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Turn by Turn Measurements with the Tevatron BPM Production Electronics

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Abstract

Slides shown at the January 12, 2005 Tevatron BPM Upgrade Meeting. A few additional slides plus the text will appear in the next version of this document.

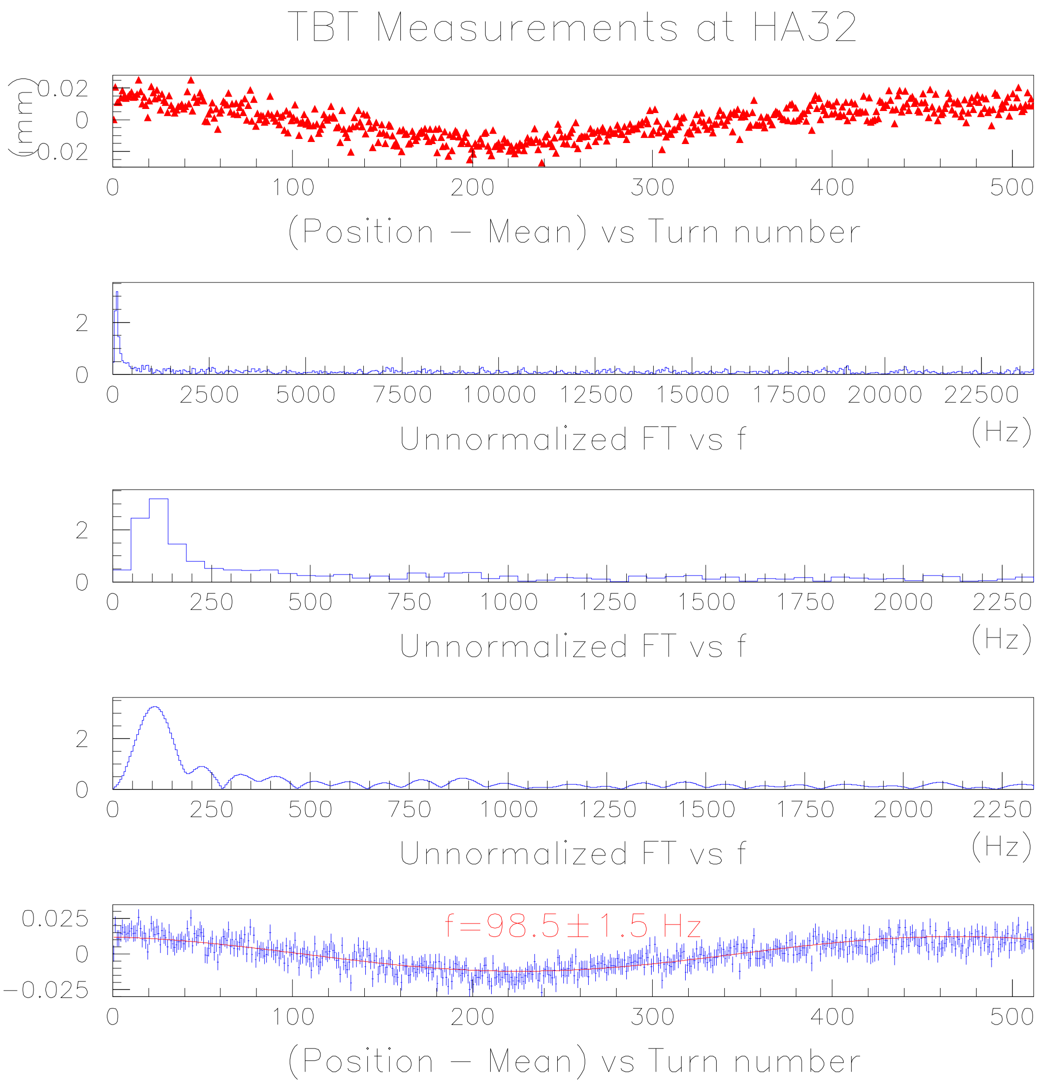
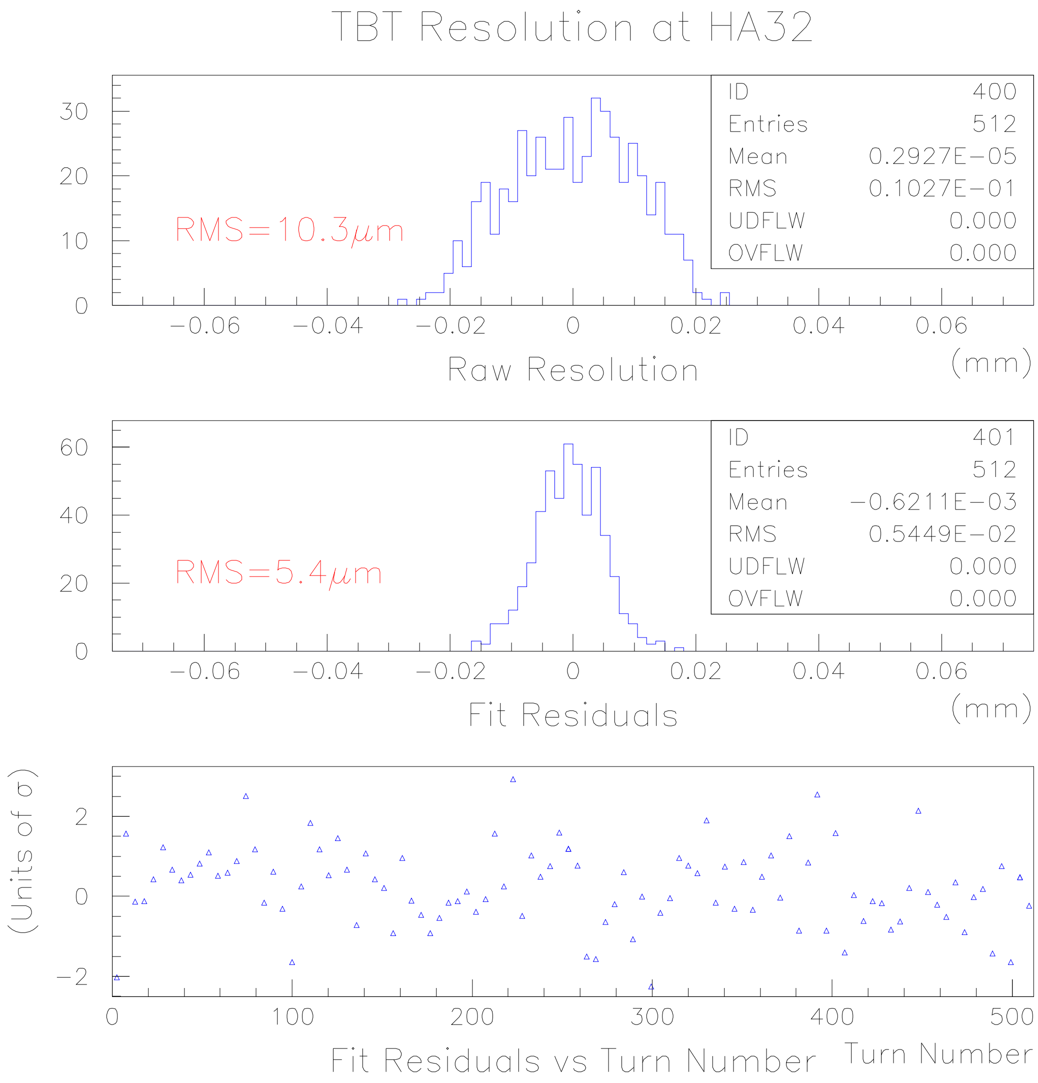

