

# Tevatron BPM Upgrade Status and Plans

Stephen Wolbers, Jim Steimel

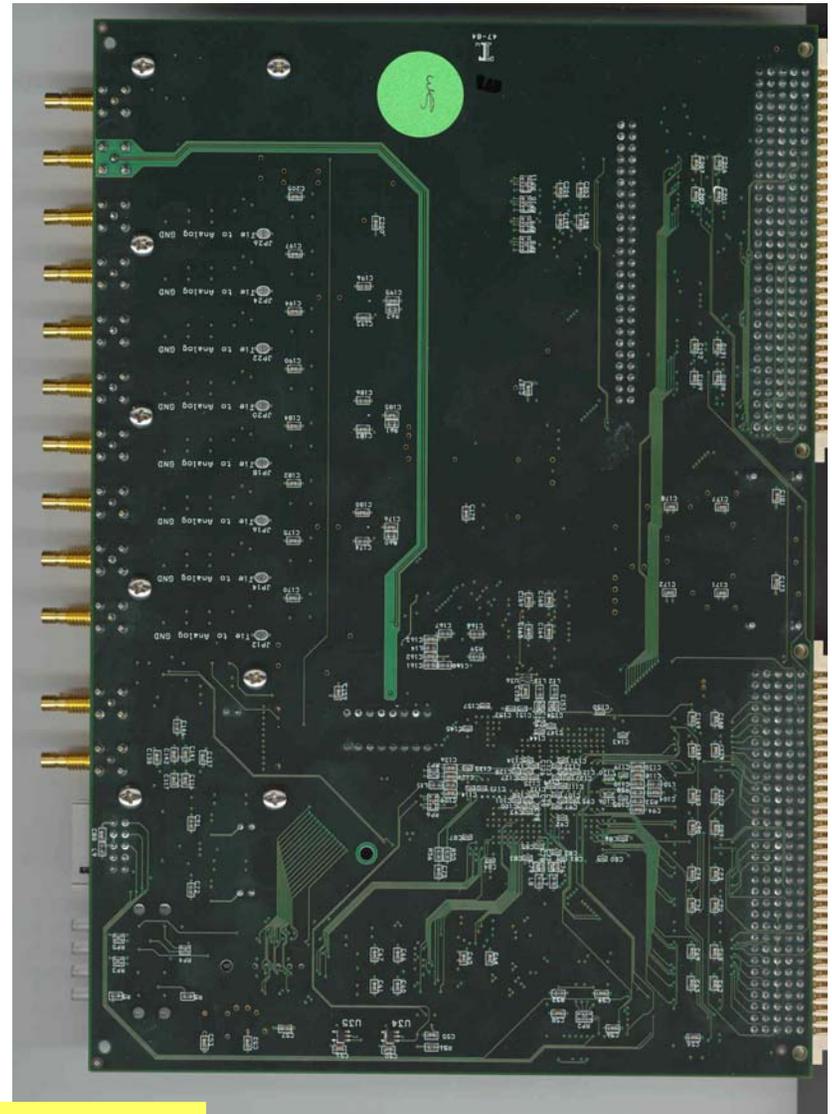
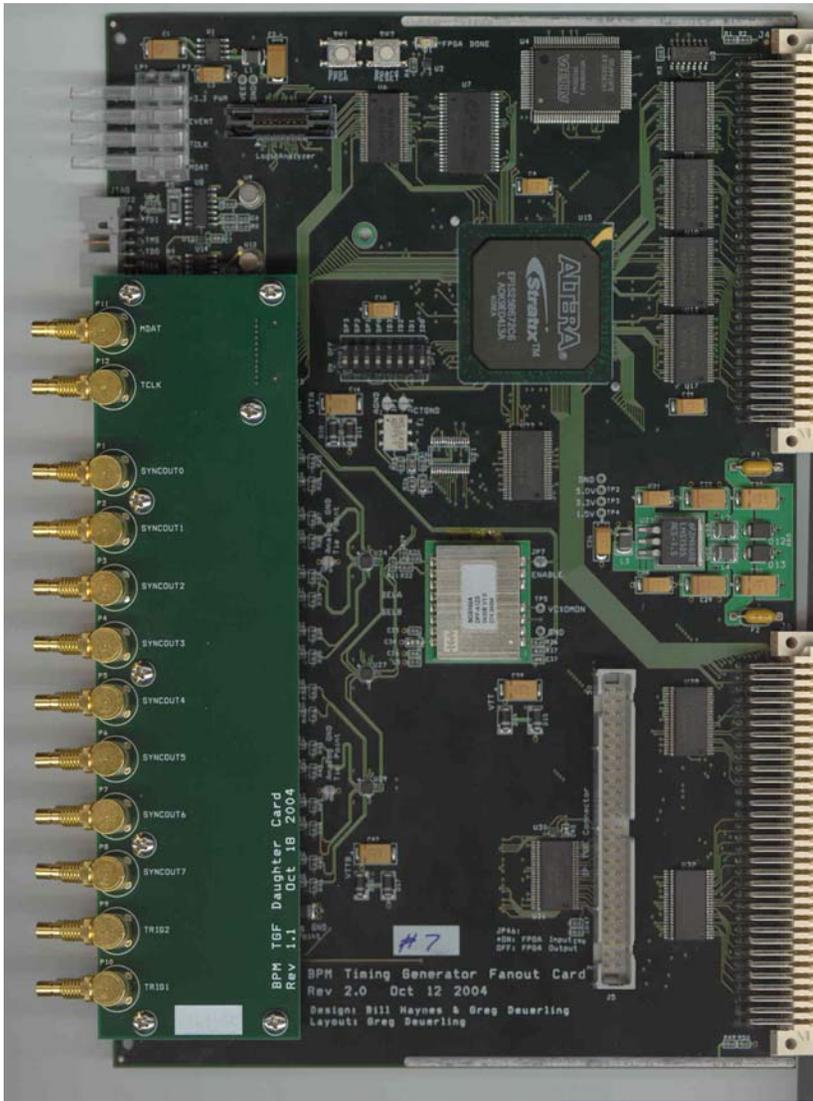
Tevatron Meeting

January 21, 2005

# Tev BPM Current Status - H/W

- Essentially all hardware is hand:
  - 150 Echotek digital receiver boards.
  - Front-end filter boards (150 here, 50 tested).
  - Timing boards (38 here, a few tested)
  - Crate controllers (31 MVME 2600)
  - Crates (31), cables(1000s), panels.
- All cabling from tunnel to service buildings (27) is in place.
- Space in all service buildings is identified for the upgrade electronics.
  - In a few buildings we will have to remove the old electronics to install the new.

