

CESR-c e- Cloud Machine Studies
e+ with witness bunch
3/13/2007

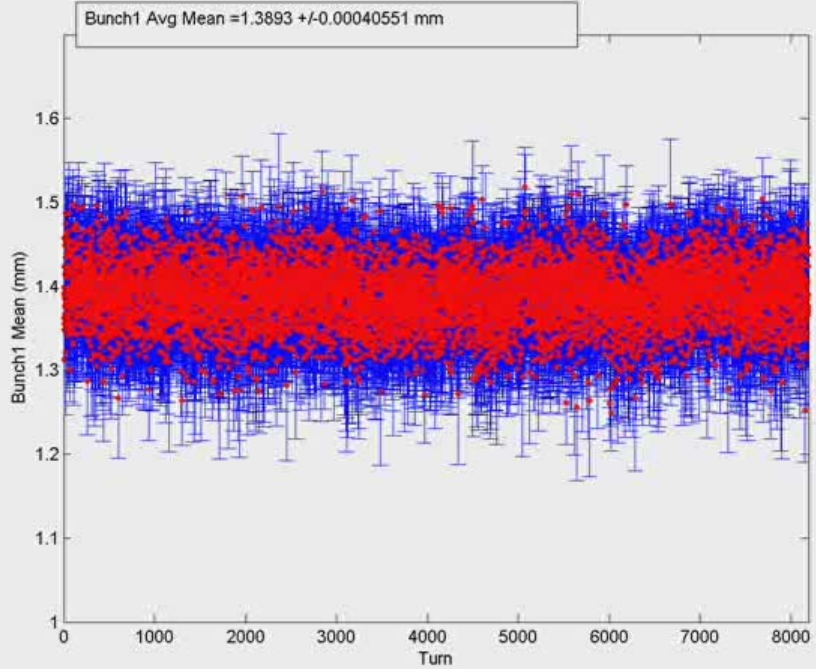
Introduction

e- cloud witness bunch measurements were made at the CESR-C operating energy with only e+ present in CESR.

Turn-by-turn vertical beam distribution measurements were made using the photomultiplier tube array. The vertical distribution was measured for 8192 turns with an e+ train of 10 bunches and e+ witness bunches located behind the main train.

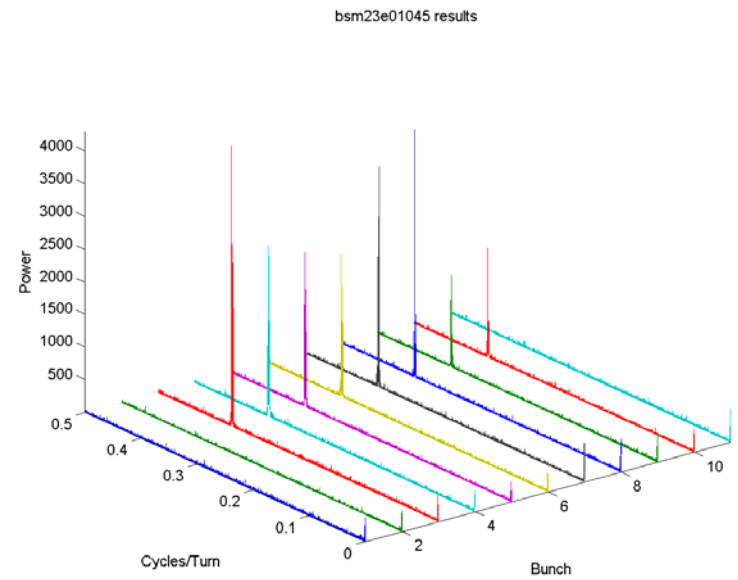
The e+ bunch current was 0.75mA/bunch (on average). The e- feedback was off and the horizontal/vertical separators were off.

Displayed on the following slides is a movie of the turn-by-turn mean vertical position and beam size as well as the FFT of these quantities. The main 10 bunch train is displayed first in the movie and FFT. The witness bunches are displayed in order from closest to furthest from the main train.

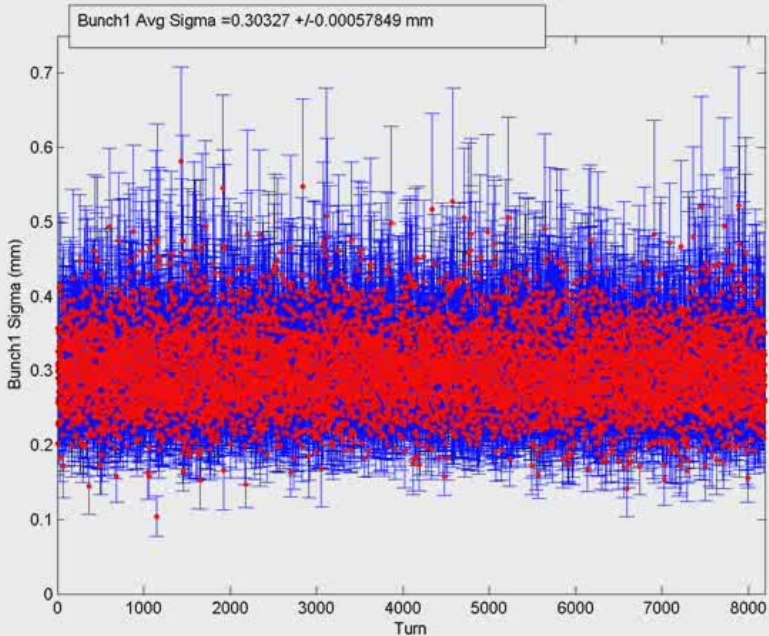


Vertical mean position (movie)

FFT Vertical position

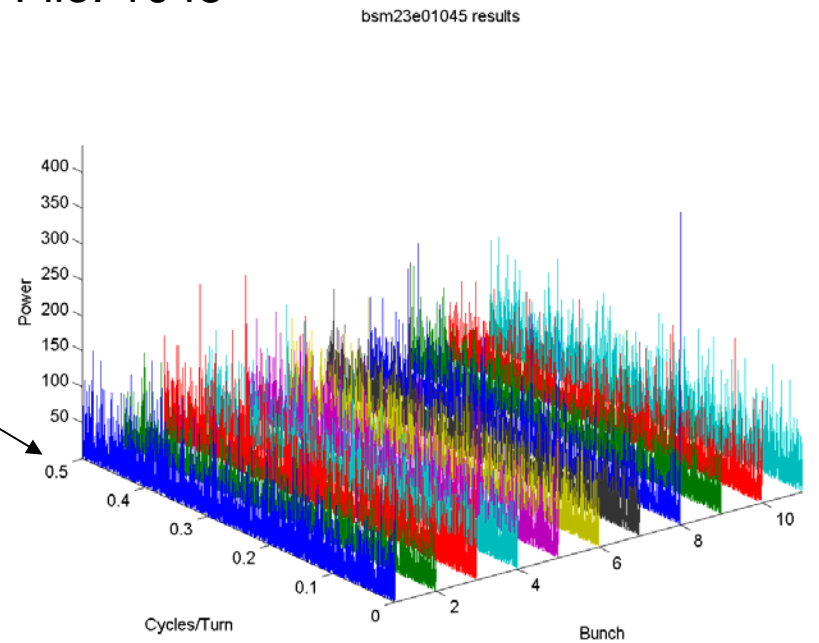


e+ vertical dynamics
 Witness bunch 42
 File: 1045



σ_v (movie)

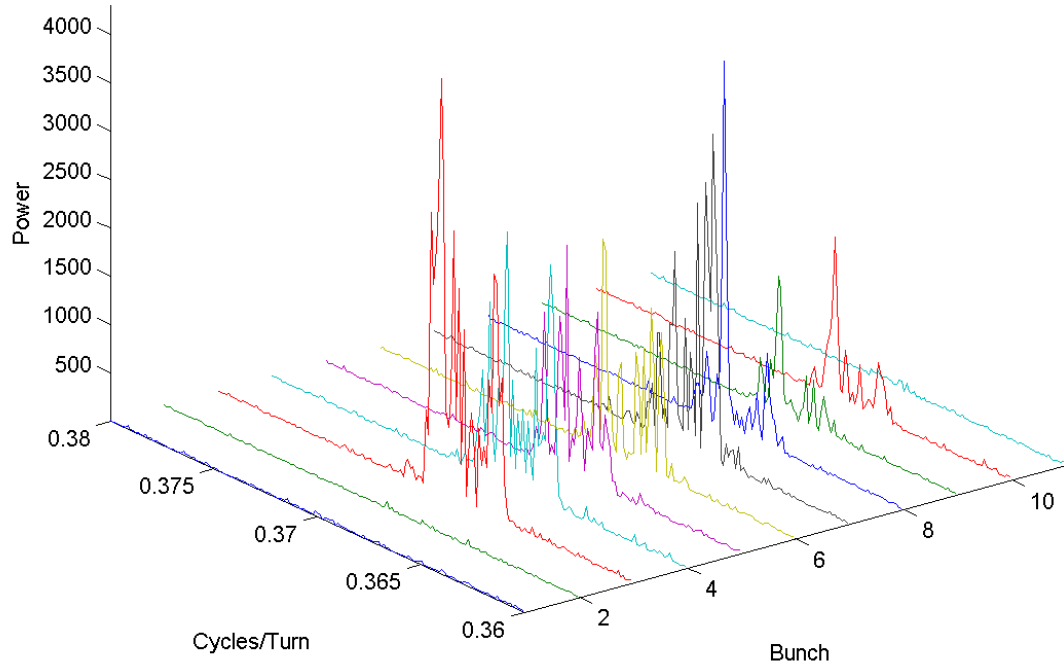
FFT σ_v

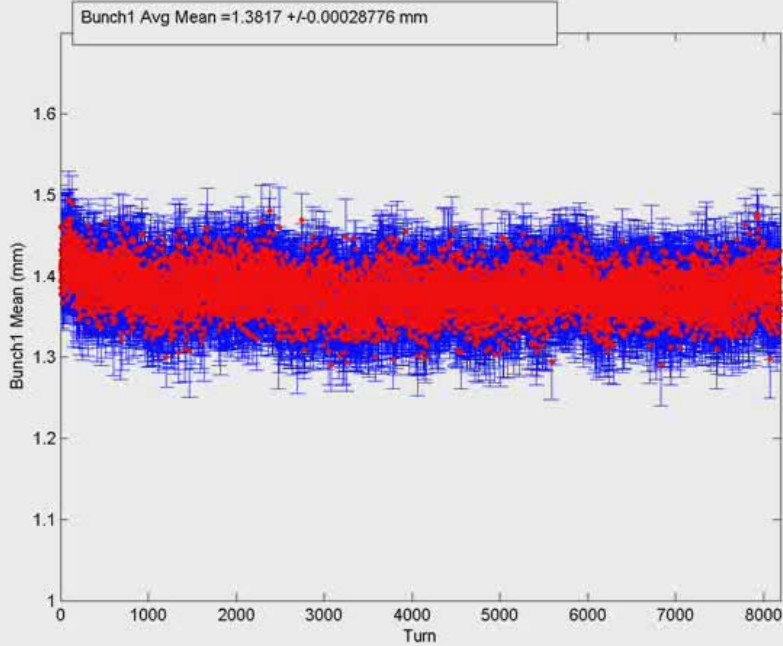


FFT of mean vertical
position from 242.0-249.8 kHz

bsm23e01045 results

e+ vertical dynamics
Witness bunch 42
File: 1045

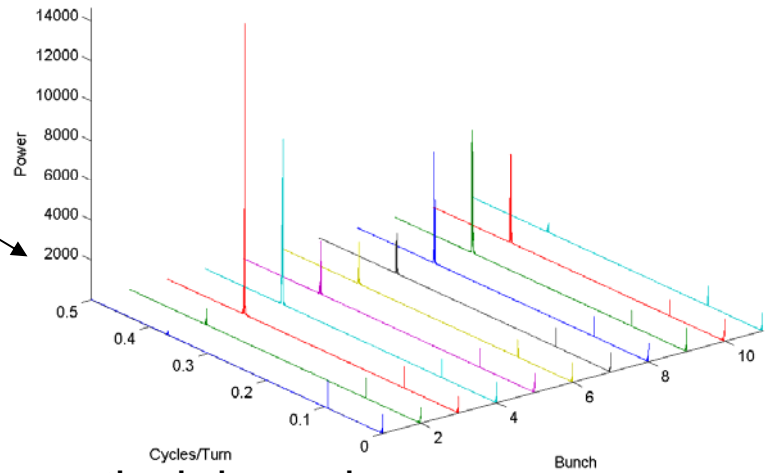




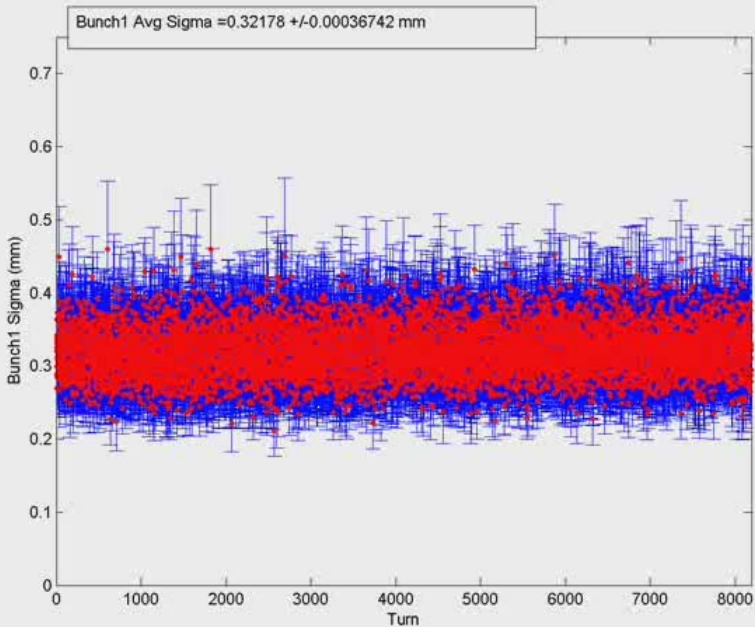
Vertical mean position (movie)