TBT Measurements at HA32
(mm)
0.02
0
-0.02
0
100
200
300
400
500
(Position − Mean) vs Turn number
2
0
0
2500
5000
7500
10000
12500
15000
17500
20000
22500
Unnormalized FT vs f
(Hz)
2
0
0
250
500
750
1000
1250
1500
1750
2000
2250
Unnormalized FT vs f
(Hz)
2
0
0
250
500
750
1000
1250
1500
1750
2000
2250
Unnormalized FT vs f
(Hz)
f=98.5±1.5 Hz
0.025
0
−0.025
0
100
200
300
400
500
(Position − Mean) vs Turn number

Figure 1: cc



TBT Resolution at HA32
ID 400
Entries 512
Mean 0.2927E−05
RMS 0.1027E−01
UDFLW 0.000
OVFLW 0.000
RMS=10.3μm
Raw Resolution
(mm)
ID 401
Entries 512
Mean −0.6211E−03
RMS 0.5449E−02
UDFLW 0.000
OVFLW 0.000
RMS=5.4μm
Fit Residuals
(mm)
(Units of σ)
Fit Residuals vs Turn Number
Turn Number

Figure 2: cc

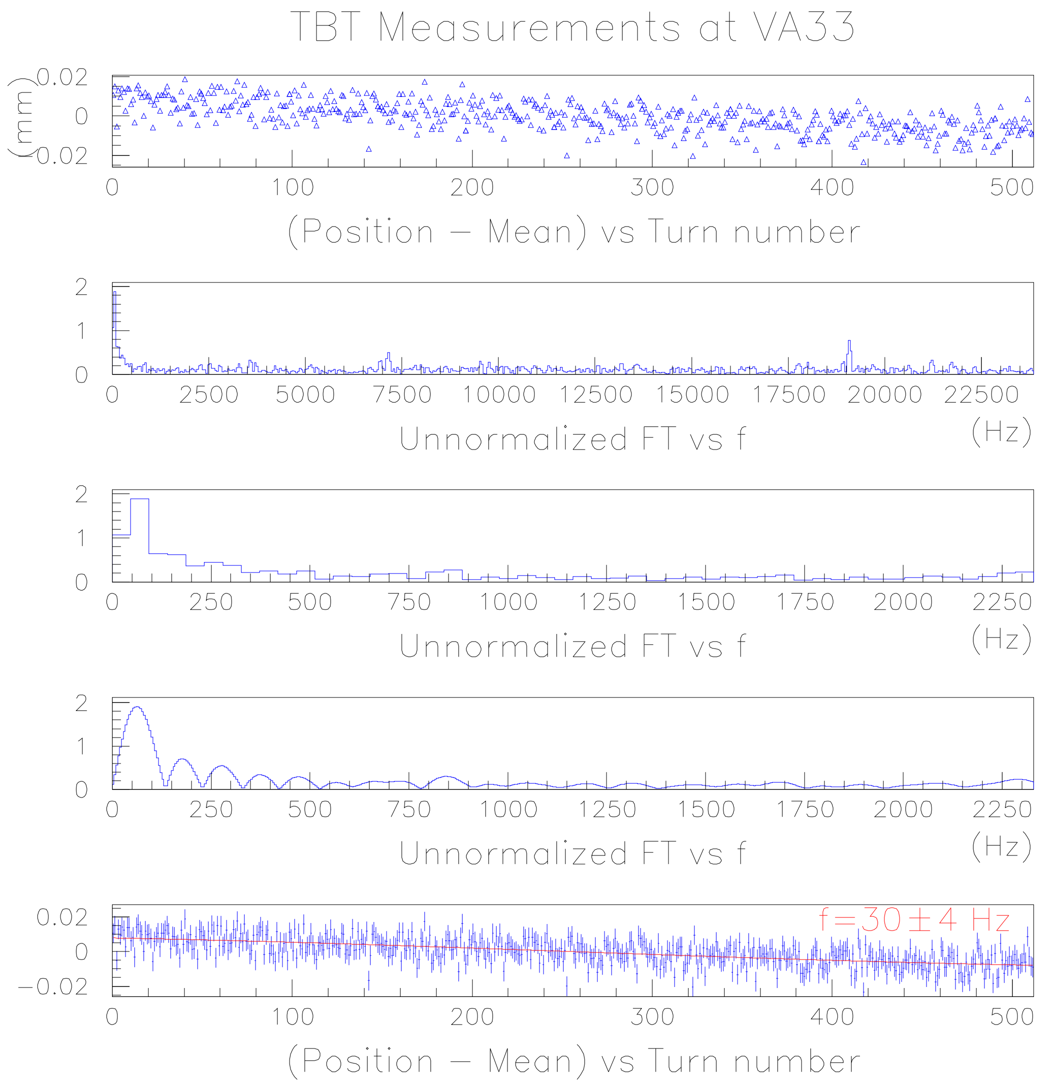
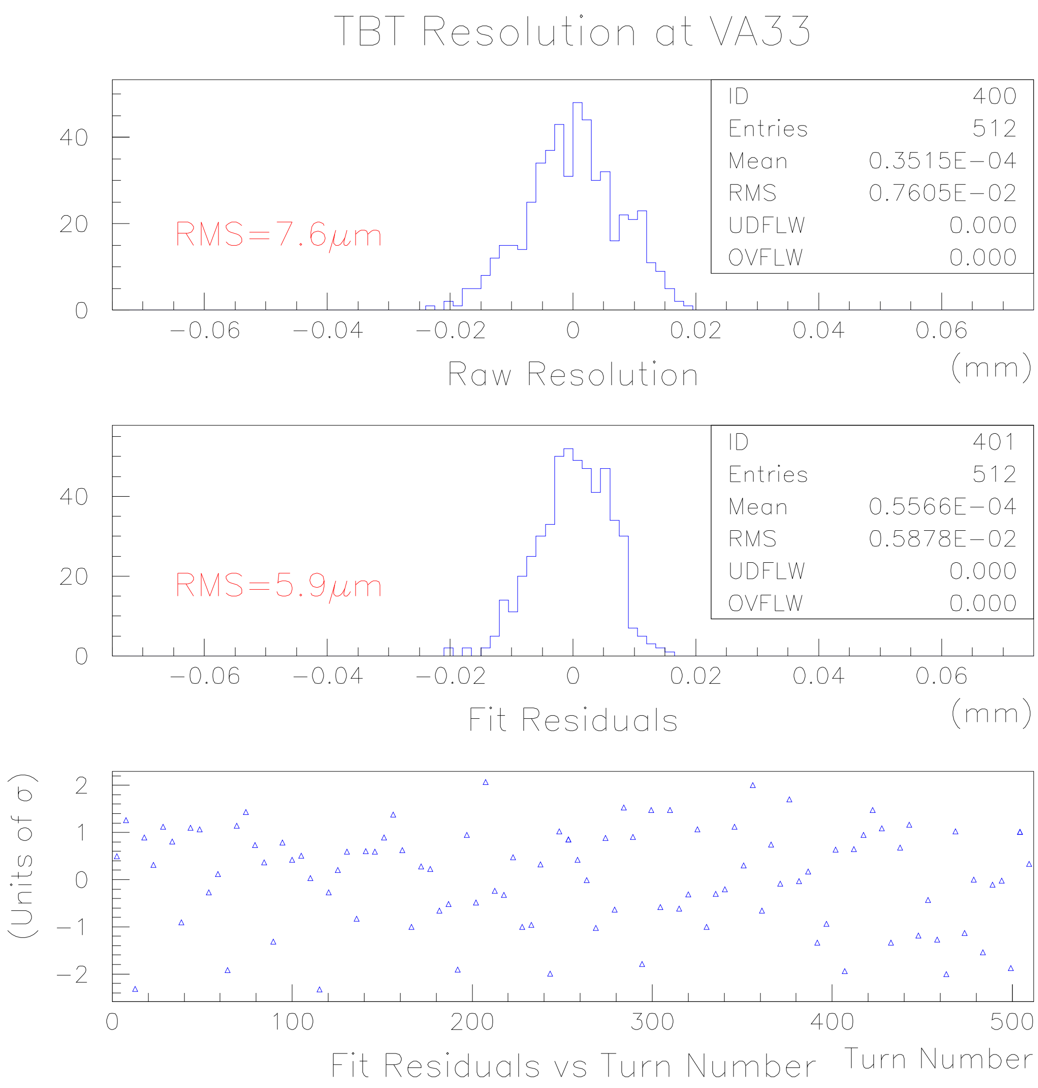