# Timing Board



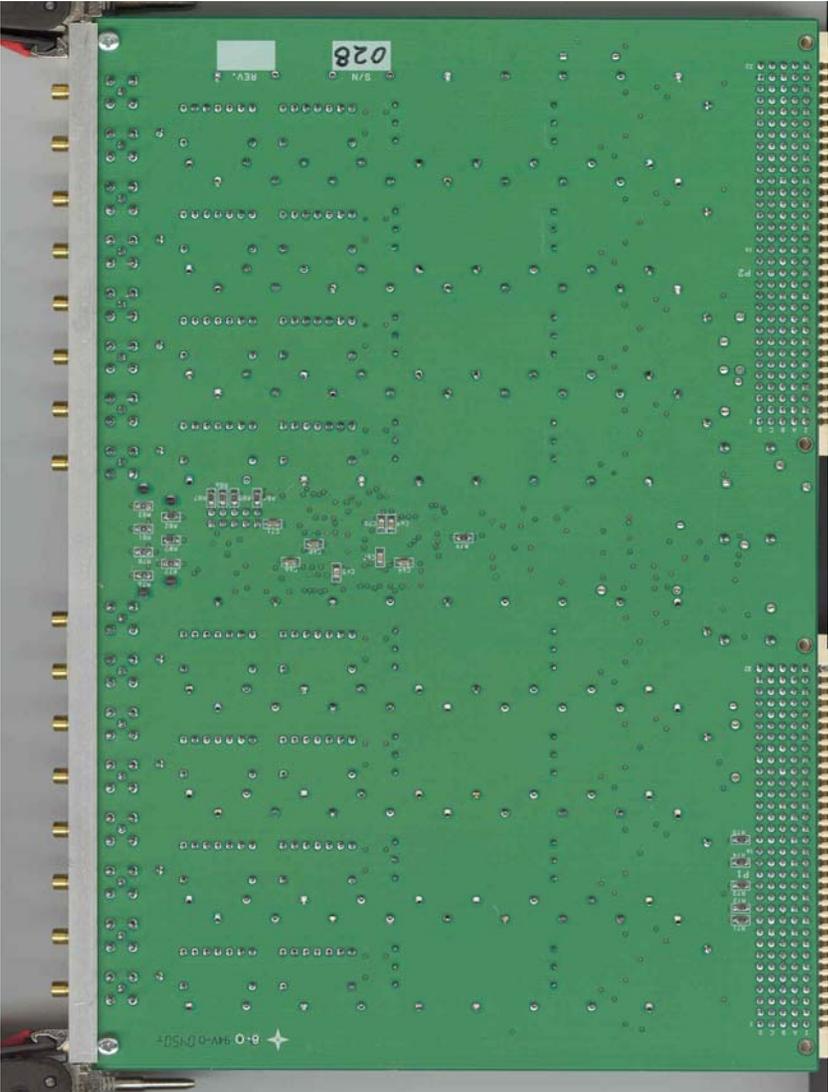
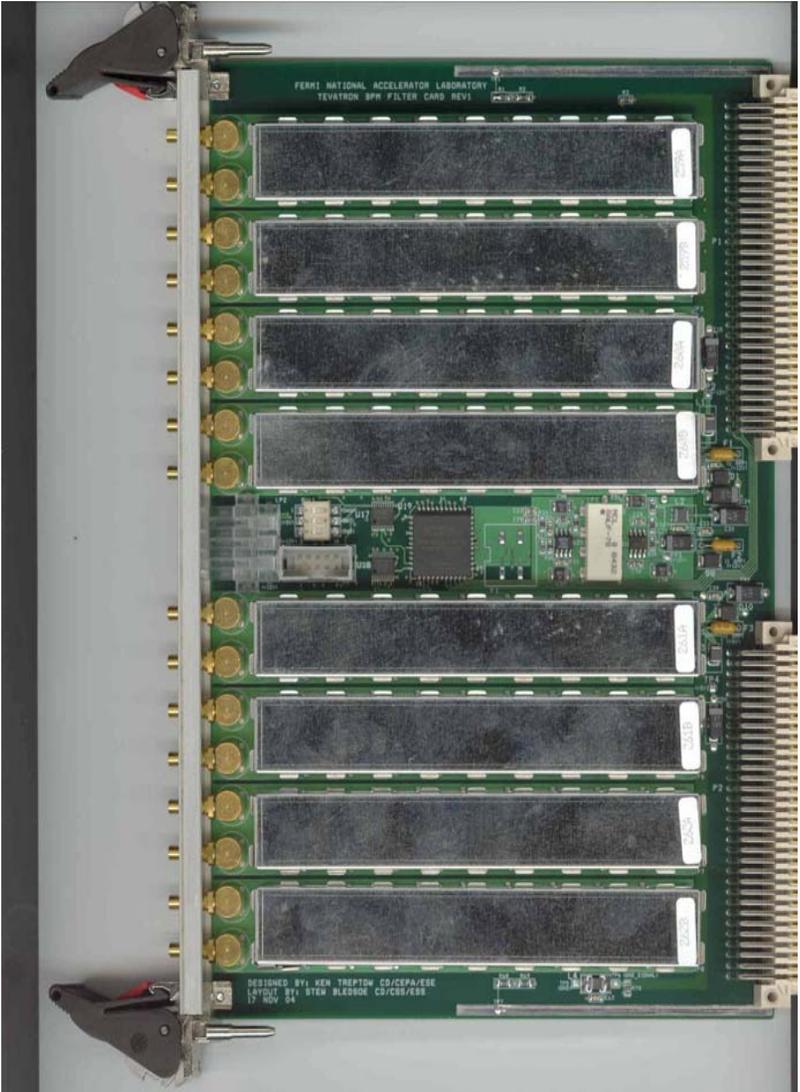
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**Production Board**