FFT Vertical position



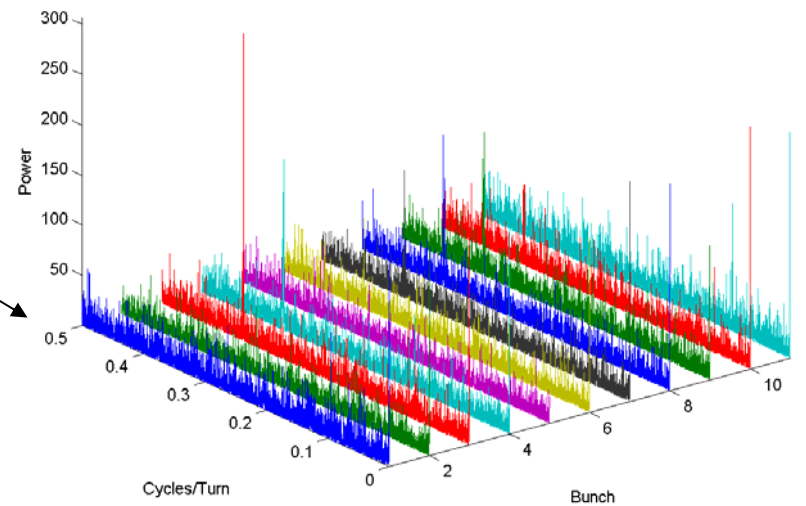
e+ vertical dynamics
 Witness bunch 42
 File: 1046



σ_v (movie)

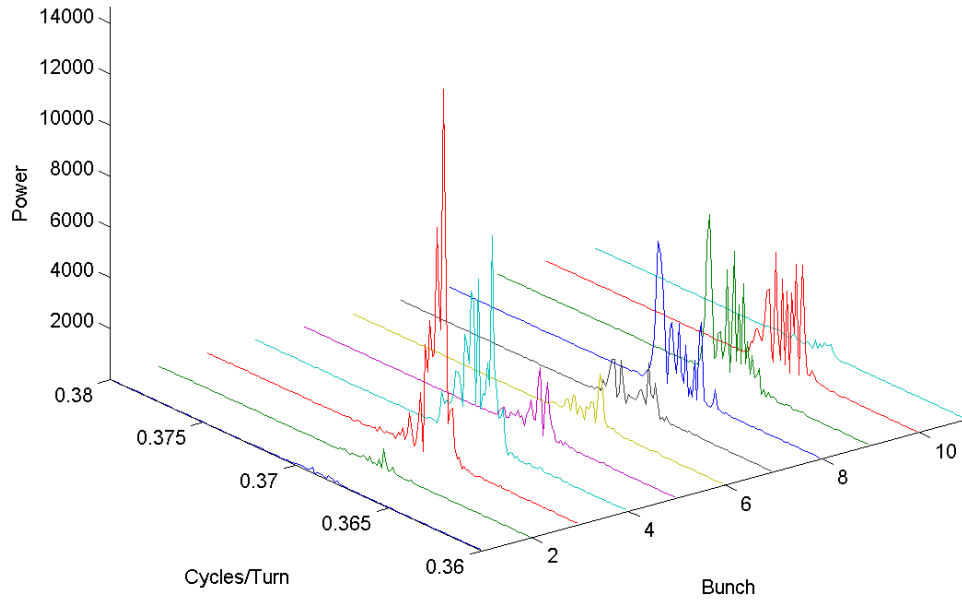


FFT σ_v



FFT of mean vertical
position from 242.0-249.8 kHz

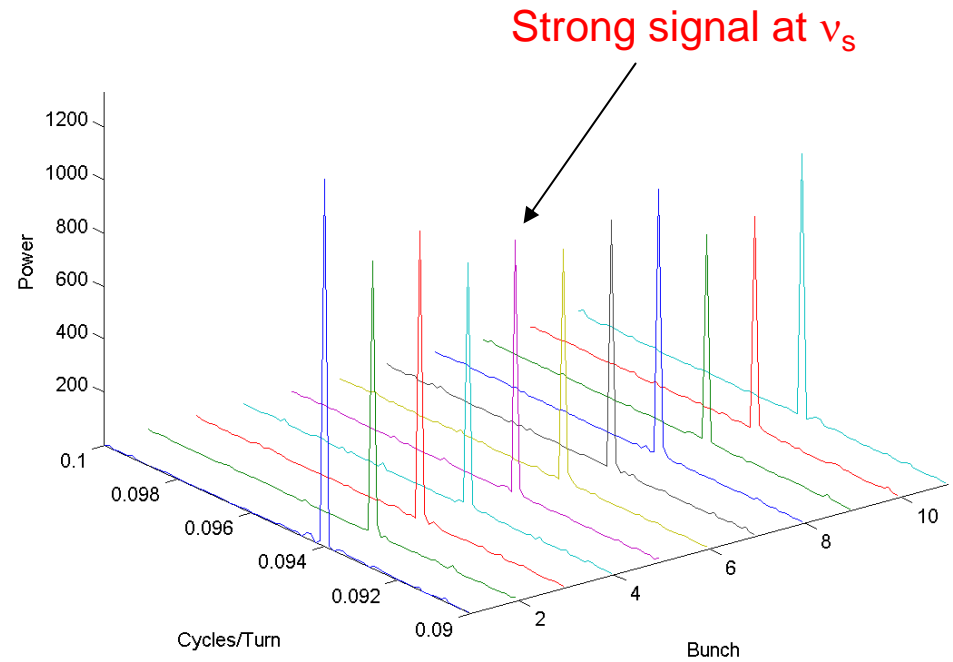
bsm23e01046 results

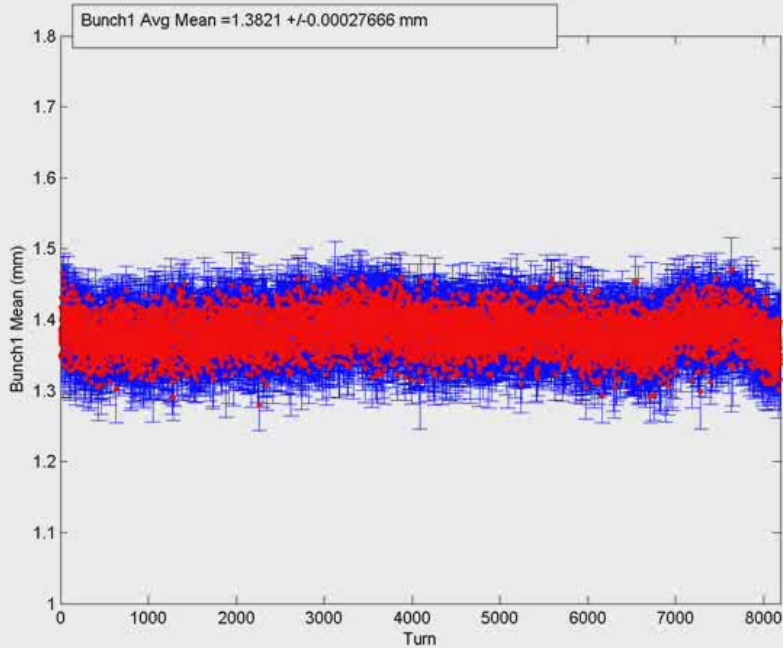


e+ vertical dynamics
Witness bunch 42
File: 1046

FFT of mean vertical
position from 35-39 kHz

bsm23e01046 results

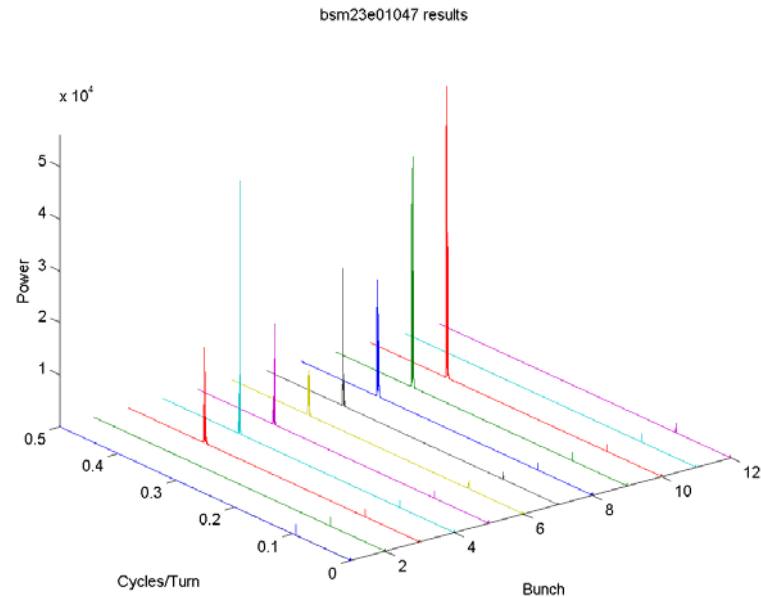
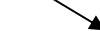




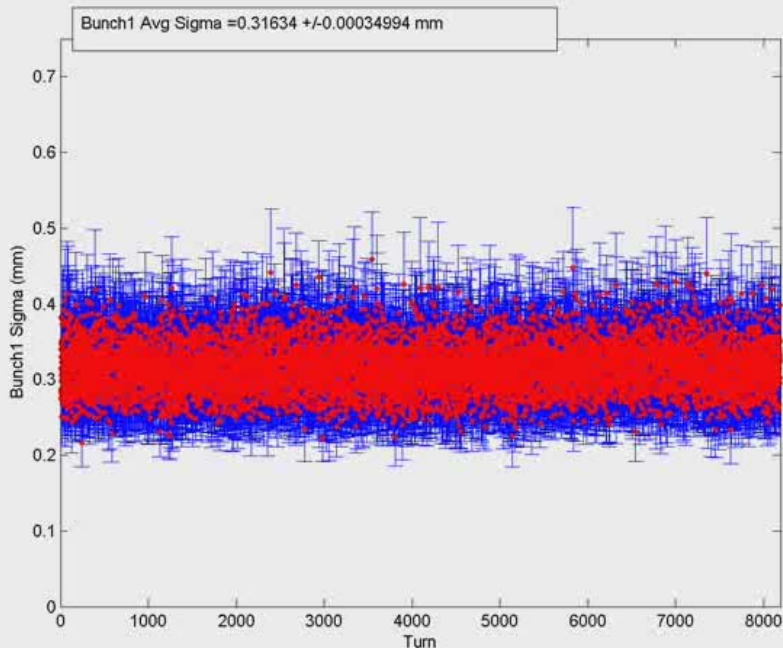
Vertical mean position (movie)



FFT Vertical position



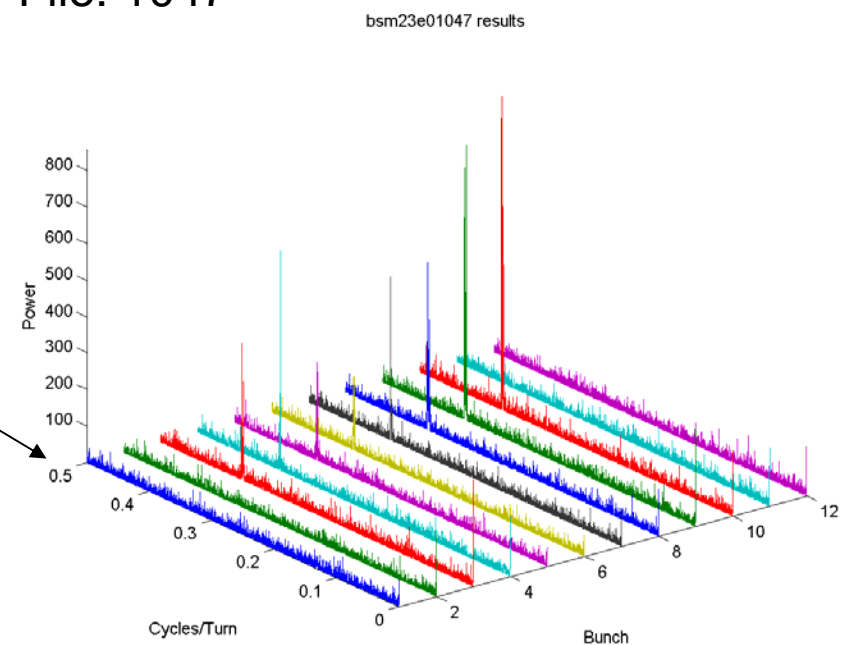
e+ vertical dynamics
 Witness bunches 38,42
 File: 1047



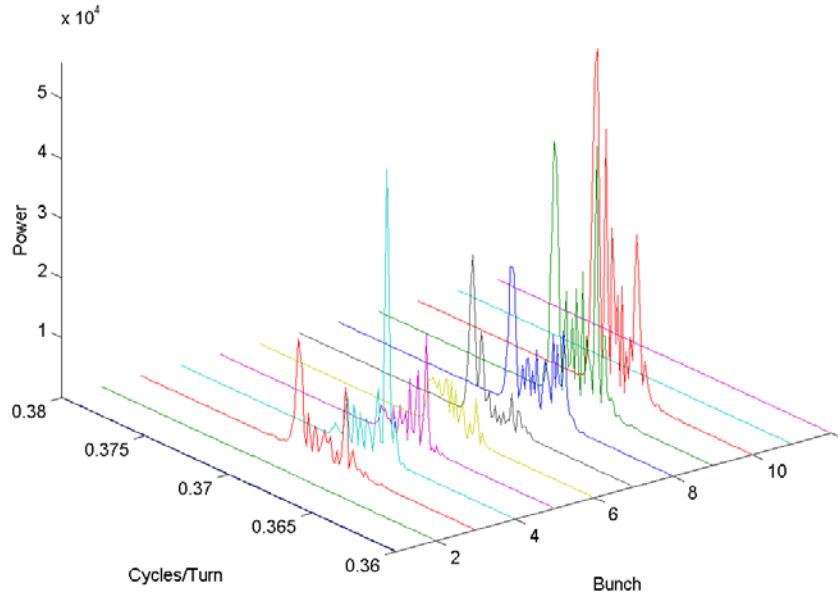
σ_v (movie)



