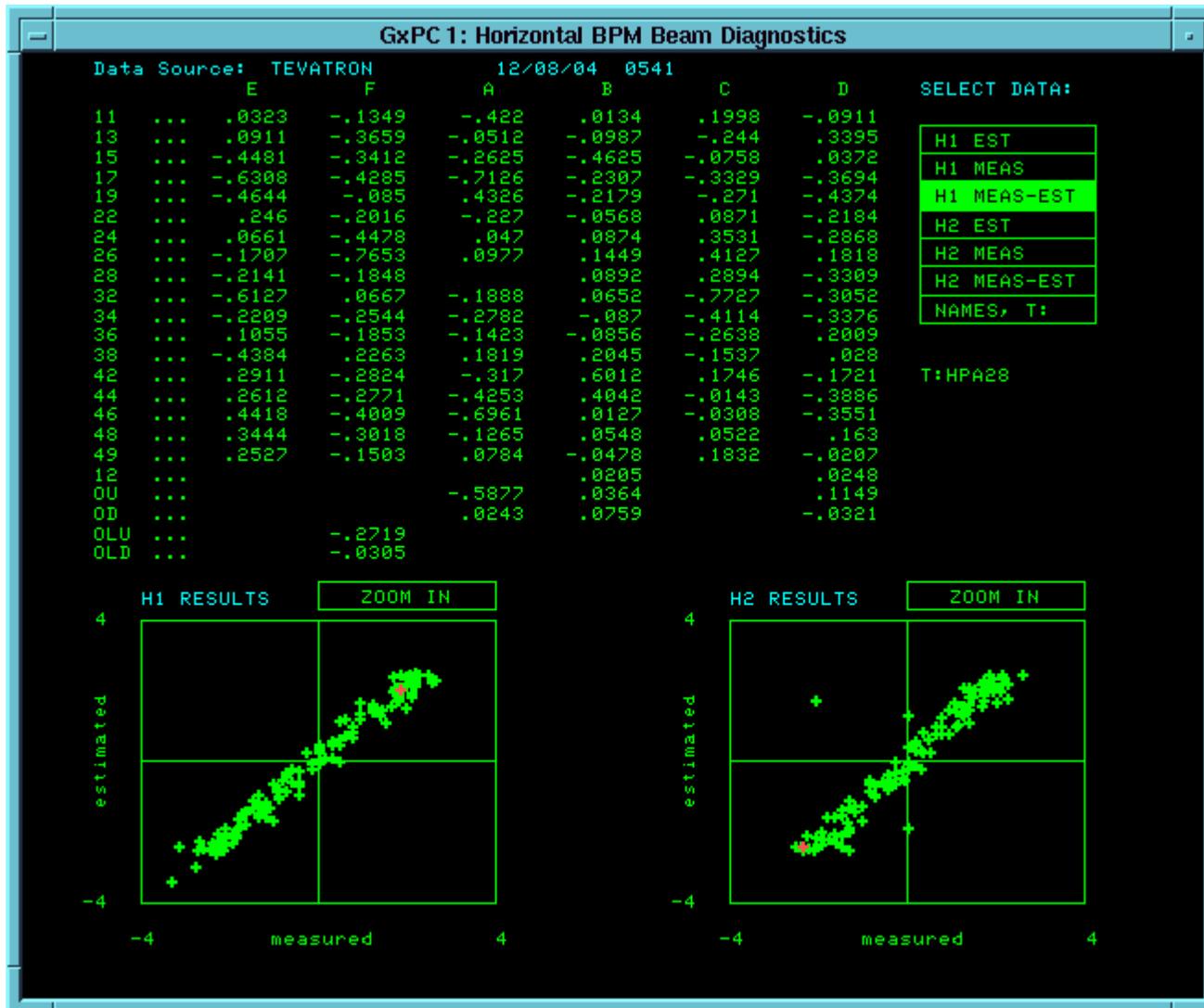


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Scale check of BPM using bumped beam



A3 result - pbar, injection

Reverse Helix Study, VA35 December 8, 2004