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8 Channels

# Filter Board

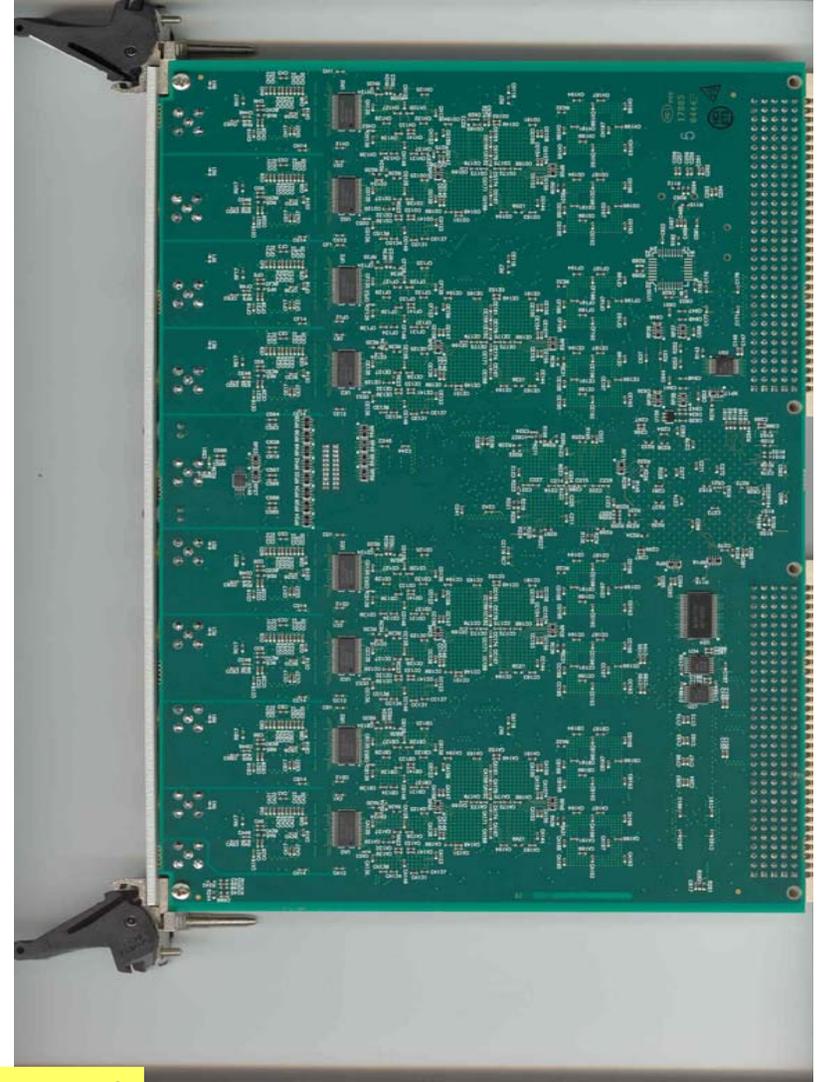
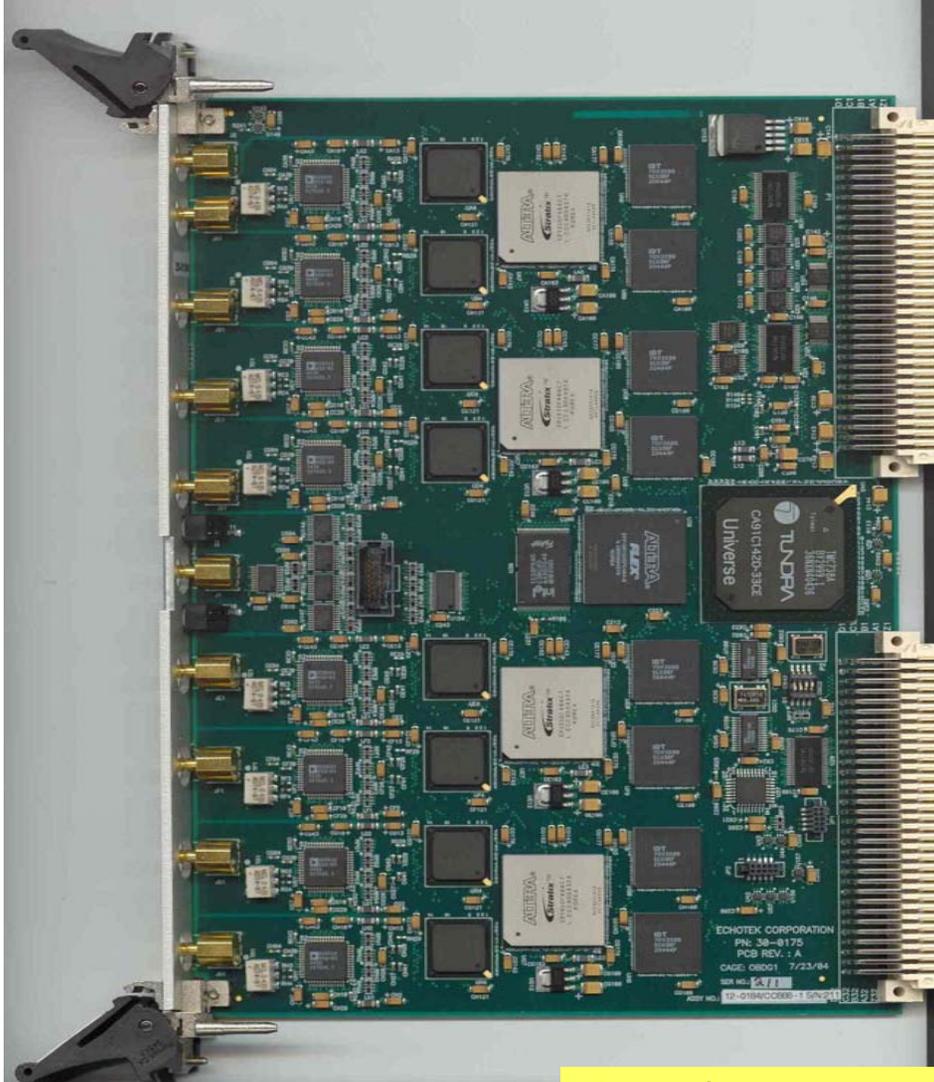


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**Production Board**

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# 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.
- Commissioning closed orbit, TBT, first turn and pbar measurements.