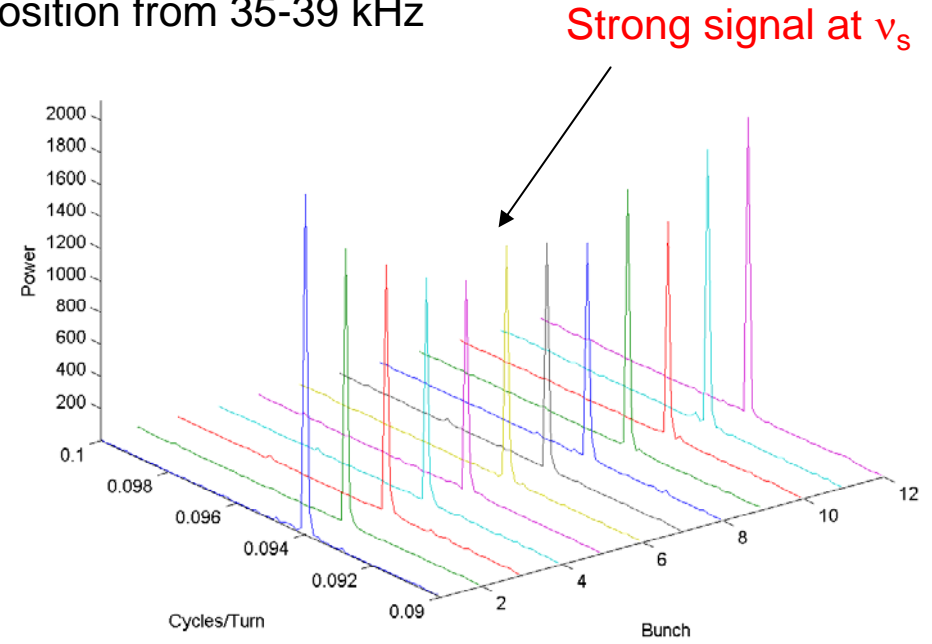
FFT σ_v



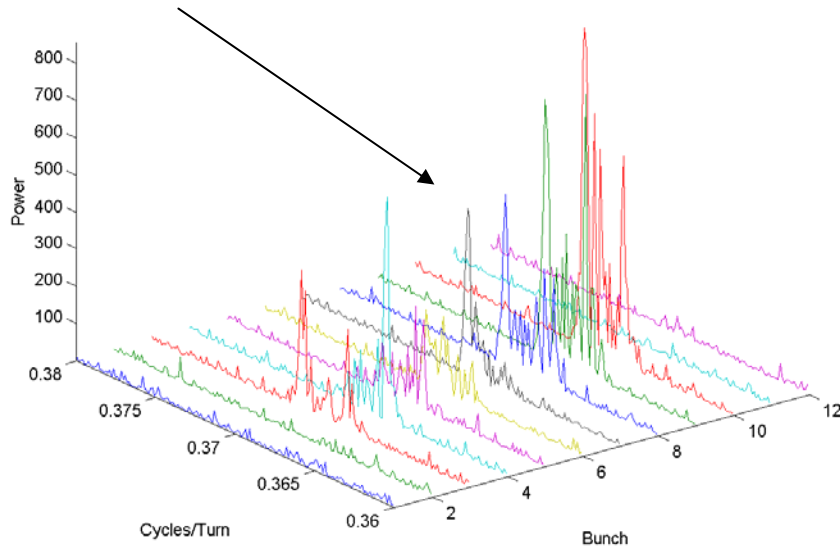
bsm23e01047 results
FFT of mean vertical position from 242.0-249.8 kHz



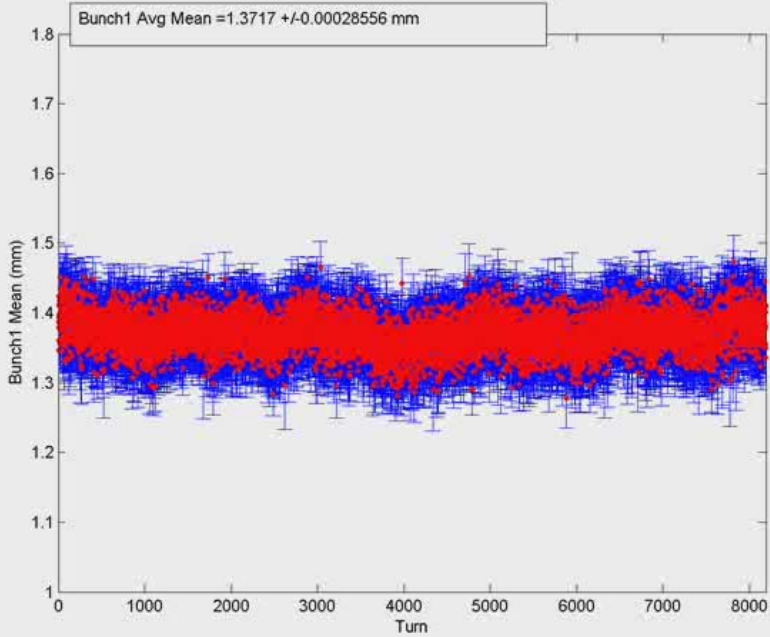
bsm23e01047 results
FFT of mean vertical position from 35-39 kHz



bsm23e01047 results
FFT of σ_v from 242.0-249.8 kHz



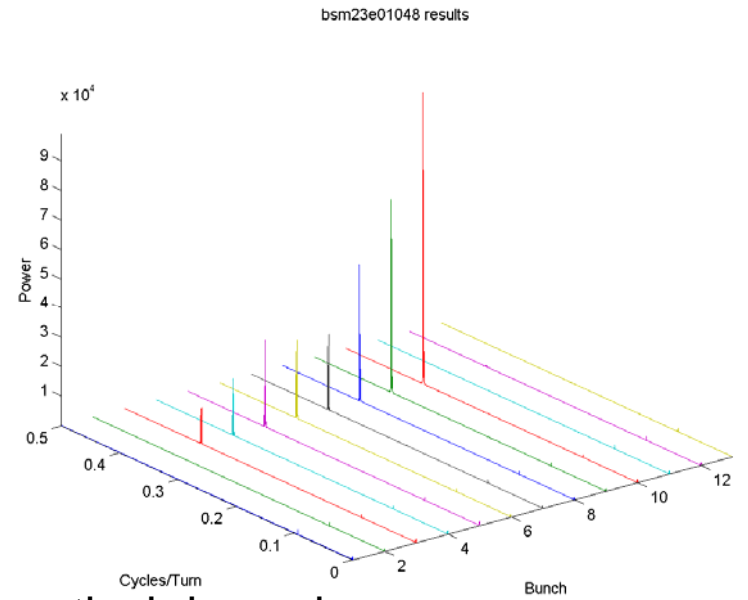
e+ vertical dynamics
Witness bunches 38,42
File: 1047



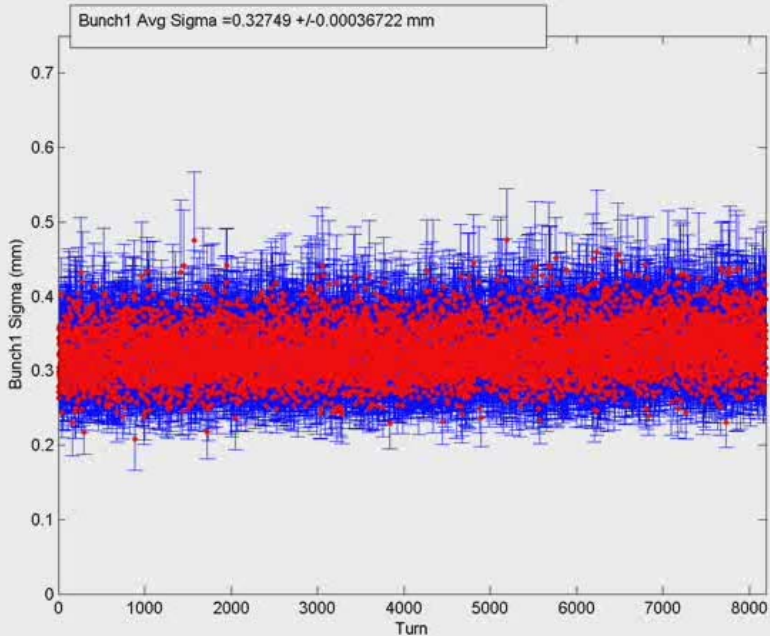
Vertical mean position (movie)



FFT Vertical position



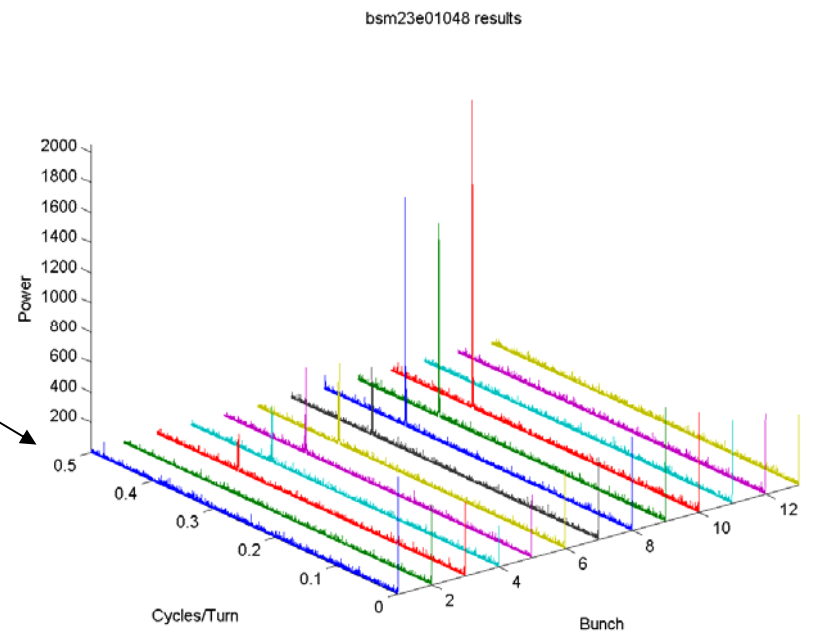
e+ vertical dynamics
 Witness bunches 34,38,42
 File: 1048



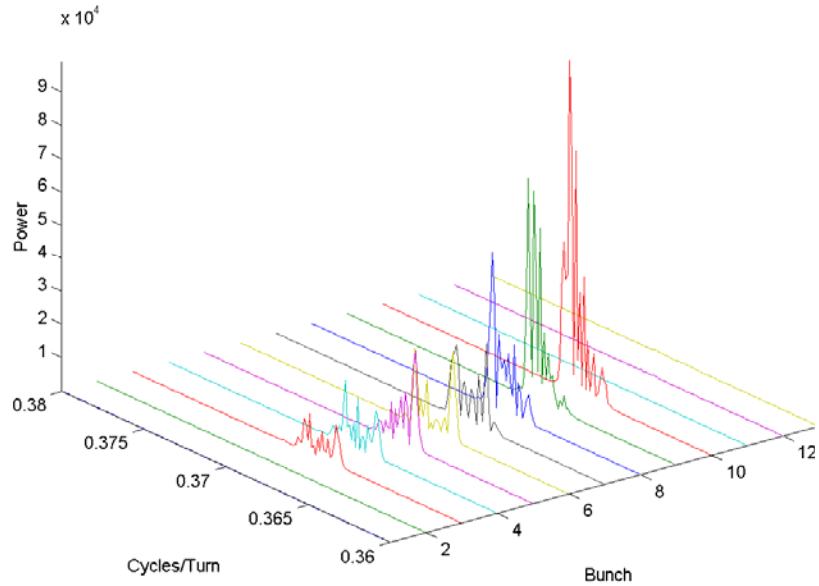
σ_v (movie)