TBT Measurements at VA33
(mm)
0.02
0
-0.02
0
100
200
300
400
500
(Position − Mean) vs Turn number
2
1
0
0
2500
5000
7500
10000
12500
15000
17500
20000
22500
Unnormalized FT vs f
(Hz)
2
1
0
0
250
500
750
1000
1250
1500
1750
2000
2250
Unnormalized FT vs f
(Hz)
2
1
0
0
250
500
750
1000
1250
1500
1750
2000
2250
Unnormalized FT vs f
(Hz)
f=30±4 Hz
0.02
0
−0.02
0
100
200
300
400
500
(Position − Mean) vs Turn number

Figure 3: cc



TBT Resolution at VA33
ID 400
Entries 512
Mean 0.3515E−04
RMS 0.7605E−02
UDFLW 0.000
OVFLW 0.000
RMS=7.6μm
Raw Resolution
(mm)
ID 401
Entries 512
Mean 0.5566E−04
RMS 0.5878E−02
UDFLW 0.000
OVFLW 0.000
RMS=5.9μm
Fit Residuals
(mm)
(Units of σ)
Fit Residuals vs Turn Number
Turn Number

Figure 4: cc

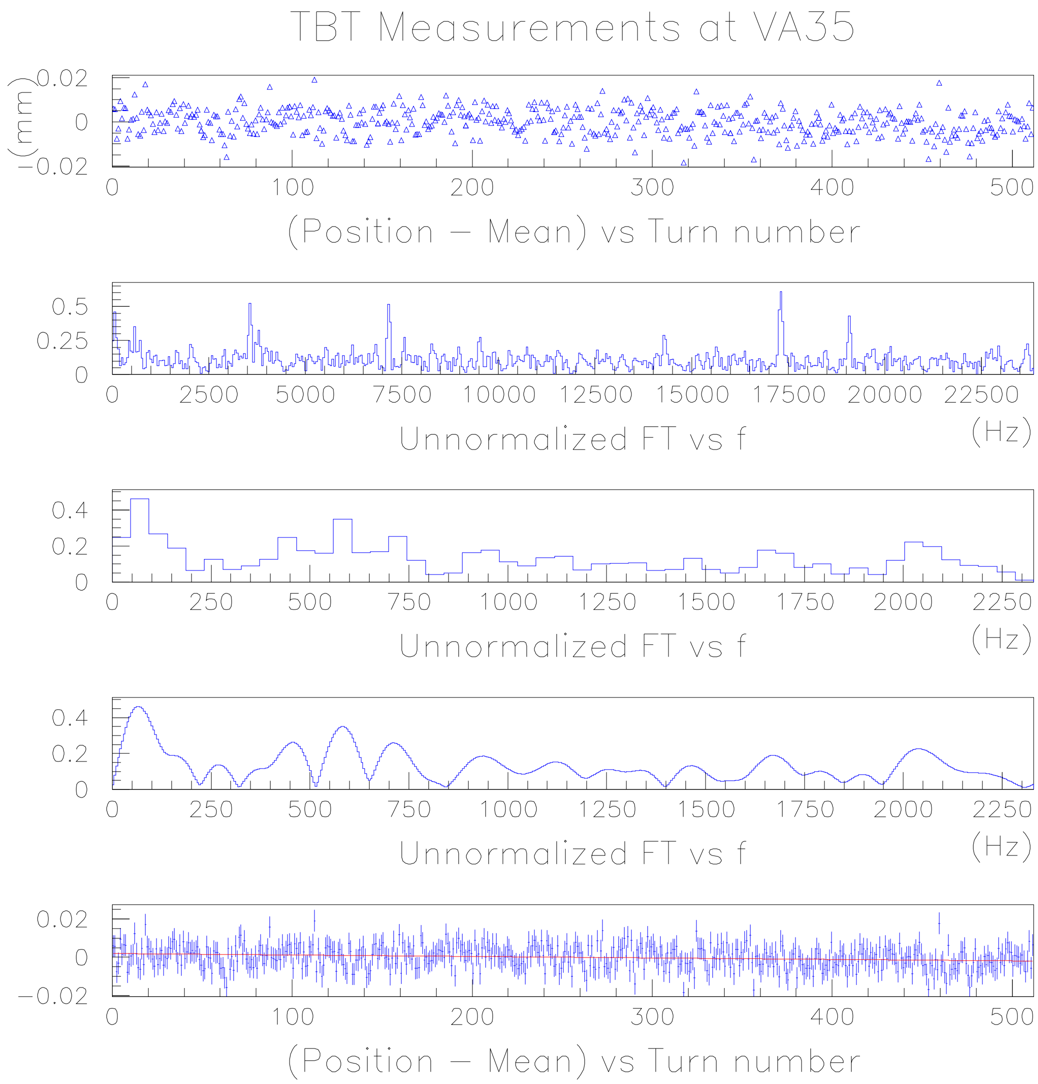

TBT Measurements at VA35
(mm)
0.02
0
−0.02
0
100
200
300
400
500
(Position − Mean) vs Turn number
0.5
0.25
0
0
2500
5000
7500
10000
12500
15000
17500
20000
22500
Unnormalized FT vs f
(Hz)
0.4
0.2
0
0
250
500
750
1000
1250
1500
1750
2000
2250
Unnormalized FT vs f
(Hz)
0.4
0.2
0
0
250
500
750
1000
1250
1500
1750
2000
2250
Unnormalized FT vs f
(Hz)
0.02
0
−0.02
0
100
200
300
400
500
(Position − Mean) vs Turn number

Figure 5: cc

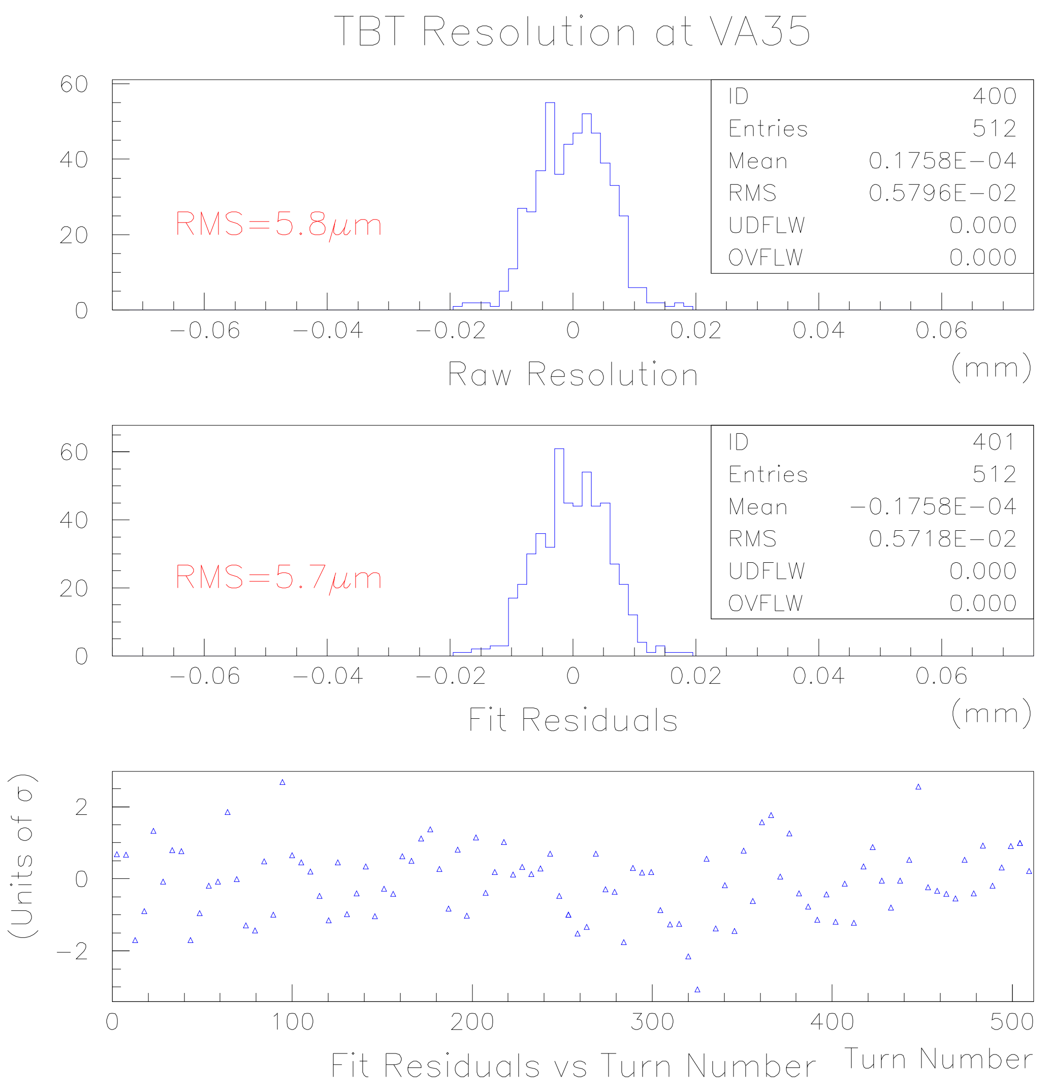
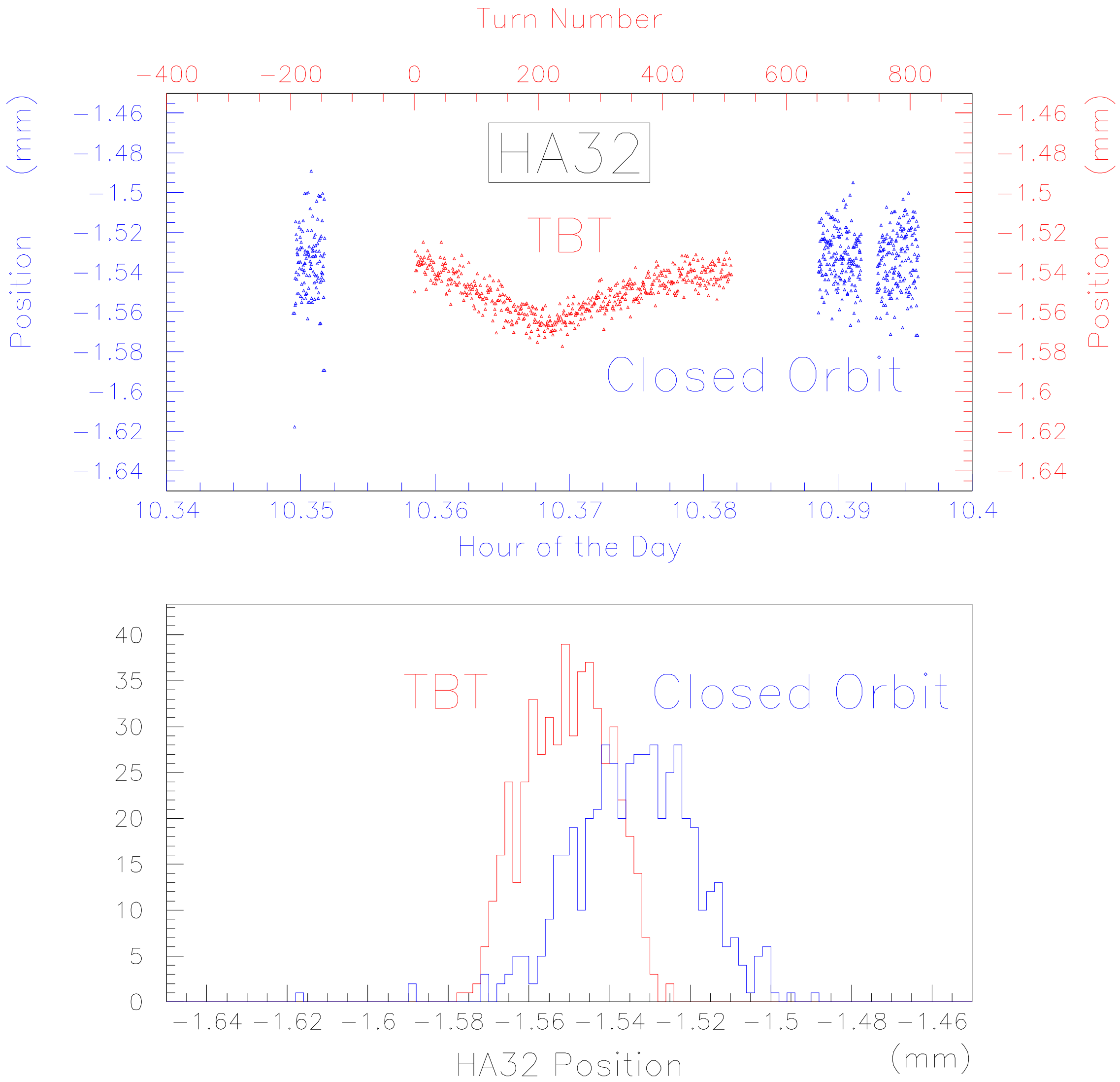