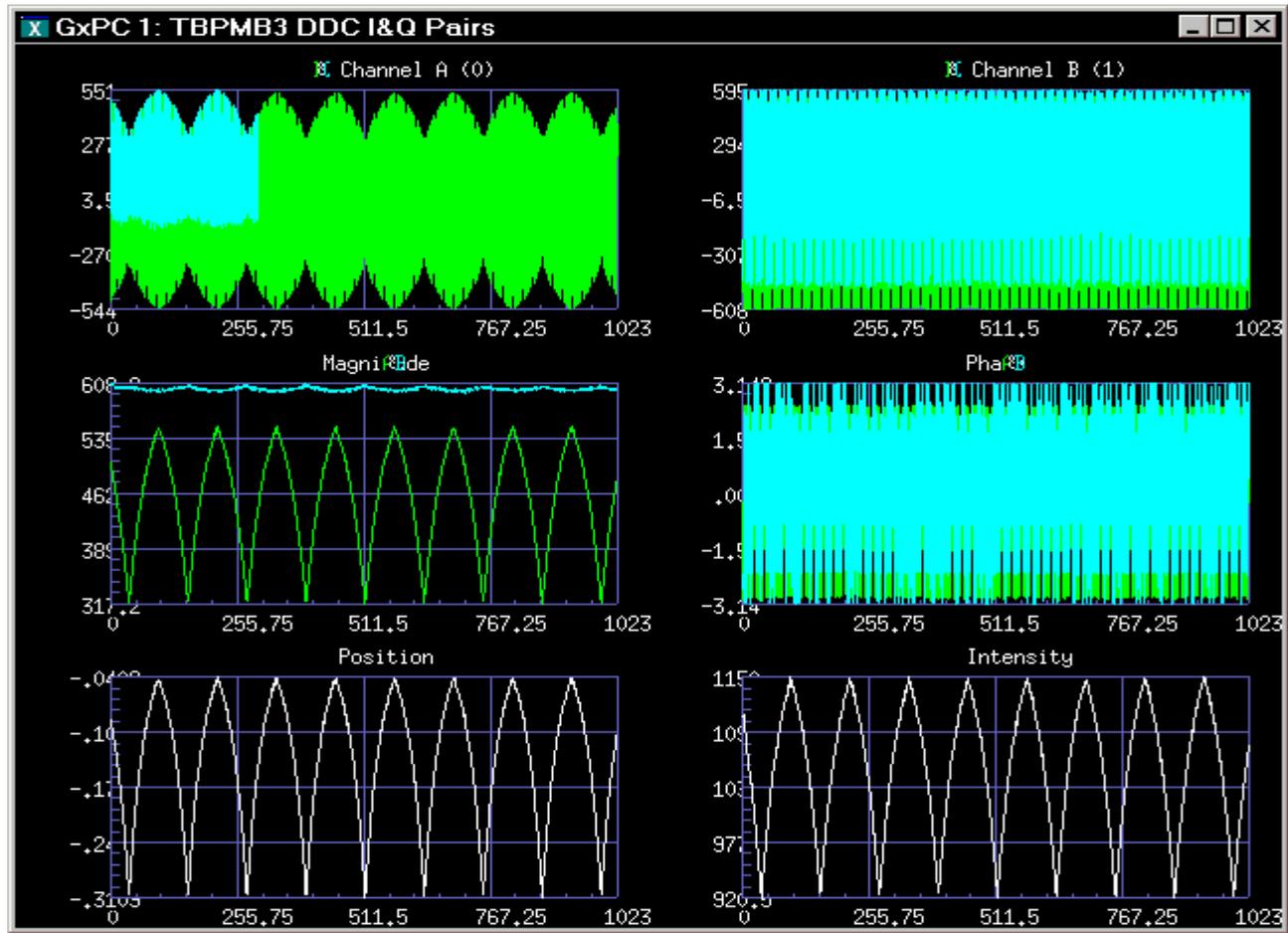
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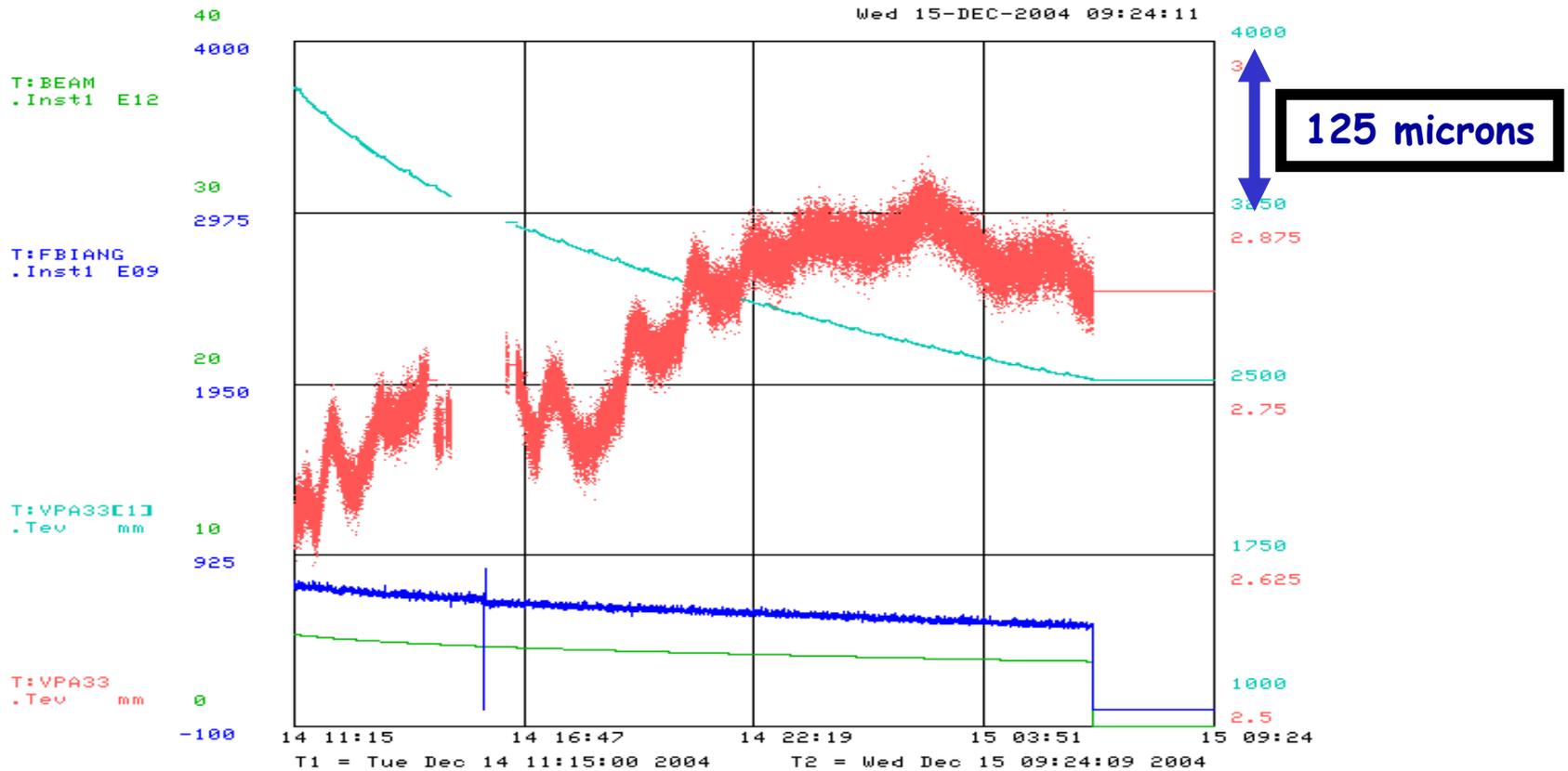
# Measurements and functionality