FFT σ_v

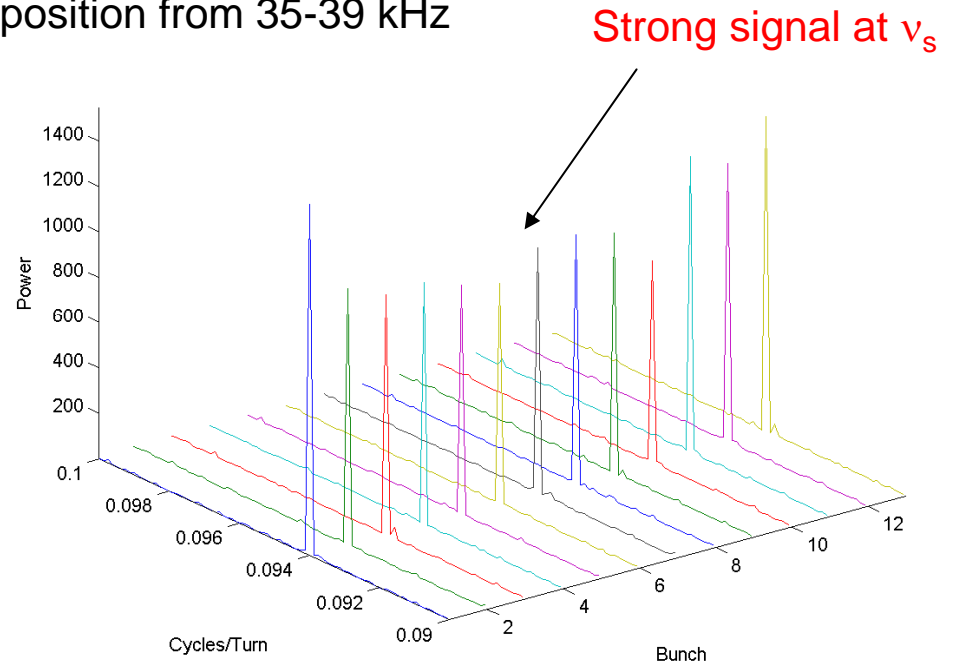


bsm23e01048 results
 FFT of mean vertical position from 242.0-249.8 kHz

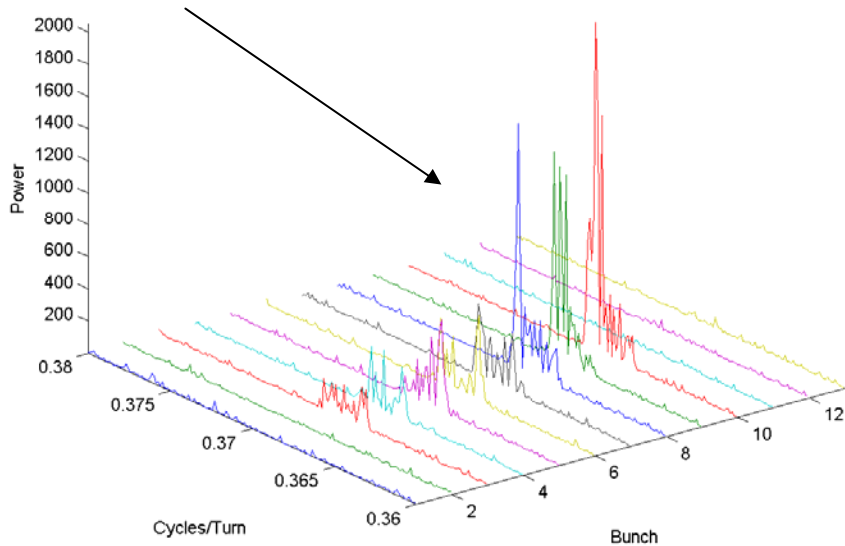


bsm23e01048 results

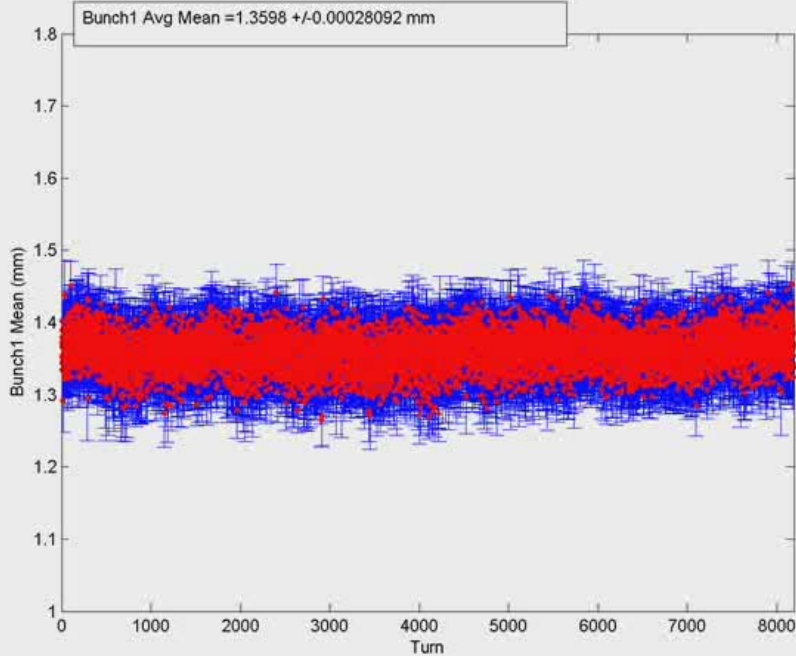
bsm23e01048 results
 FFT of mean vertical position from 35-39 kHz



bsm23e01048 results
 FFT of σ_v from 242.0-249.8 kHz

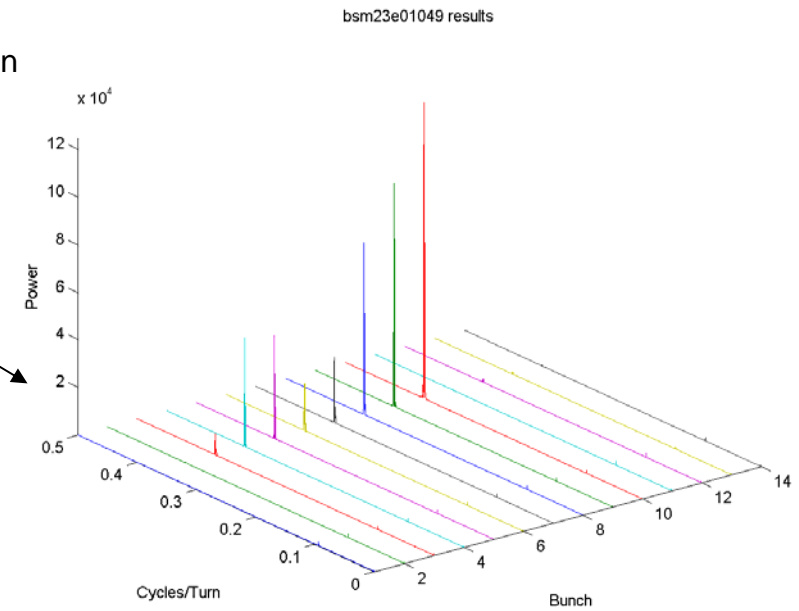


e+ vertical dynamics
 Witness bunches 34,38,42
 File: 1048

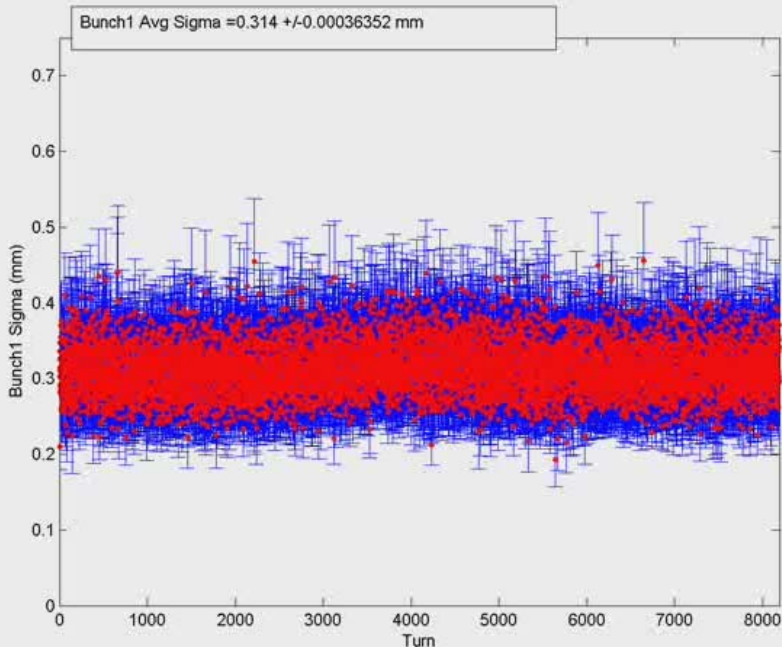


Vertical mean position (movie)

FFT Vertical position

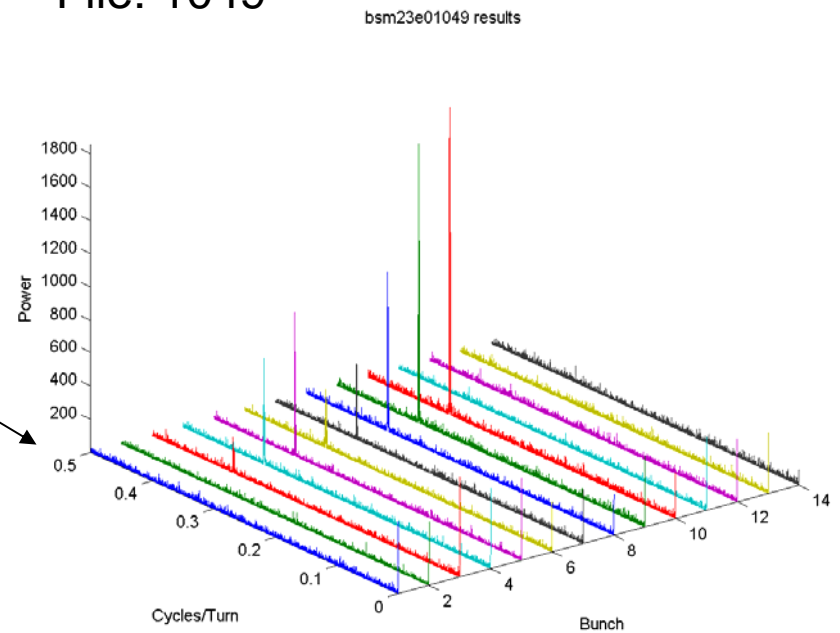


e+ vertical dynamics
 Witness bunches 30,34,38,42
 File: 1049



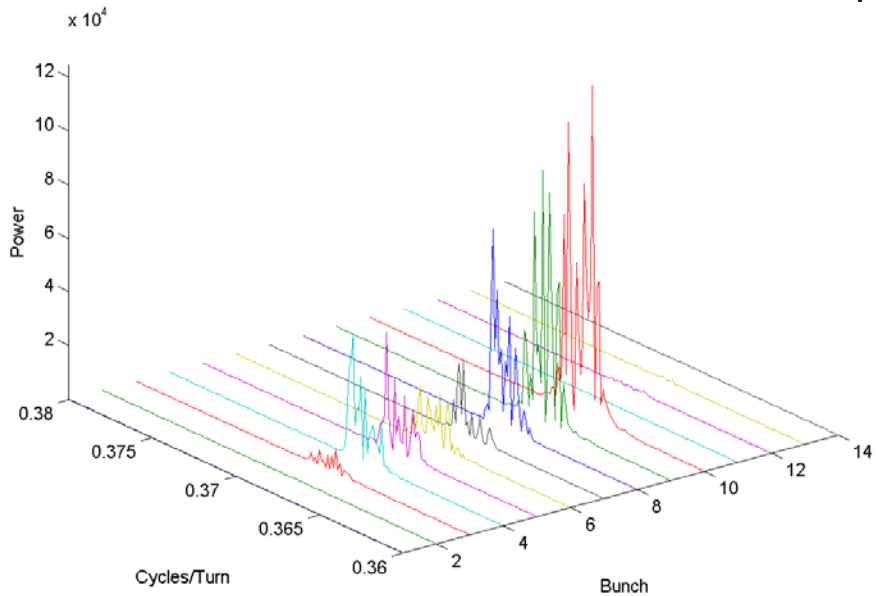
σ_v (movie)