TBT Resolution at VA35
ID 400
Entries 512
Mean 0.1758E−04
RMS 0.5796E−02
UDFLW 0.000
OVFLW 0.000
RMS=5.8μm
Raw Resolution
(mm)
ID 401
Entries 512
Mean −0.1758E−04
RMS 0.5718E−02
UDFLW 0.000
OVFLW 0.000
RMS=5.7μm
Fit Residuals
(mm)
(Units of σ)
Fit Residuals vs Turn Number
Turn Number

Figure 6: cc



Turn Number
−400
−200
0
200
400
600
800
HA32
TBT
Closed Orbit
Position (mm)
−1.46
−1.48
−1.5
−1.52
−1.54
−1.56
−1.58
−1.6
−1.62
−1.64
10.34
10.35
10.36
10.37
10.38
10.39
10.4
Hour of the Day
40
35
30
25
20
15
10
5
0
−1.64 −1.62 −1.6 −1.58 −1.56 −1.54 −1.52 −1.5 −1.48 −1.46
HA32 Position
(mm)

Figure 7: cc

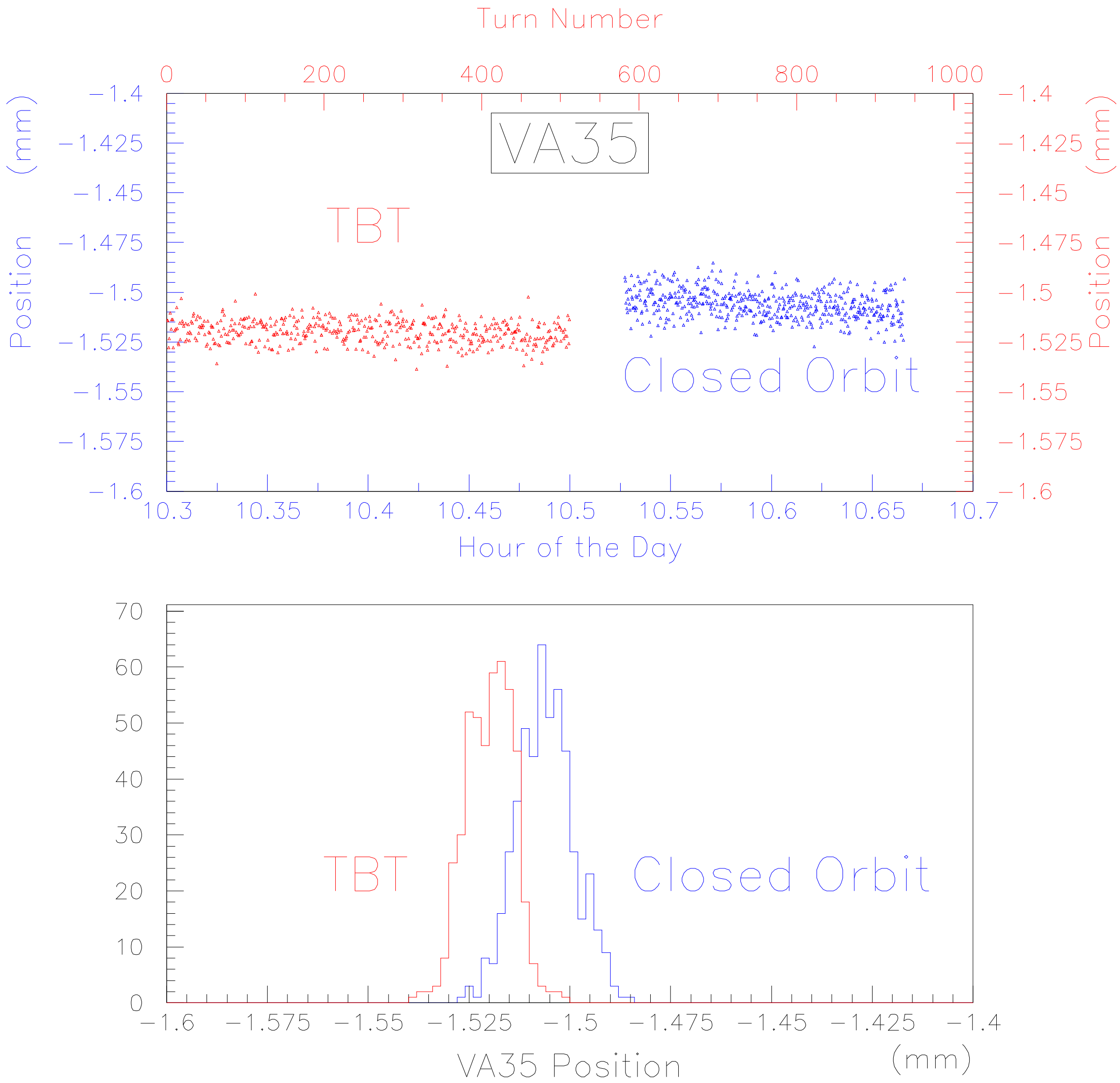

Turn Number
VA35
TBT
Closed Orbit
Position (mm)
Hour of the Day
TBT
Closed Orbit
VA35 Position
(mm)