- **Test stand**
  - Closed orbit, TBT studies
  - Study timing, triggers, etc. under controlled conditions
- **A3 measurements**
  - Closed orbit
  - Turn by turn commissioning
    - Still some problems - serious debugging going on now
    - Hope to find and solve remaining problems soon

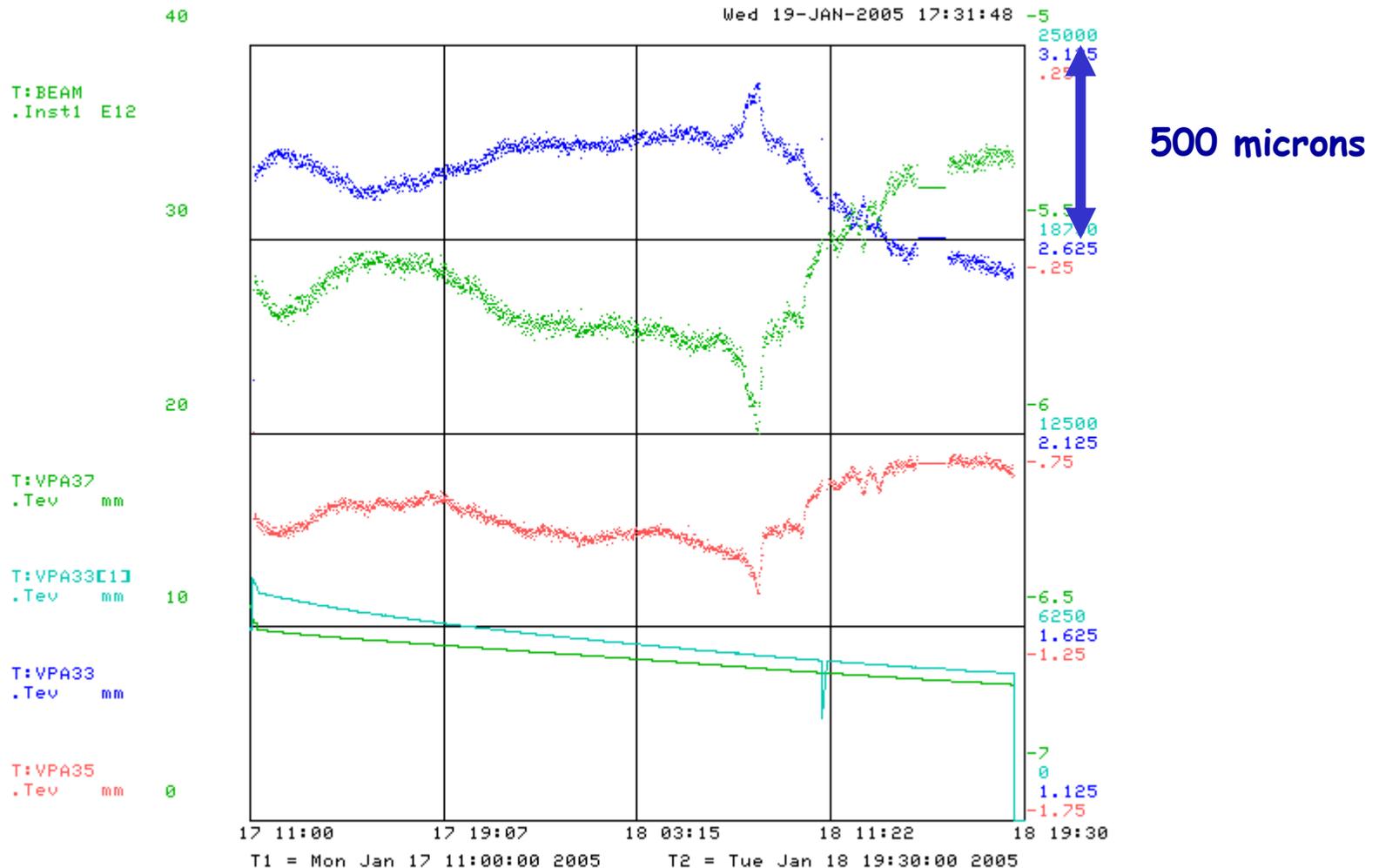
# Test Stand Turn-by-turn



# Results from A3 system - closed orbit, complete store



# Recent Store (Monday 1/17/05) Vertical

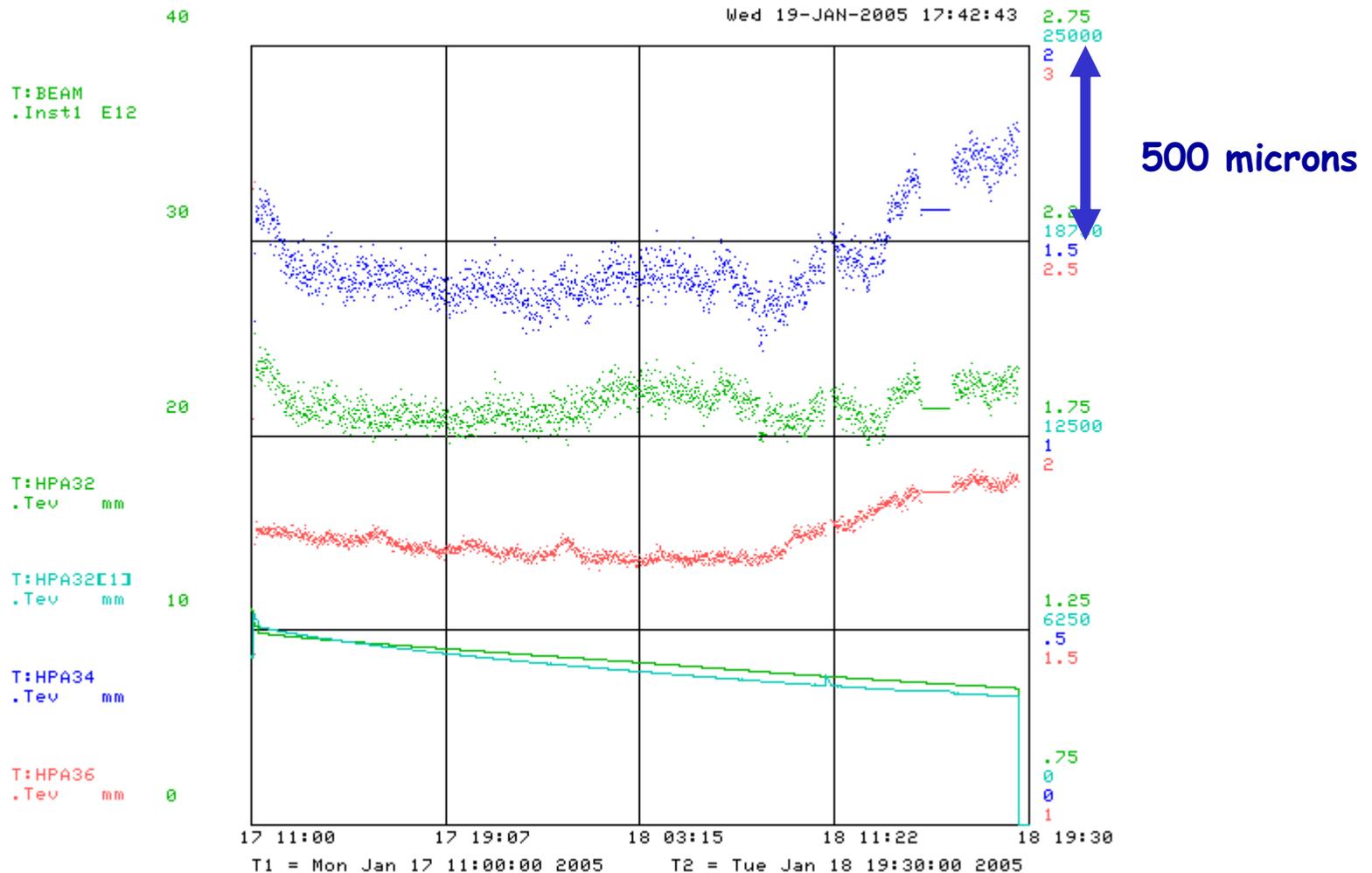


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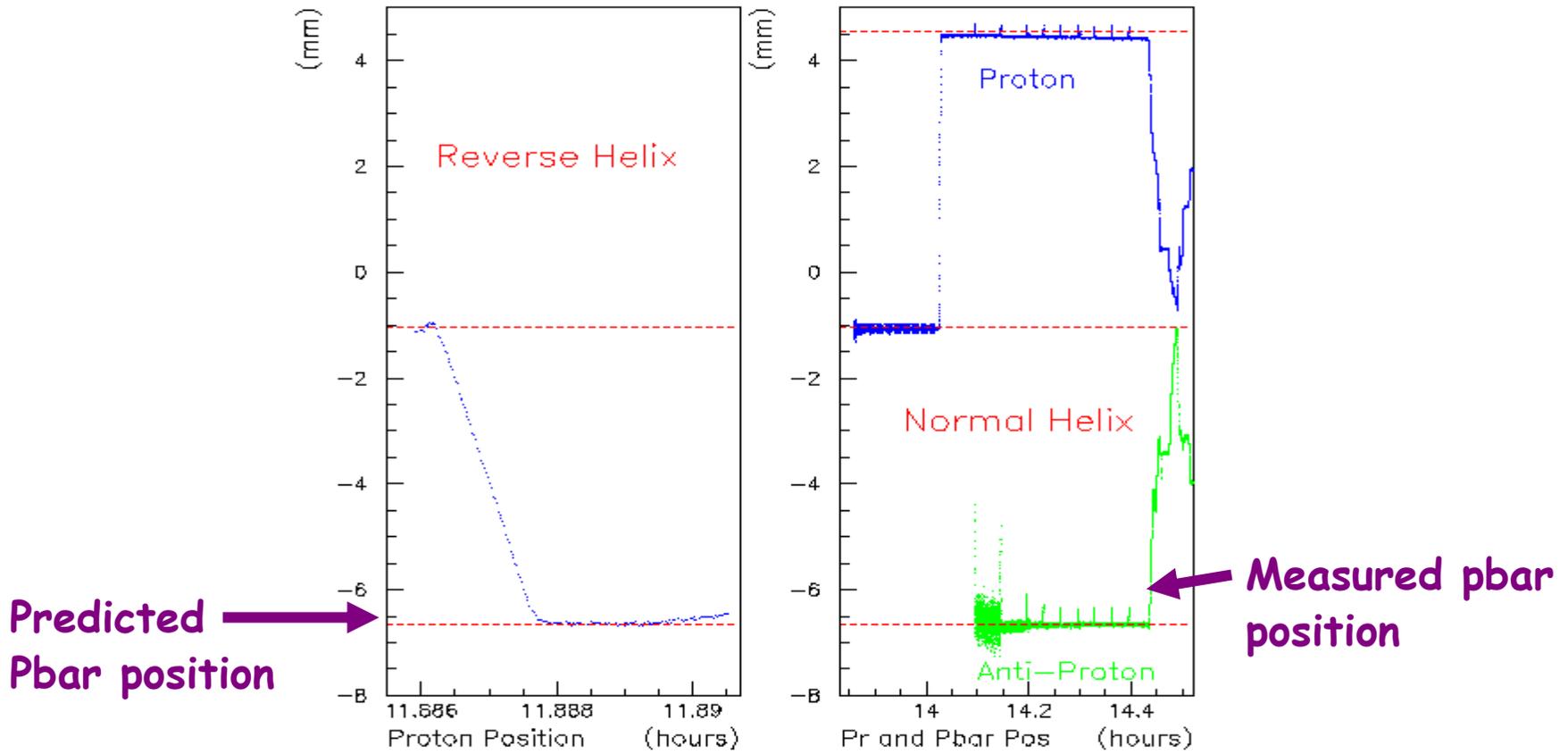
10