FFT σ_v



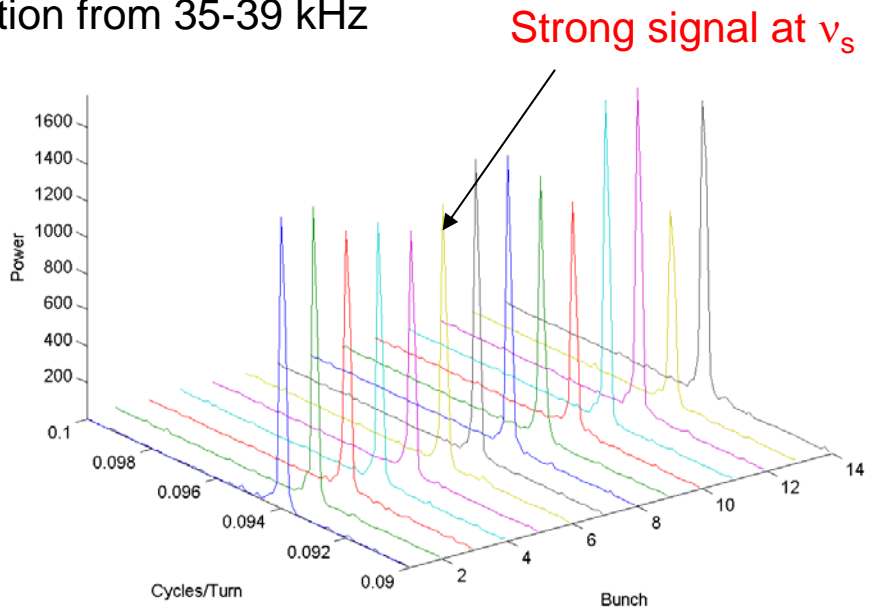
bsm23e01049 results

FFT of mean vertical position from 242.0-249.8 kHz



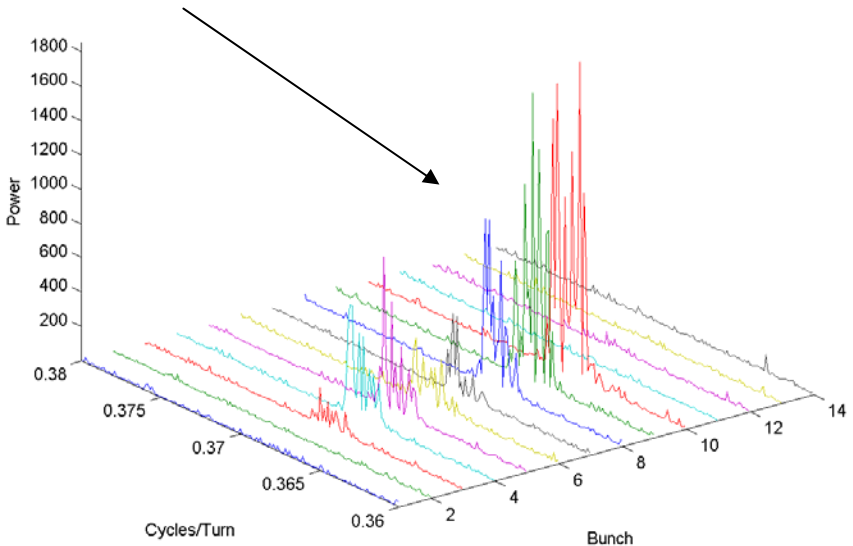
bsm23e01049 results

FFT of mean vertical position from 35-39 kHz

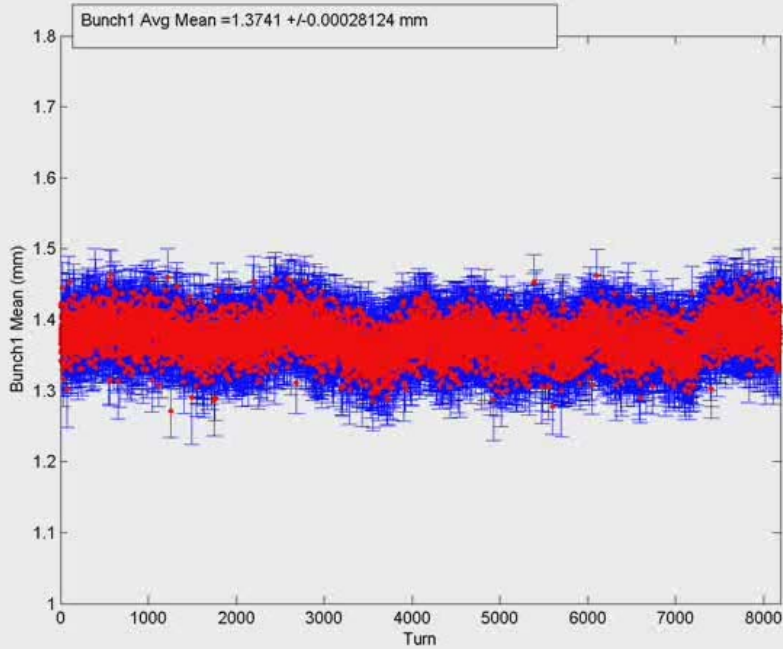


bsm23e01049 results

FFT of σ_v from 242.0-249.8 kHz



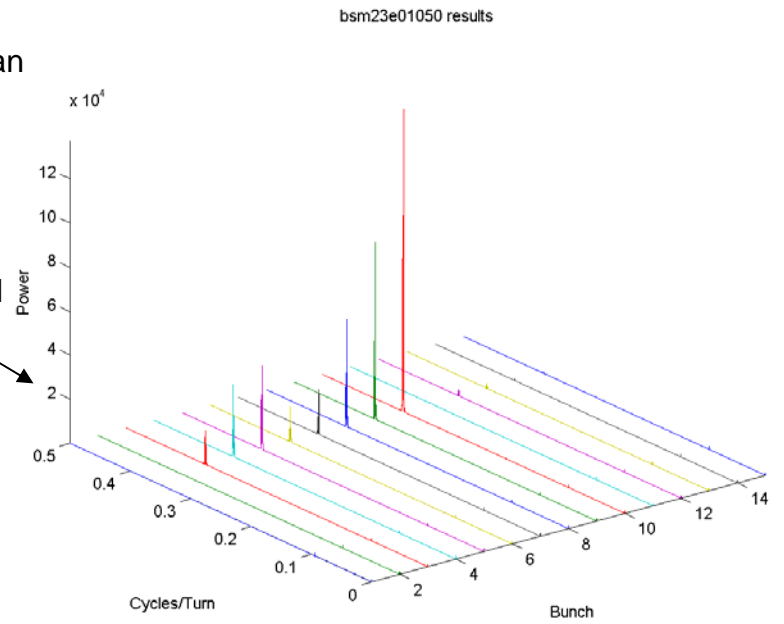
e+ vertical dynamics
 Witness bunches 30,34,38,42
 File: 1049



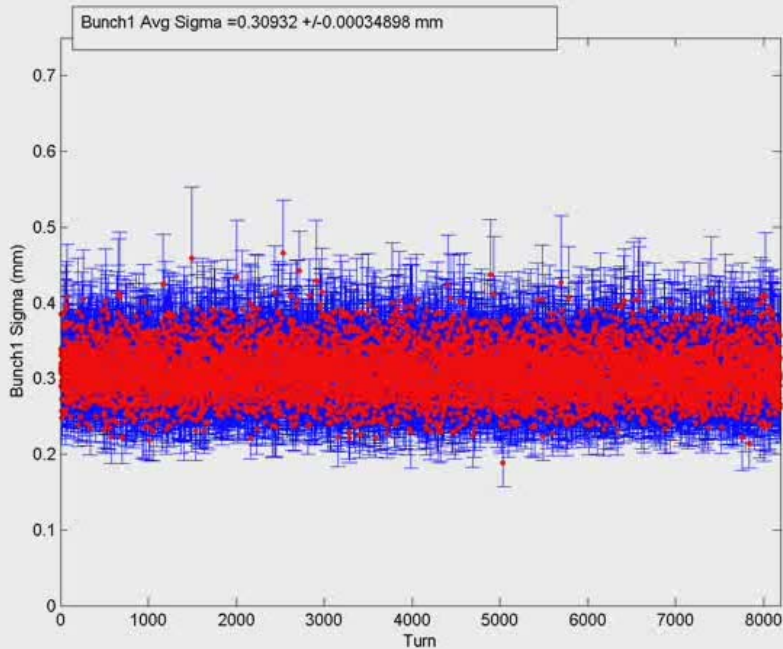
Vertical mean position (movie)



FFT Vertical position



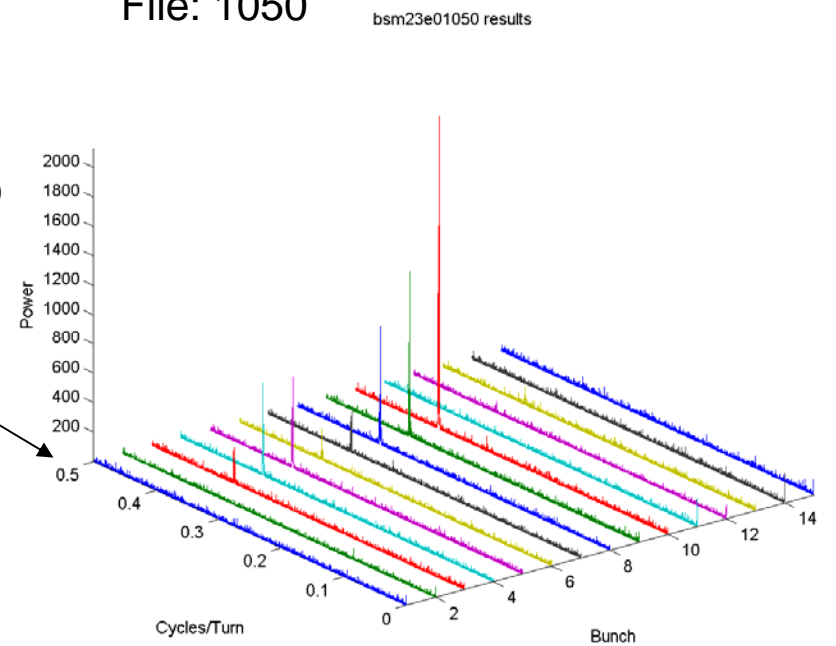
e+ vertical dynamics
 Witness bunches 28,30,34,38,42
 File: 1050



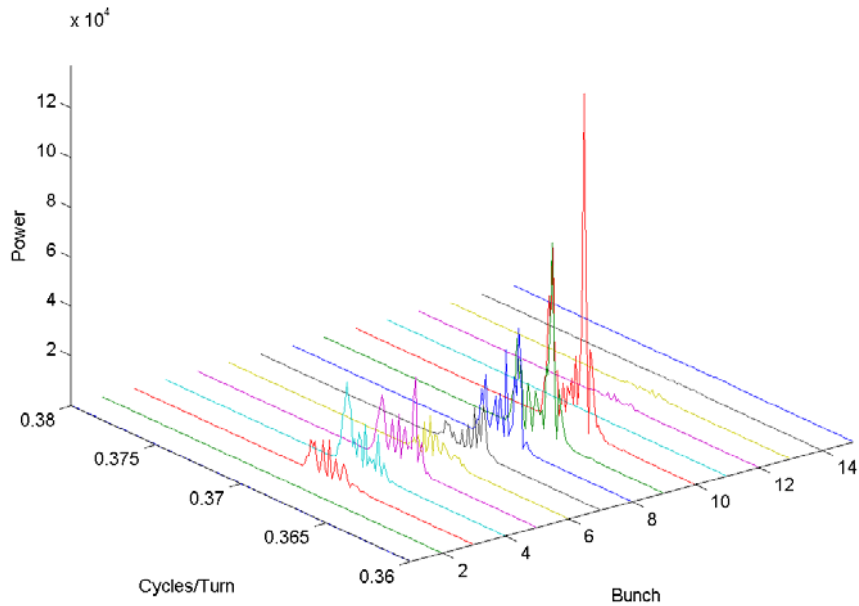
σ_v (movie)



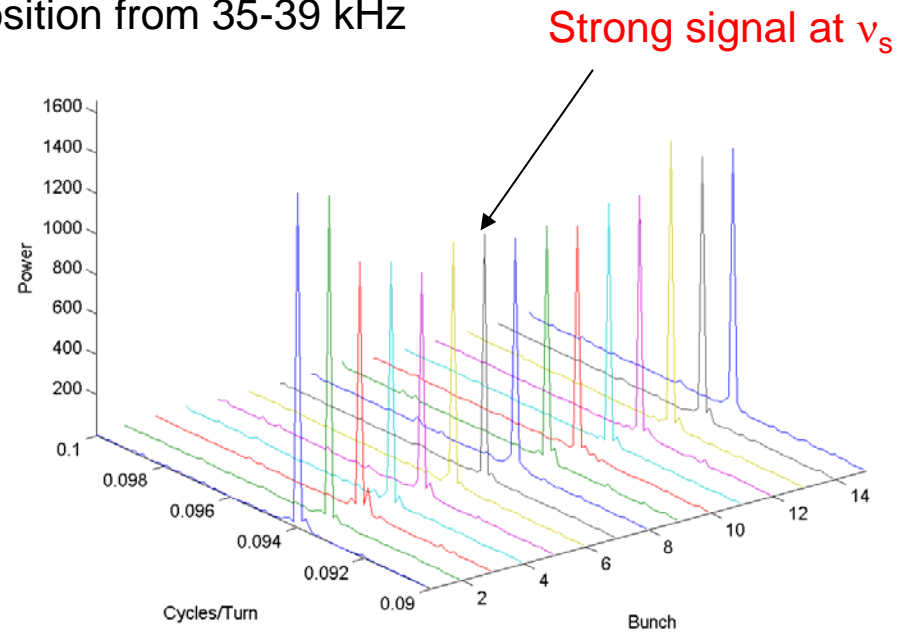
FFT σ_v



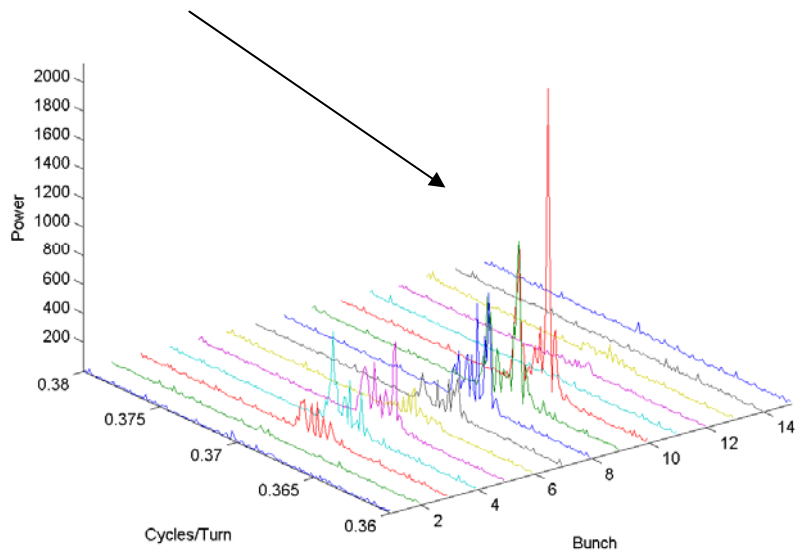
bsm23e01050 results
FFT of mean vertical position from 242.0-249.8 kHz