Figure 8: cc

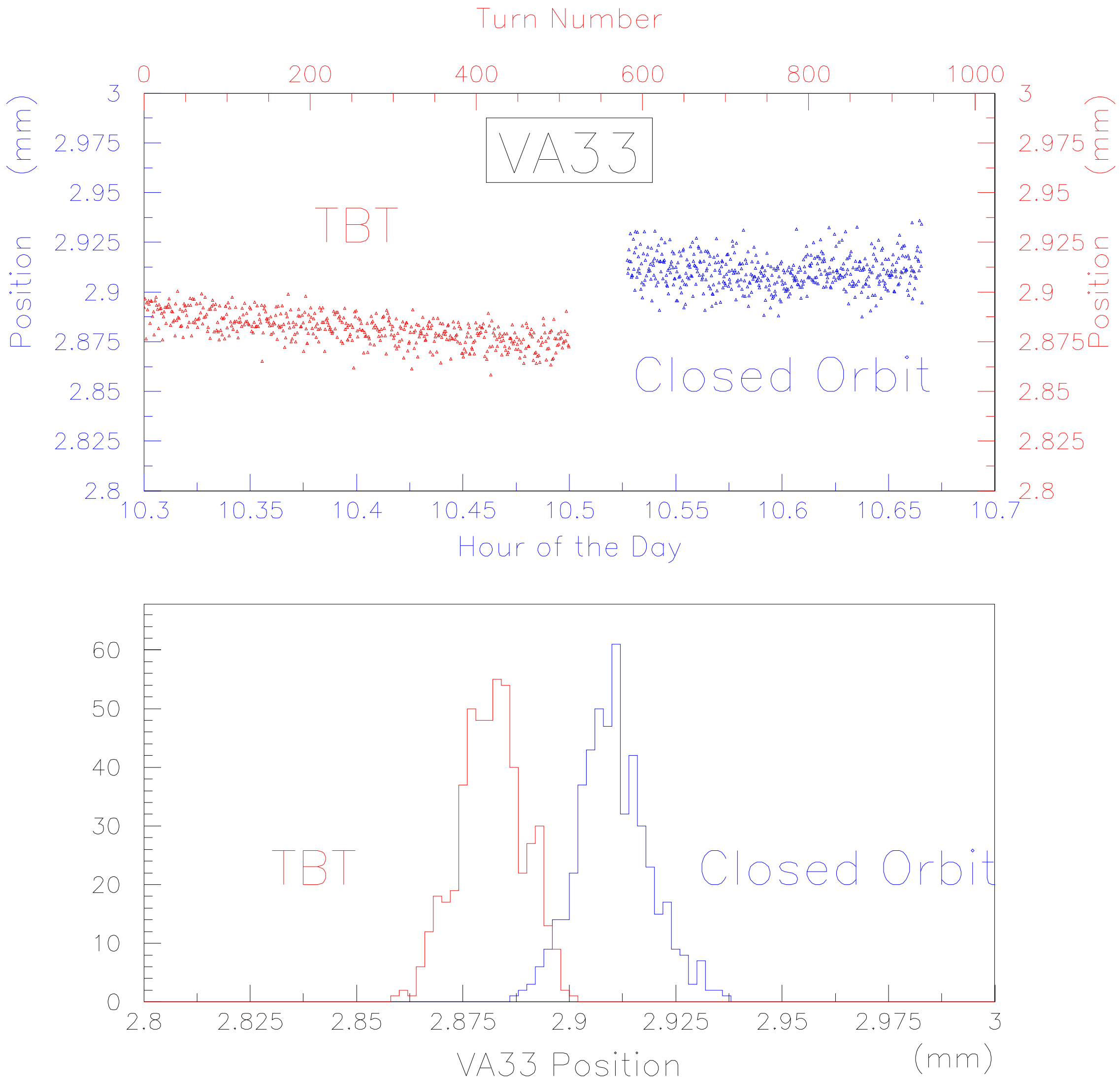

Turn Number
0
200
400
600
800
1000
3
2.975
2.95
2.925
2.9
2.875
2.85
2.825
2.8
Position (mm)
VA33
TBT
Closed Orbit
10.3
10.35
10.4
10.45
10.5
10.55
10.6
10.65
10.7
Hour of the Day
60
50
40
30
20
10
0
2.8
2.825
2.85
2.875
2.9
2.925
2.95
2.975
3
VA33 Position
(mm)