# Same store - horizontal



# A3 result - pbar, injection (shown earlier)

Reverse Helix Study, VA35 December 8, 2004



# 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.

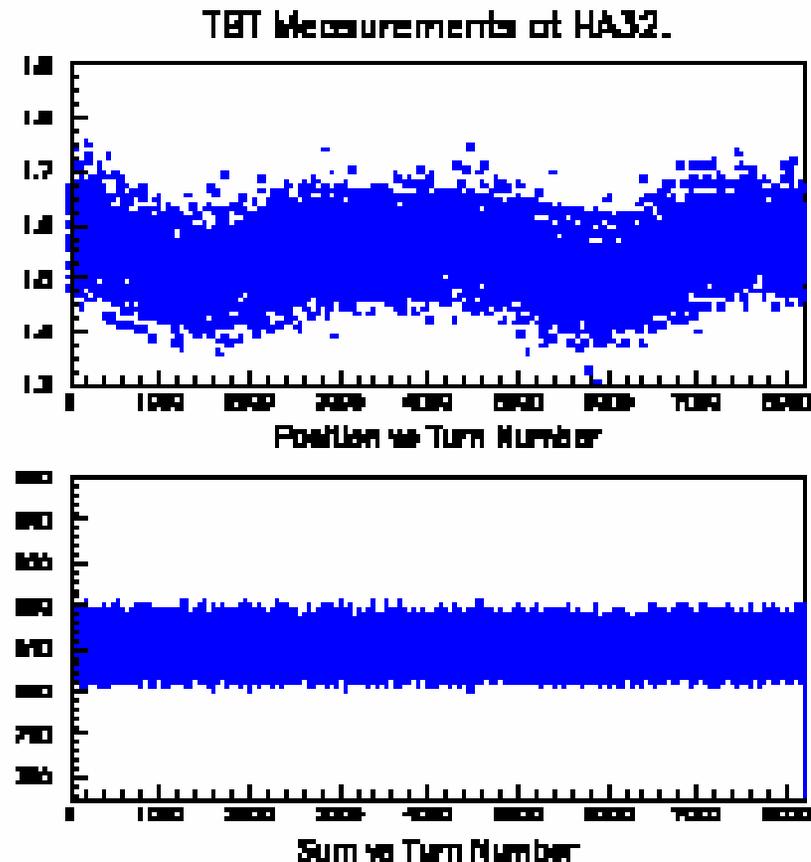


Figure 11-10

# A3 Results-TBT resolution

## Caveat: still being debugged

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

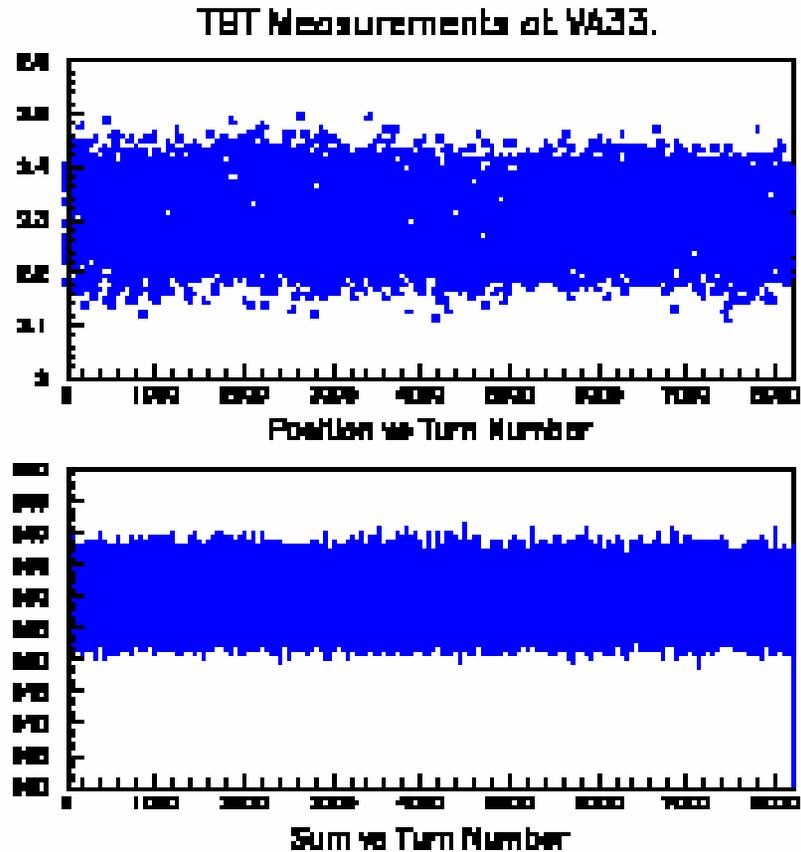
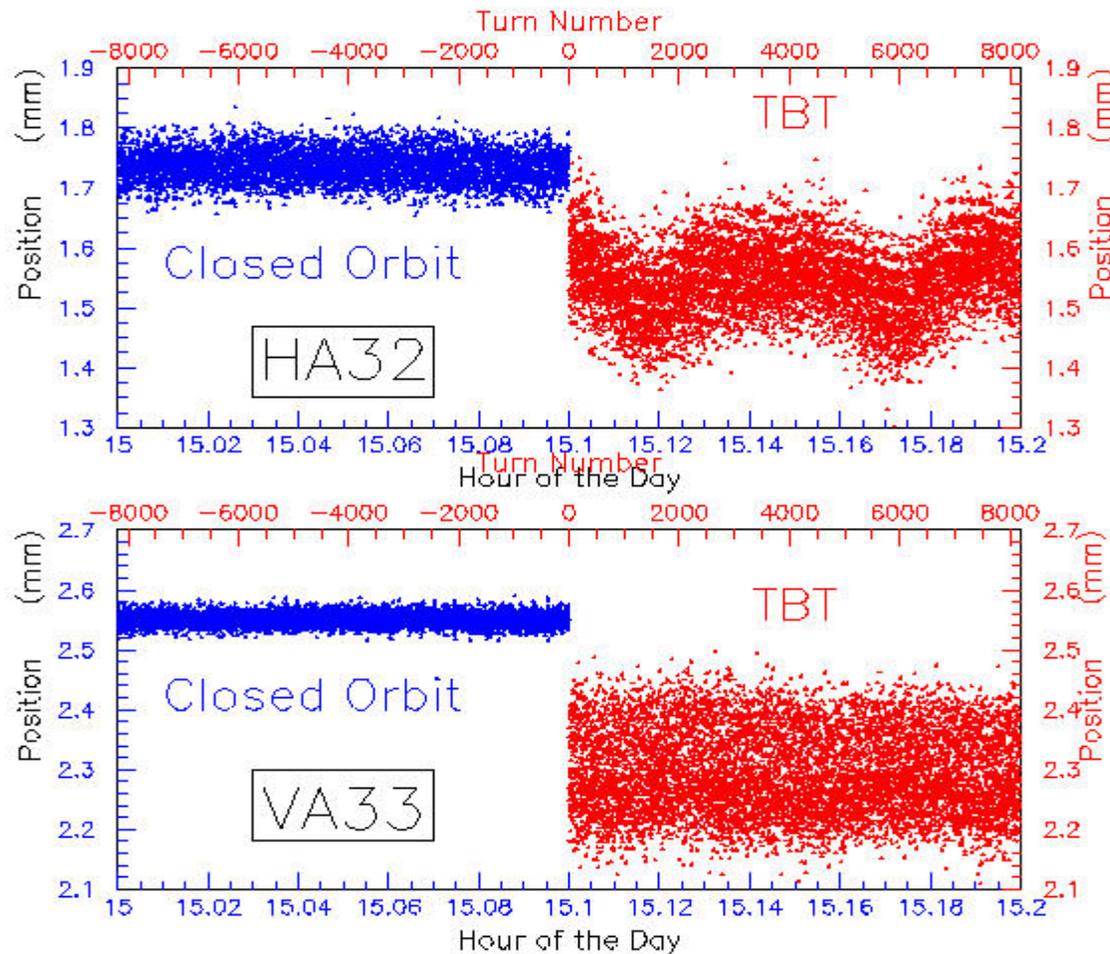