bsm23e01050 results
FFT of mean vertical position from 35-39 kHz

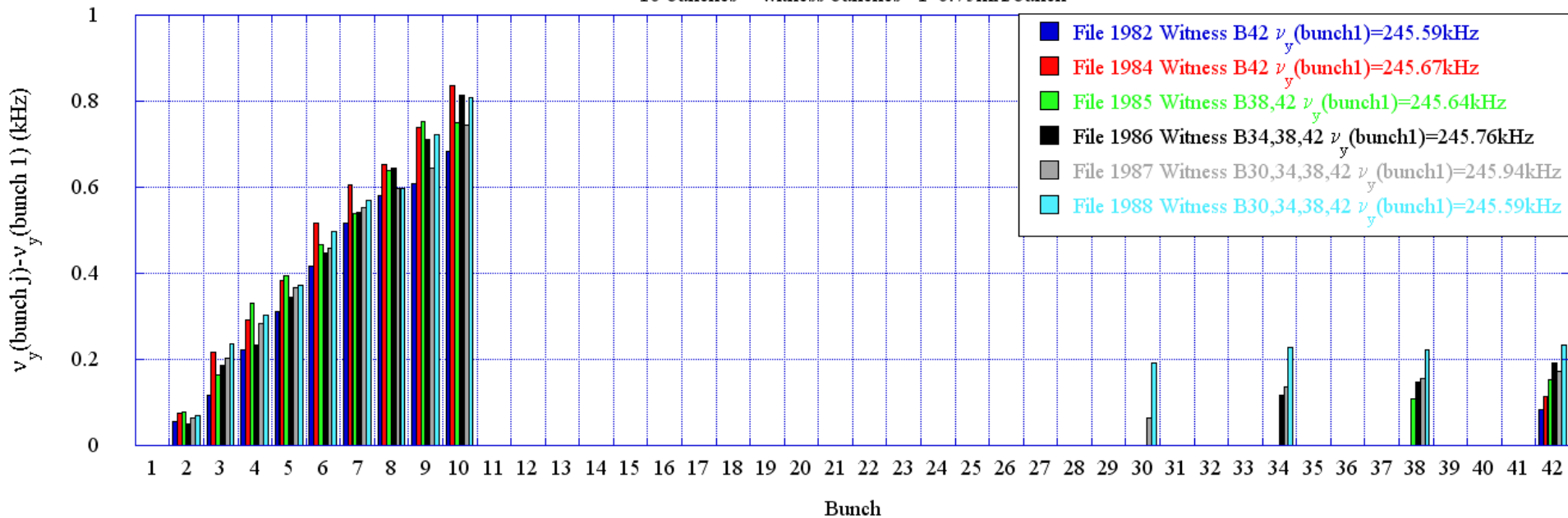


bsm23e01050 results
FFT of σ_v from 242.0-249.8 kHz

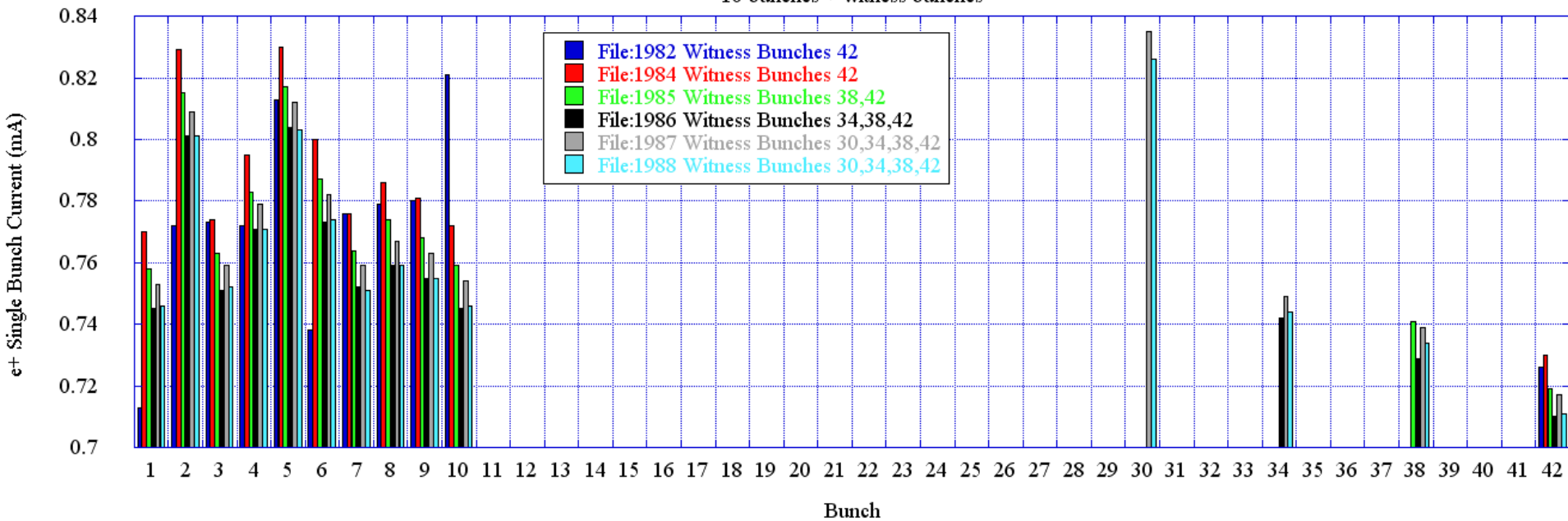


e+ vertical dynamics
Witness bunches 28,30,34,38,42
File: 1050

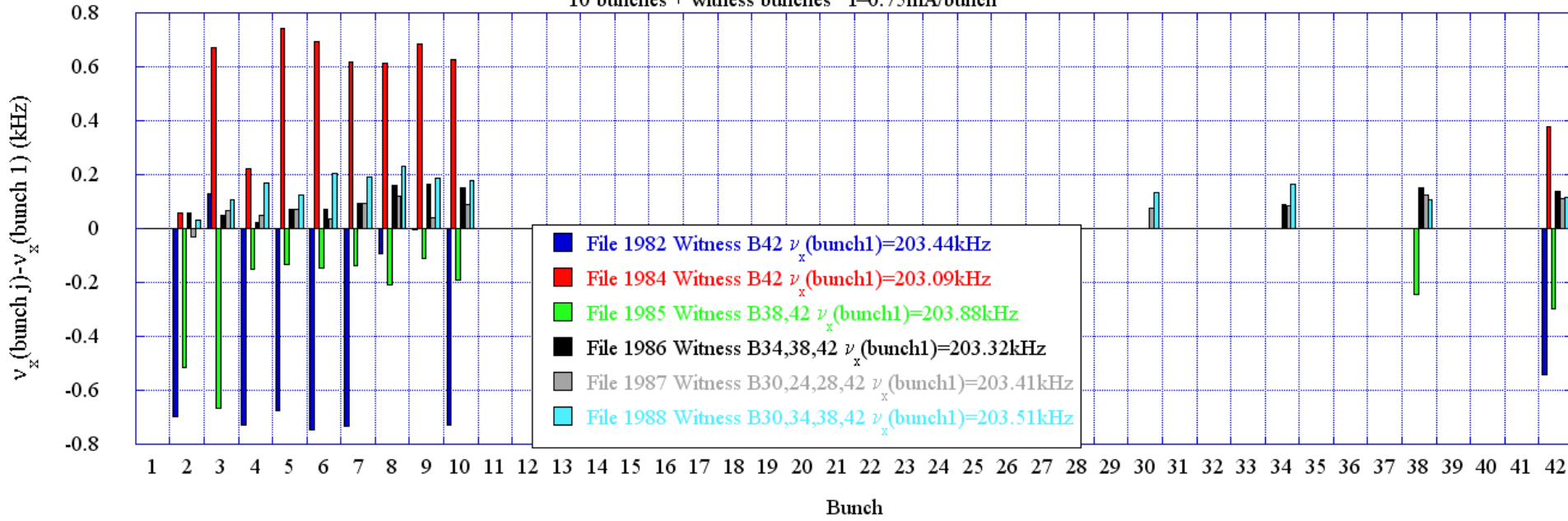
e+ Vertical Tune
10 bunches + witness bunches I=0.75mA/bunch

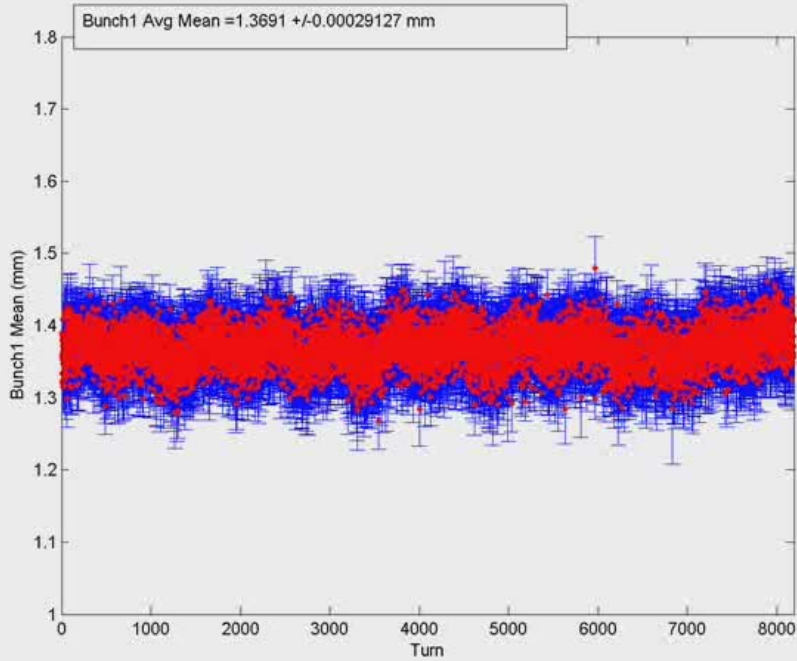


e+ Single Bunch Current
10 bunches + witness bunches



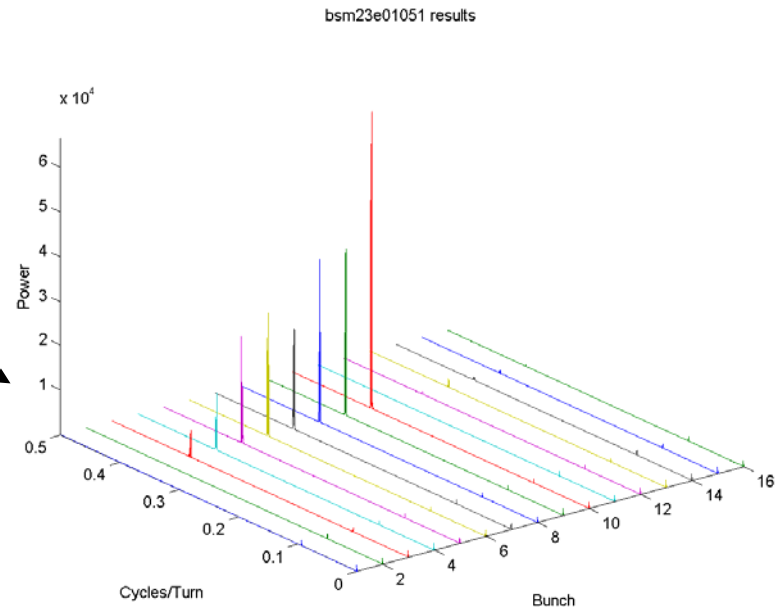
e+ Horizontal Tune I=0.75mA/bunch



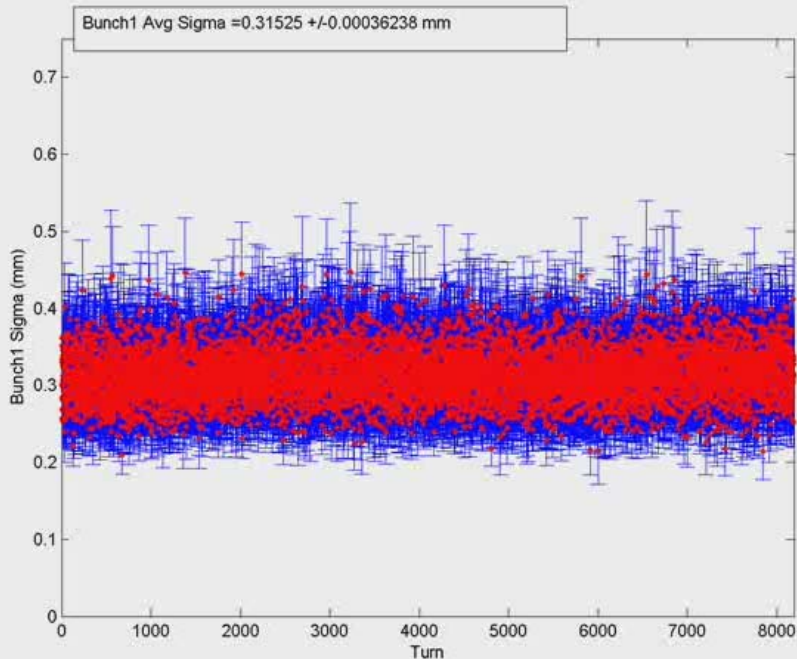


Vertical mean position (movie)

FFT Vertical position

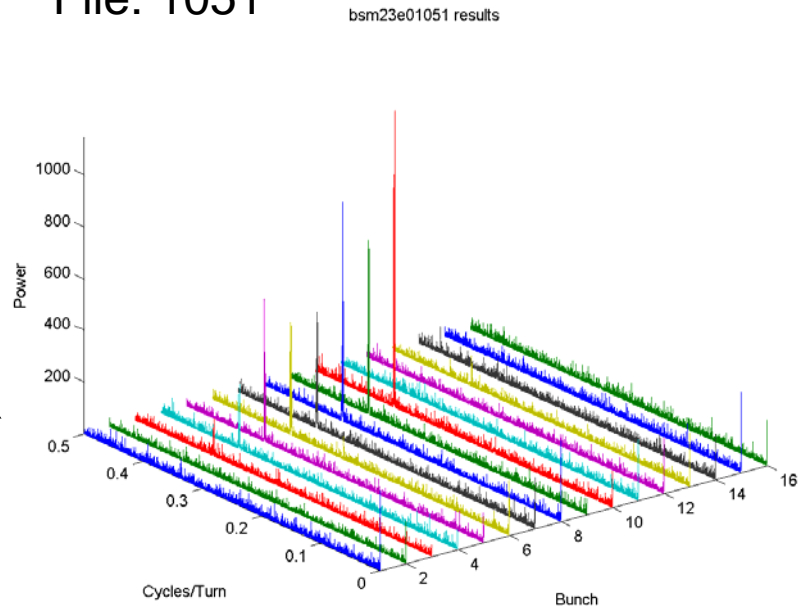


e+ vertical dynamics
 Witness bunches 26,28,30,34,38,42
 File: 1051



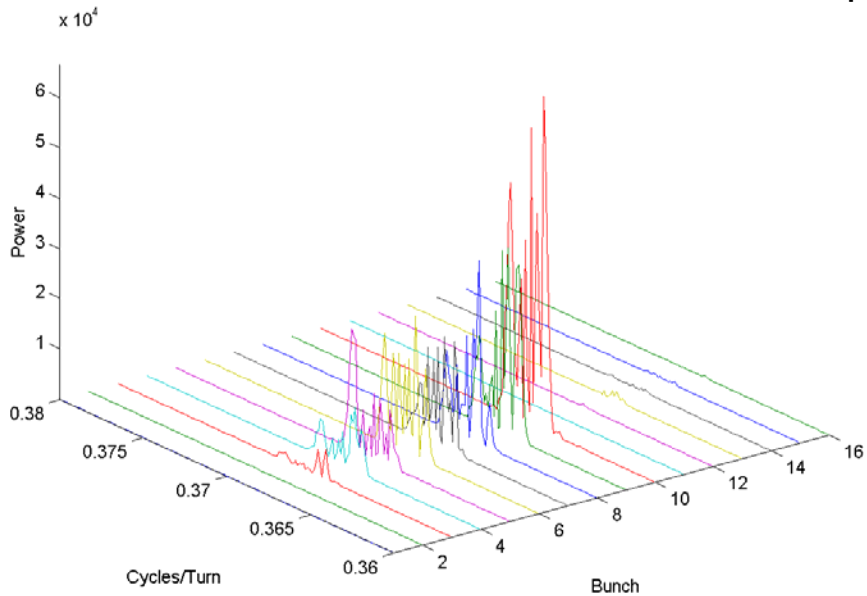
σ_v (movie)