Figure 9: cc

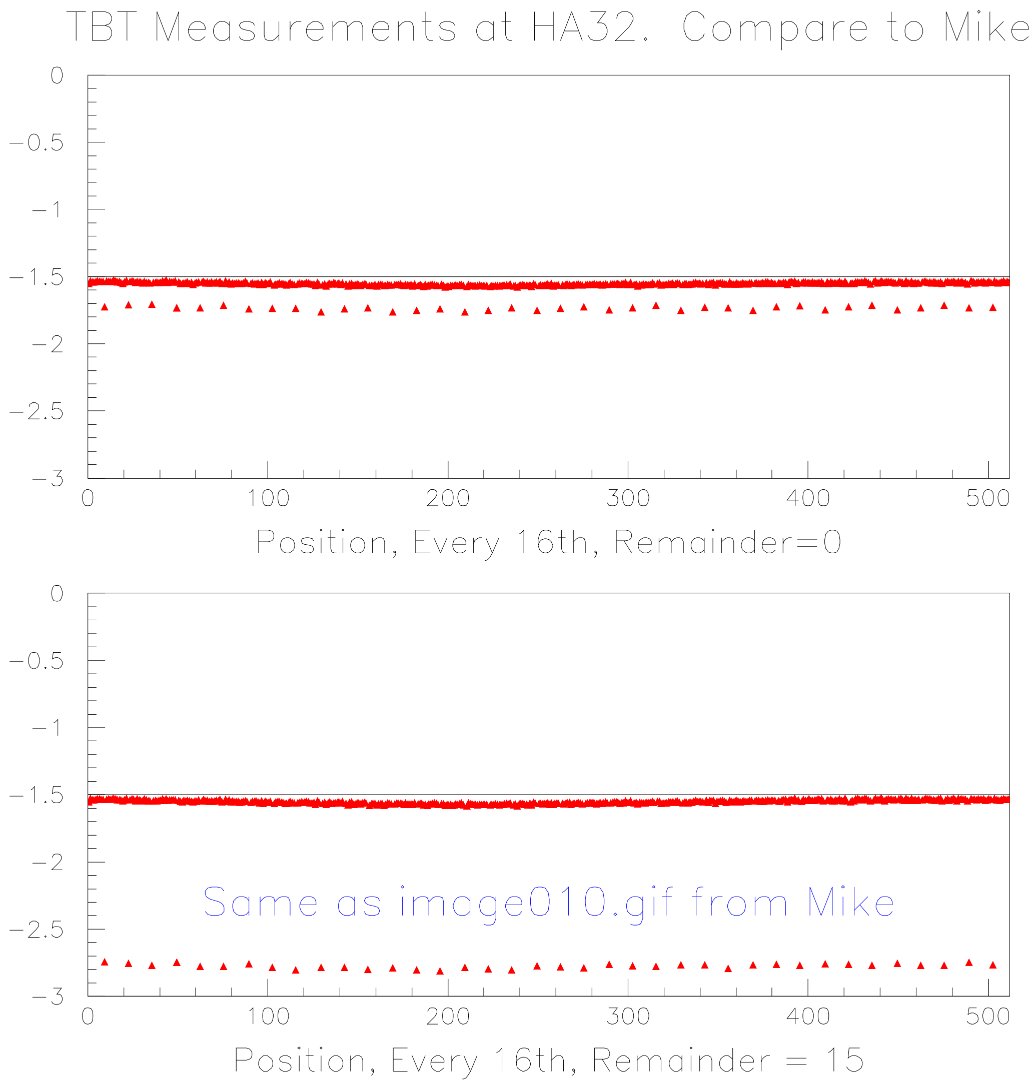
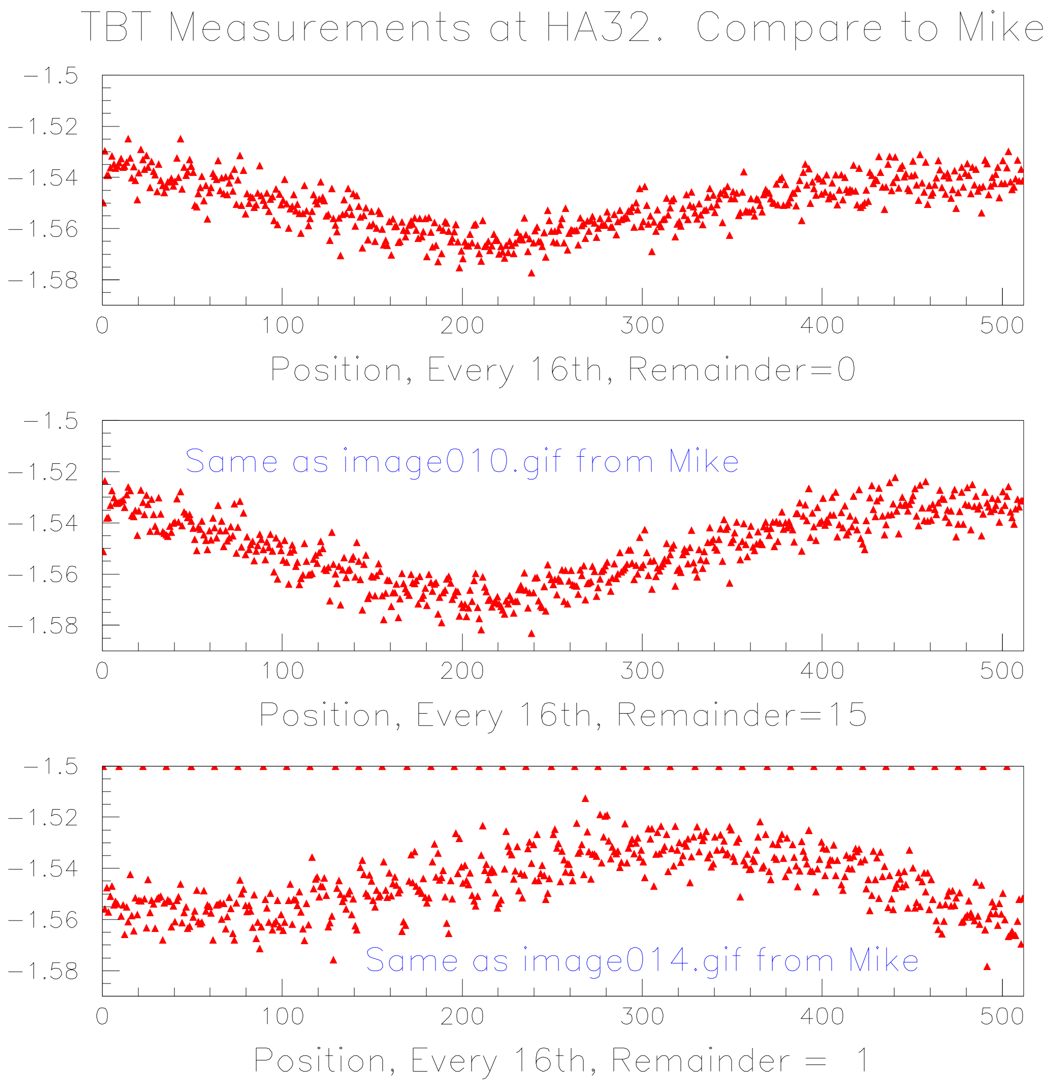
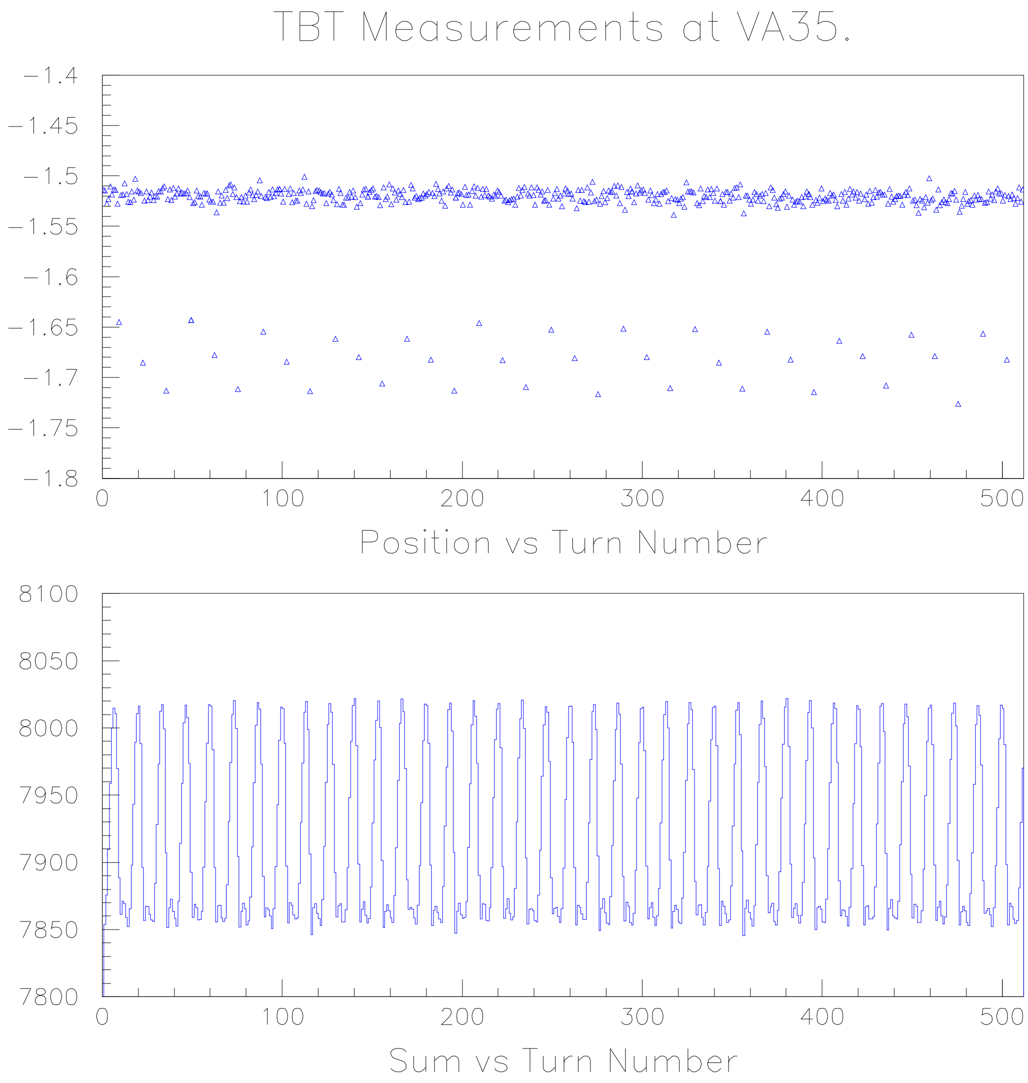