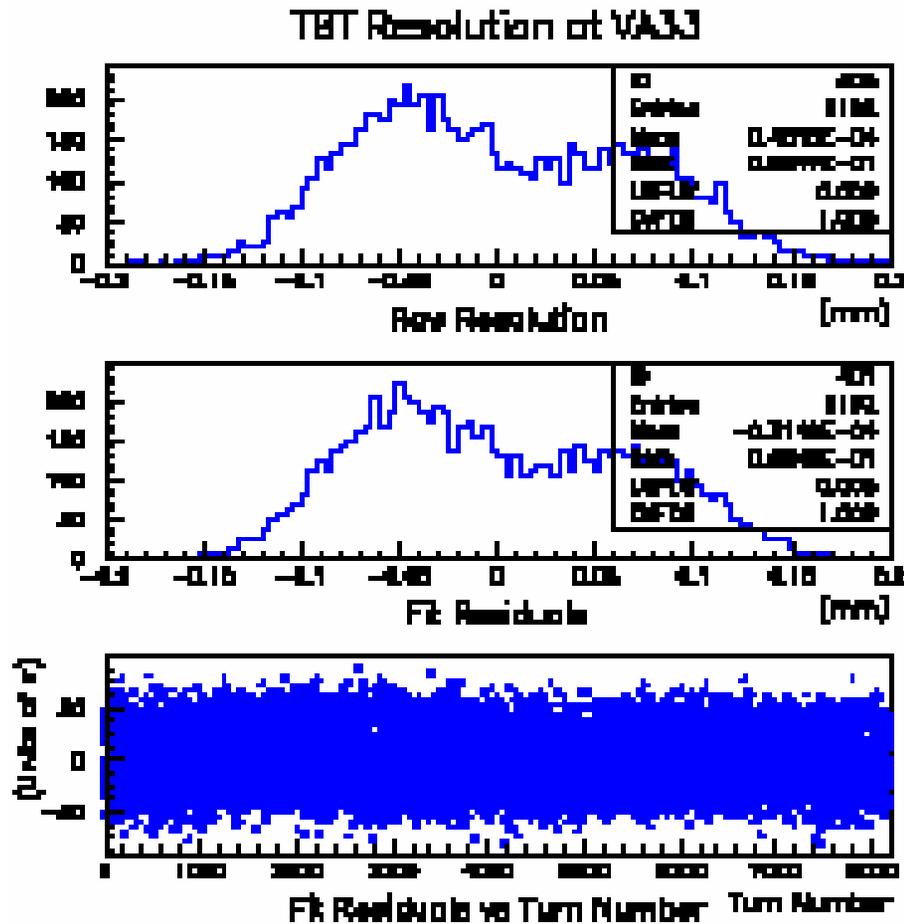
Figure 4.11

# A3 Results-TBT resolution

Caveat: still being debugged



# Turn-by-Turn Early Data: Still being debugged



Sigma =  
68 microns

Figure 6: 10

## How to proceed

- Need to fully commission A3 BPMs before moving on to B3, C3, ...
- Checklist from Mike Martens:
  - Verify Snapshot closed orbit measurements (Done)
  - Verify a DISPLAY closed orbit measurement on clock event (Done)
  - Verify PROFILE closed orbit measurements on the \$75 profile event (Done)
  - Verify that the ABORT BUFFER collects orbit data and is halted on an abort event (Needs to be tested)
  - Verify the FTP plotting of position (Done)

# A3 Commissioning

- **Mike Martens' List (Continued)**
  - Demonstrate TBT measurements at injection (Not there yet, but soon)
  - Demonstrate Injection Closed Orbit Measurement from the injection TBT data (Same as above)
  - Demonstrate TBT measurements with kicked beam (I would agree to postpone this test if we get good injection TBT data with a mis-steered injection.) (Same as above)
  - Demonstrate that we can get BPM data into and out of SDA (Work has been done and it may be ready but it needs to be checked).
  - Demonstrate that we can easily reboot the BPM system and it starts up in a friendly manner.(Was tested Thursday).

# Schedule/Plan

- The plan is to commission houses one at a time (so as not to interfere with Tevatron operations) 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
- First we finish commissioning A3, Then:
  - Week 1: B3
  - Week 2: C3
  - Two or three houses per week after that
  - Finish in April, 2005.