FFT σ_v



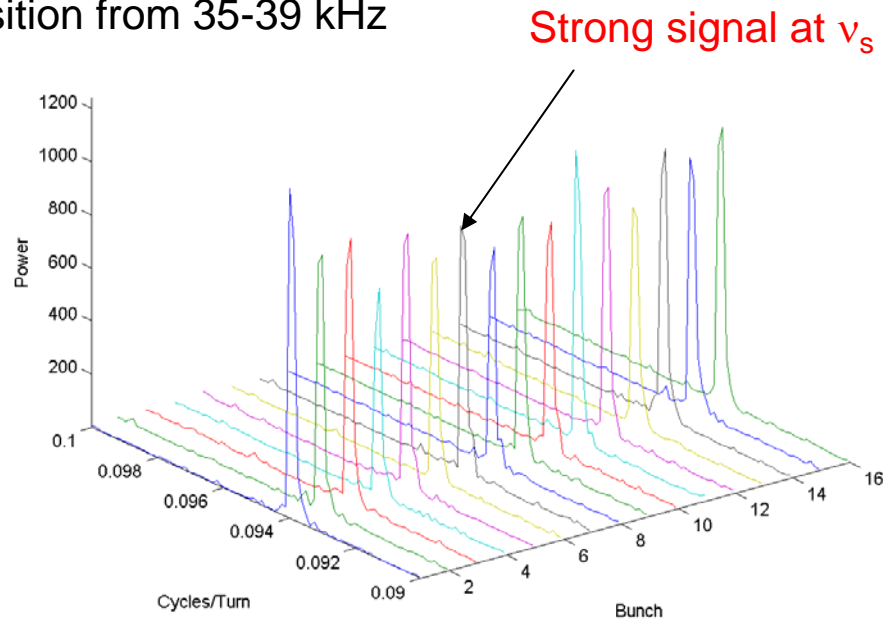
bsm23e01051 results

FFT of mean vertical position from 242.0-249.8 kHz



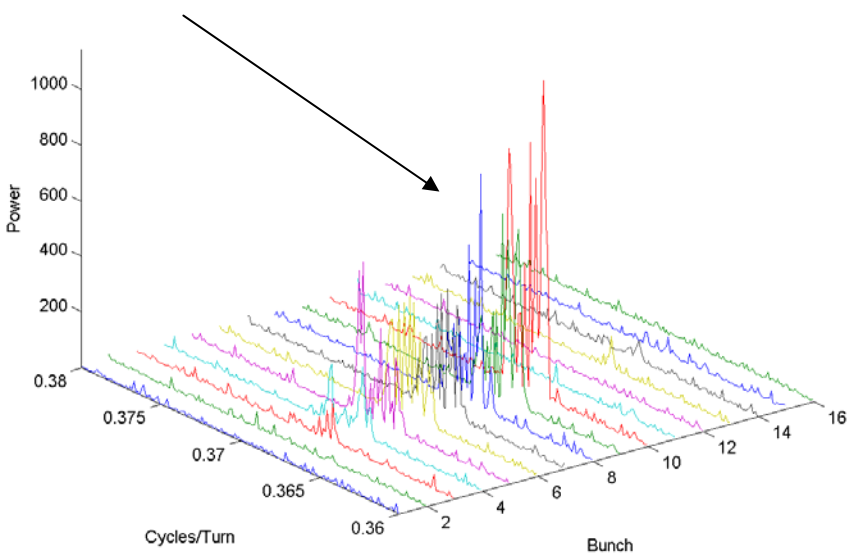
bsm23e01051 results

FFT of mean vertical position from 35-39 kHz

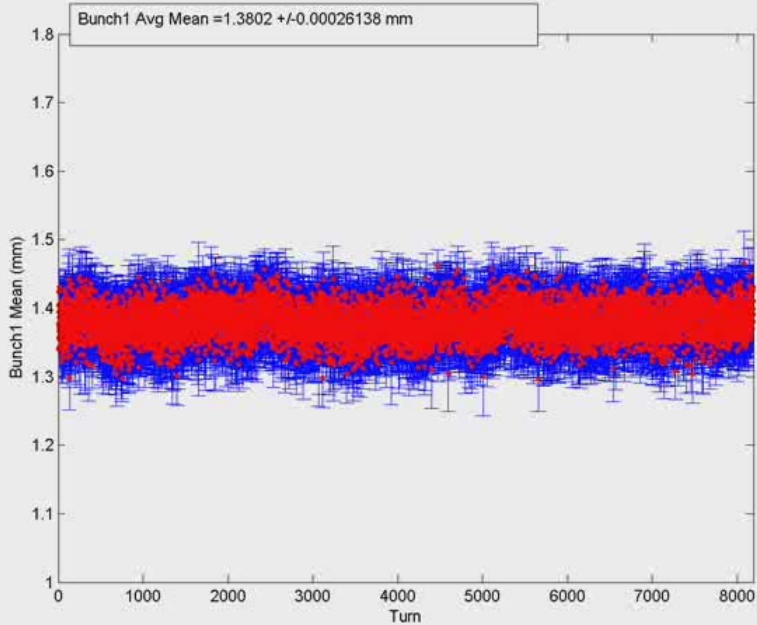


bsm23e01051 results

FFT of σ_v from 242.0-249.8 kHz

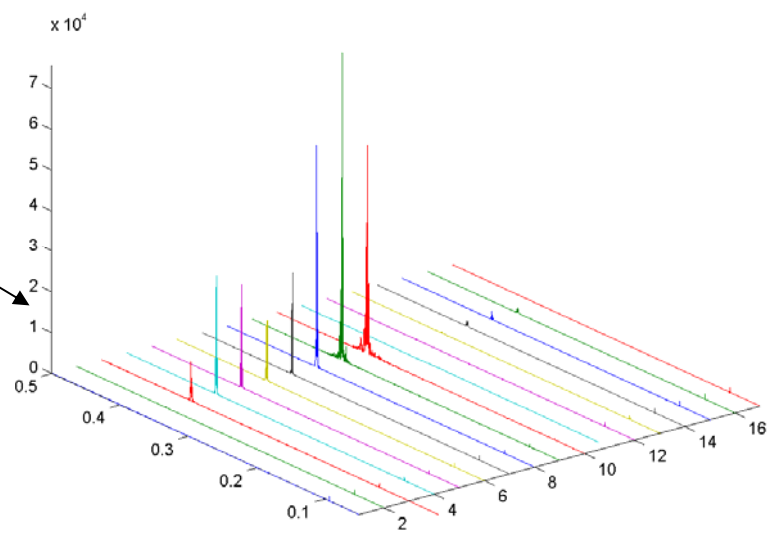


e+ vertical dynamics
 Witness bunches 26,28,30,34,38,42
 File: 1051

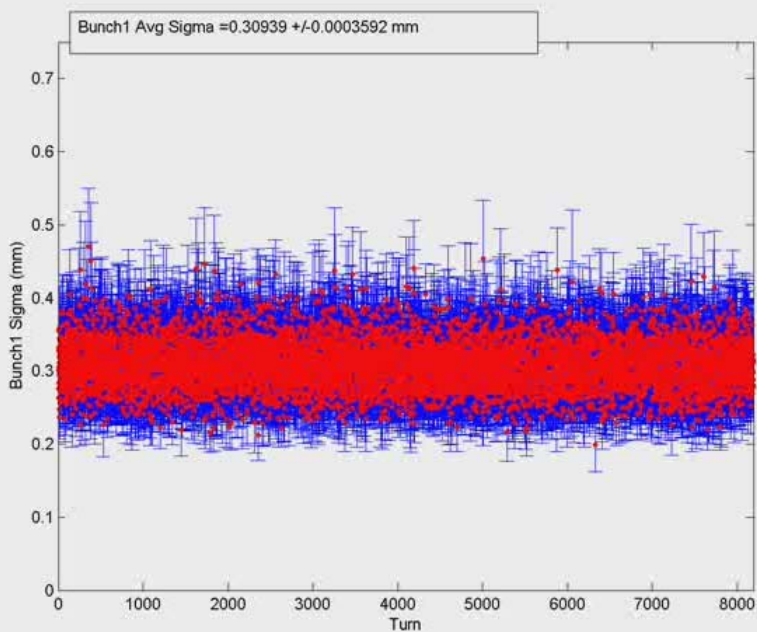


Vertical mean position (movie)

FFT Vertical position

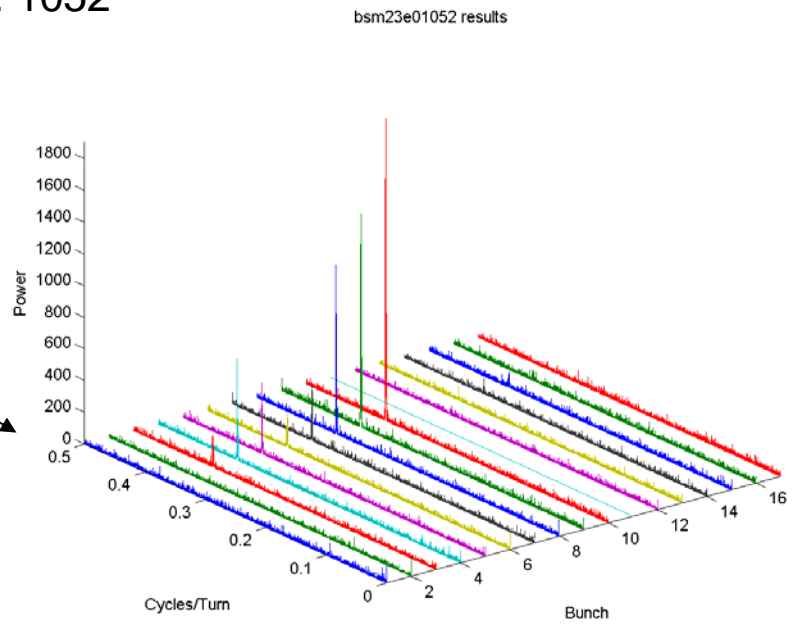


e+ vertical dynamics
 Witness bunches 26,28,30,34,38,42
 File: 1052

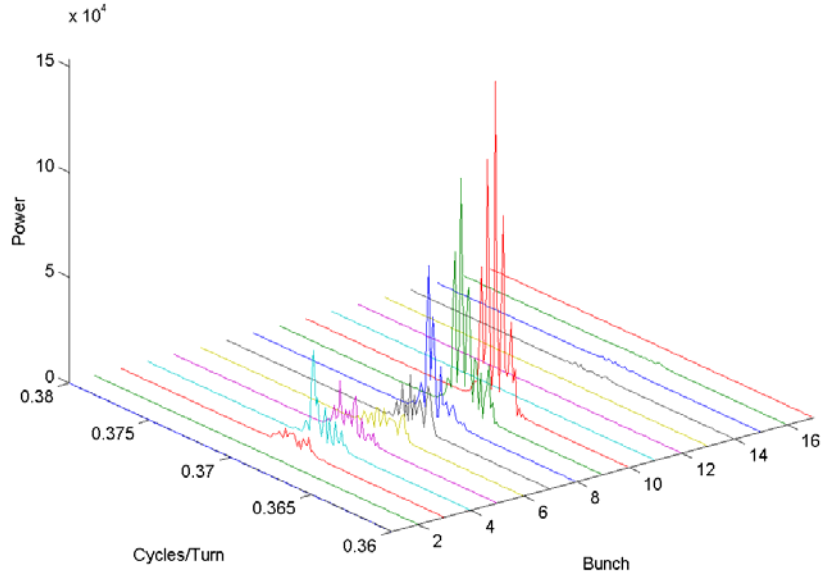


σ_v (movie)