TBT Measurements at HA32. Compare to Mike
0
−0.5
−1
−1.5
−2
−2.5
−3
0
100
200
300
400
500
Position, Every 16th, Remainder=0
Same as image010.gif from Mike
Position, Every 16th, Remainder = 15

Figure 10: cc



TBT Measurements at HA32. Compare to Mike
−1.5
−1.52
−1.54
−1.56
−1.58
0
100
200
300
400
500
Position, Every 16th, Remainder=0
Same as image010.gif from Mike
Position, Every 16th, Remainder=15
Same as image014.gif from Mike
Position, Every 16th, Remainder = 1

Figure 11: cc



TBT Measurements at VA35.
−1.4
−1.45
−1.5
−1.55
−1.6
−1.65
−1.7
−1.75
−1.8
0
100
200
300
400
500
Position vs Turn Number
8100
8050
8000
7950
7900
7850
7800
0
100
200
300
400
500
Sum vs Turn Number

Figure 12: cc

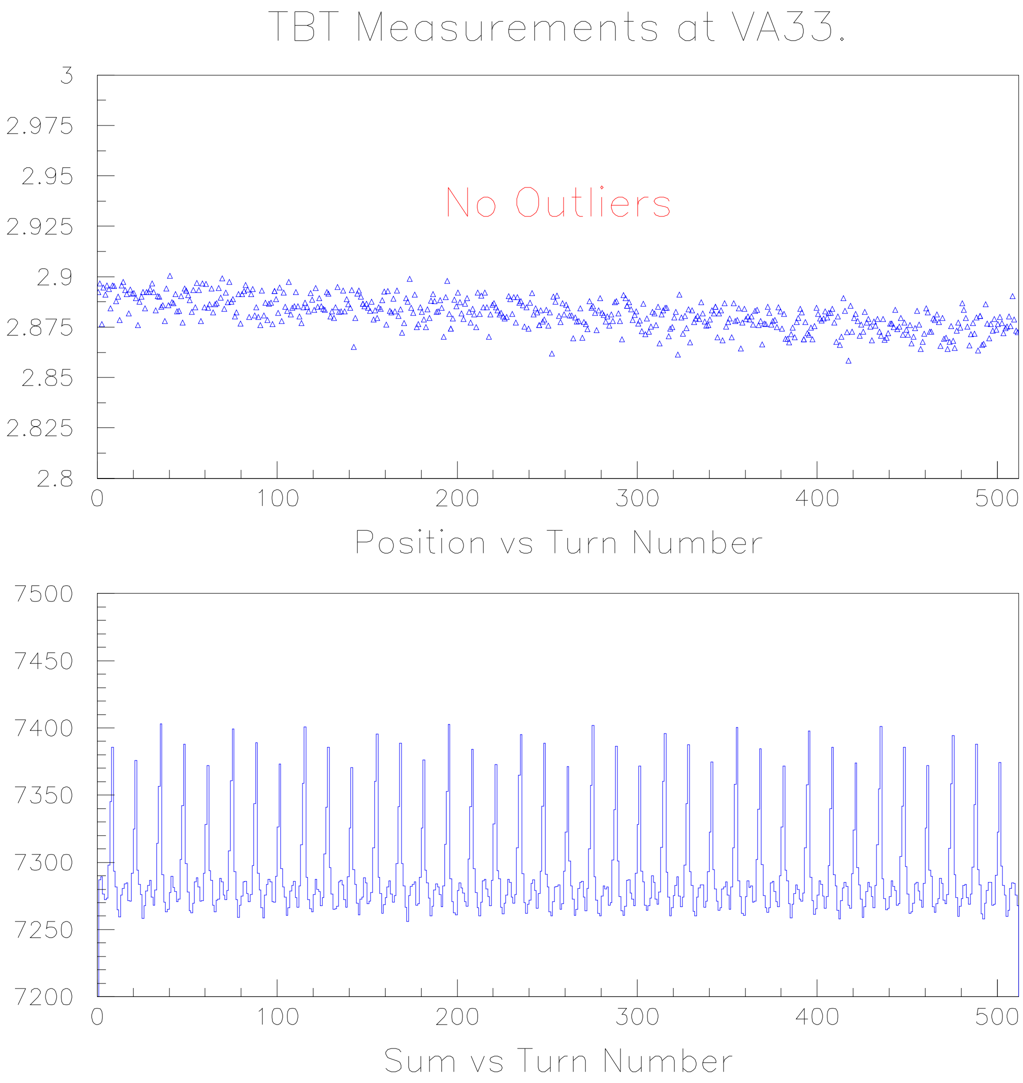

TBT Measurements at VA33.
No Outliers
3
2.975
2.95
2.925
2.9
2.875
2.85
2.825
2.8
0
100
200
300
400
500
Position vs Turn Number
7500
7450
7400
7350
7300
7250
7200
0
100
200
300
400
500
Sum vs Turn Number

Figure 13: cc