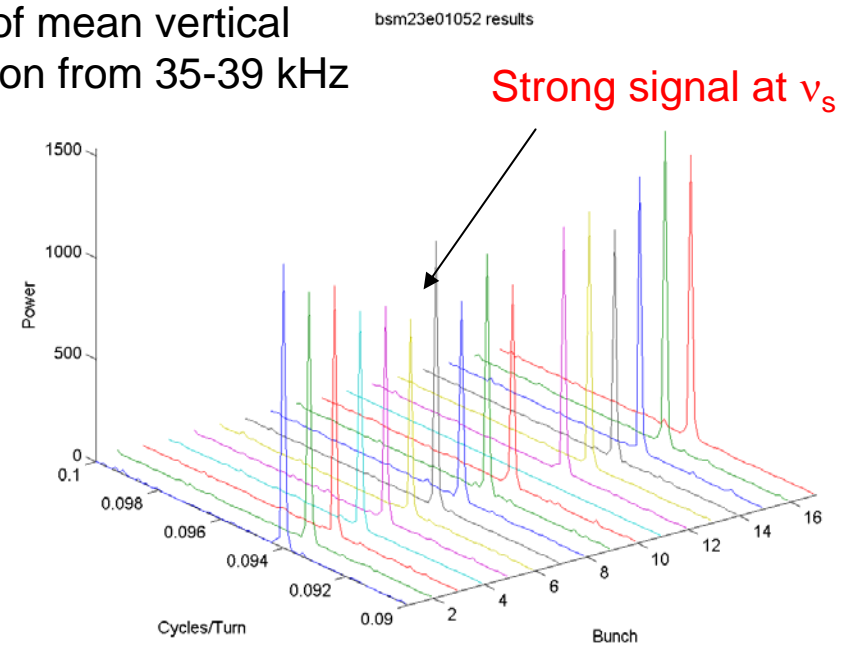
FFT σ_v



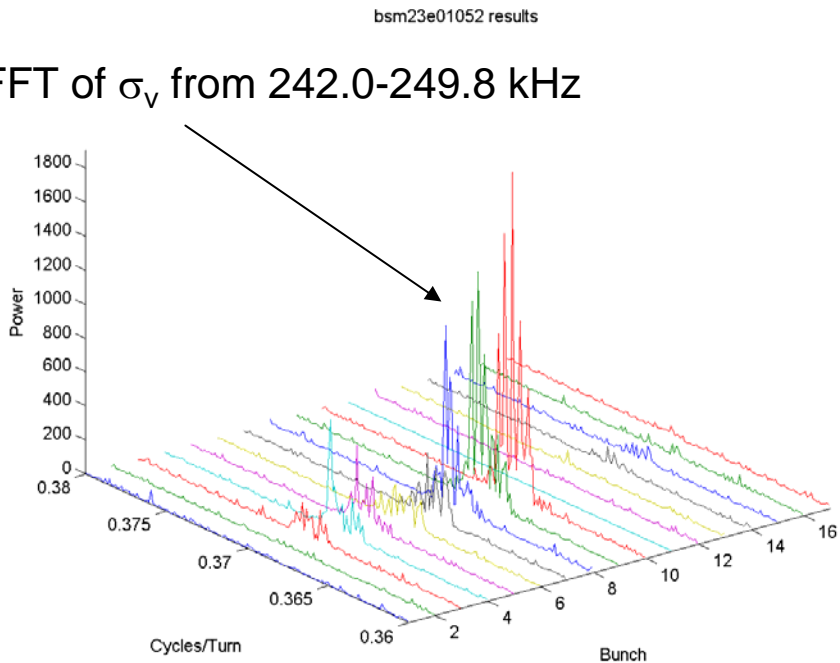
FFT of mean vertical position from 242.0-249.8 kHz



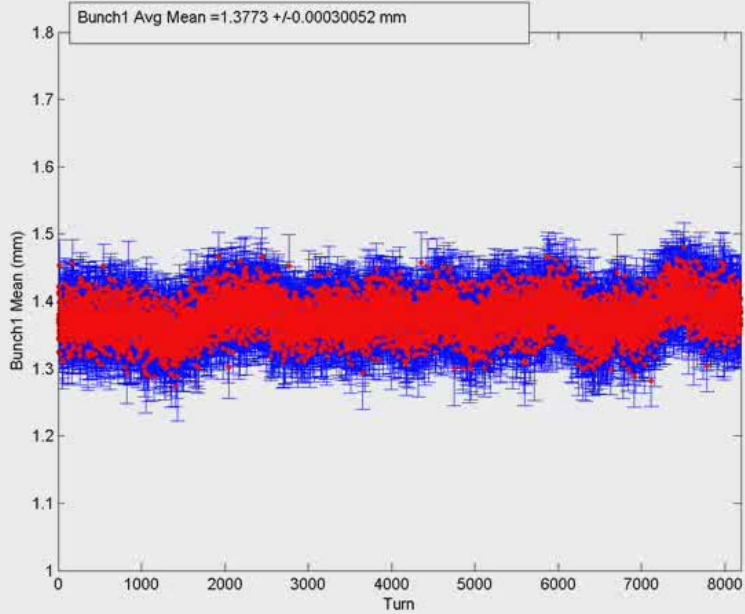
FFT of mean vertical position from 35-39 kHz



FFT of σ_v from 242.0-249.8 kHz



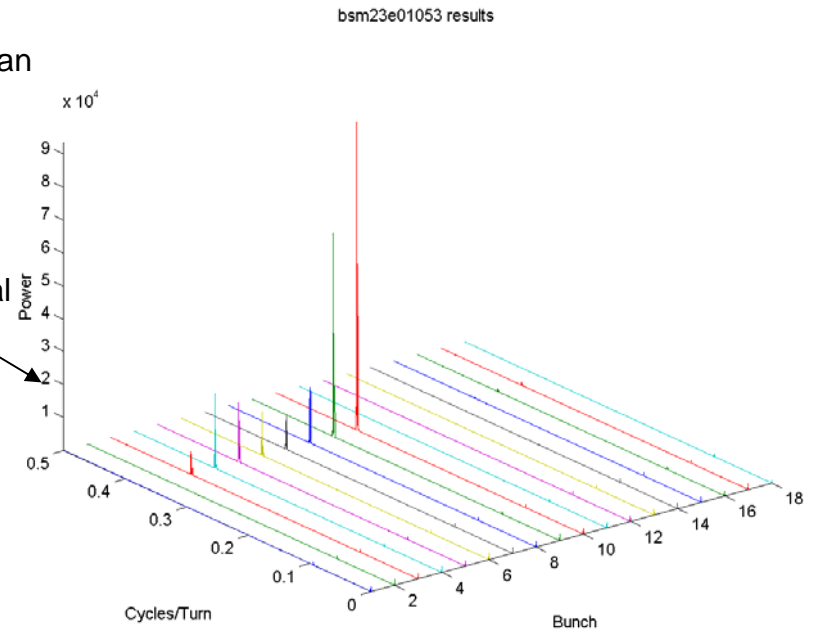
e+ vertical dynamics
Witness bunches 26,28,30,34,38,42
File: 1052



Vertical mean
position
(movie)



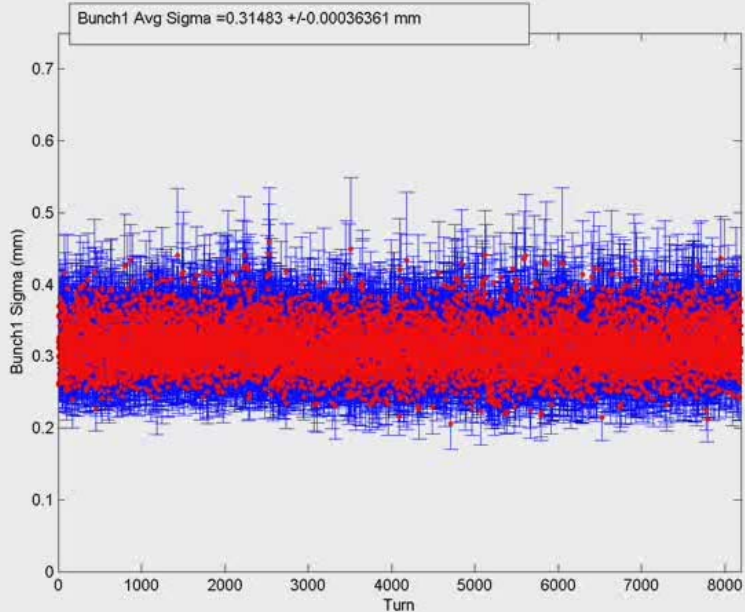
FFT Vertical
position



e+ vertical dynamics

Witness bunches 22,25-26,28,30,34,38,42

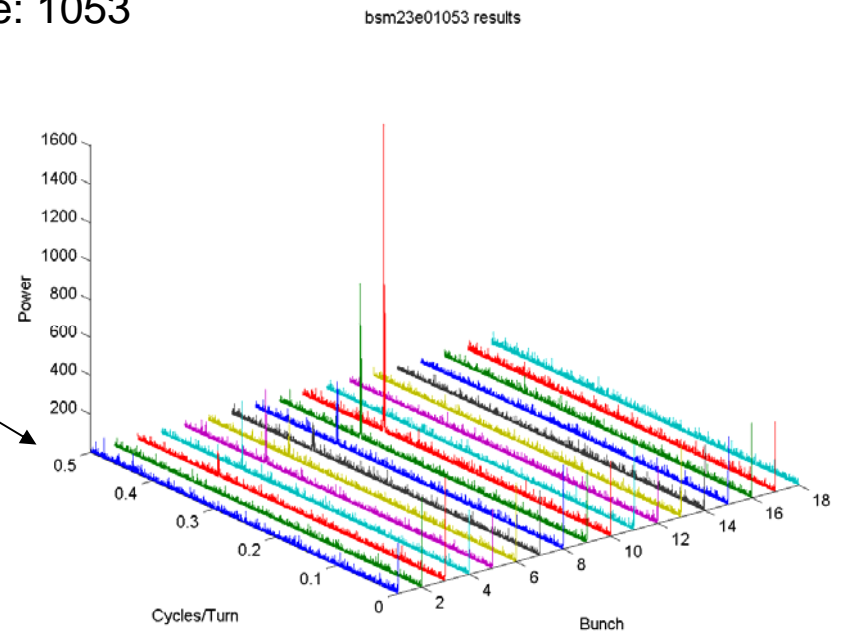
File: 1053



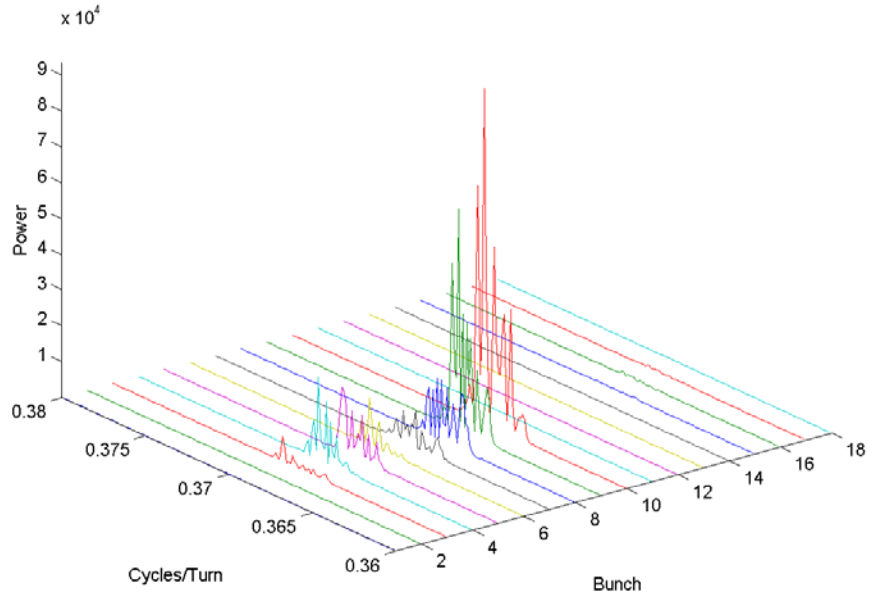
σ_v
(movie)



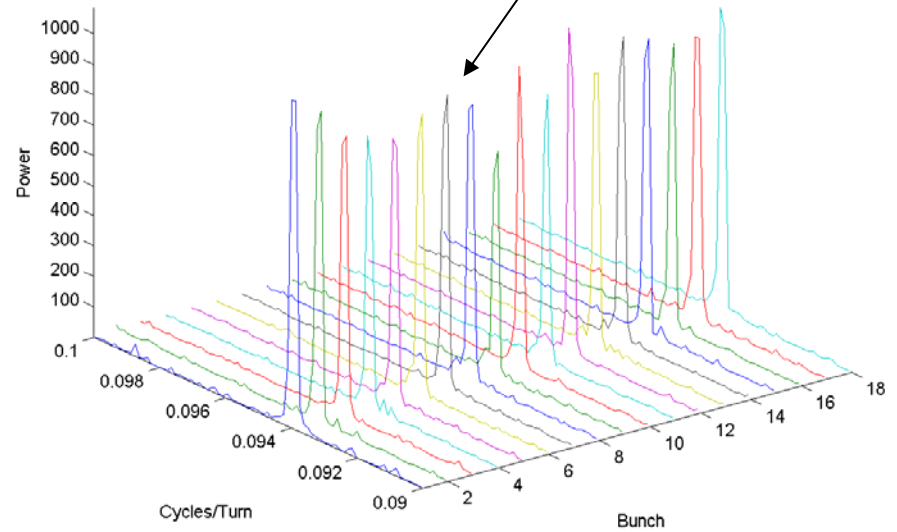
FFT σ_v



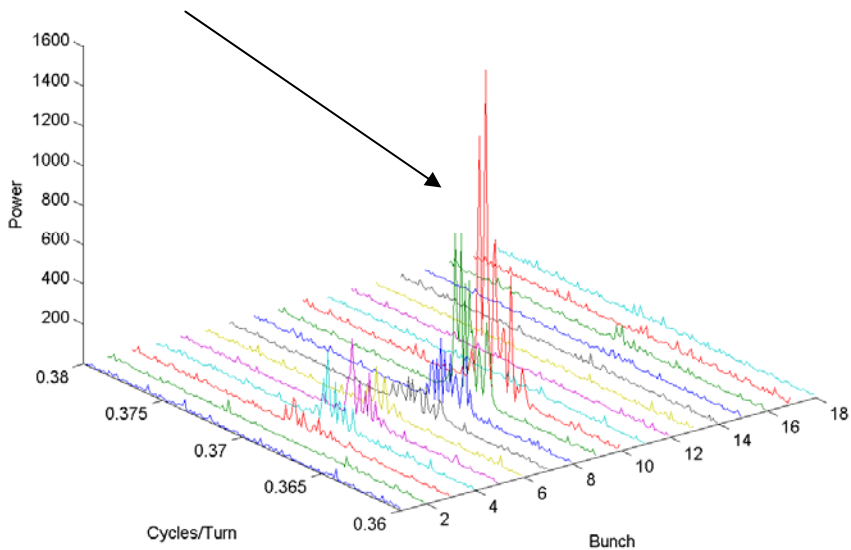
bsm23e01053 results
FFT of mean vertical position from 242.0-249.8 kHz



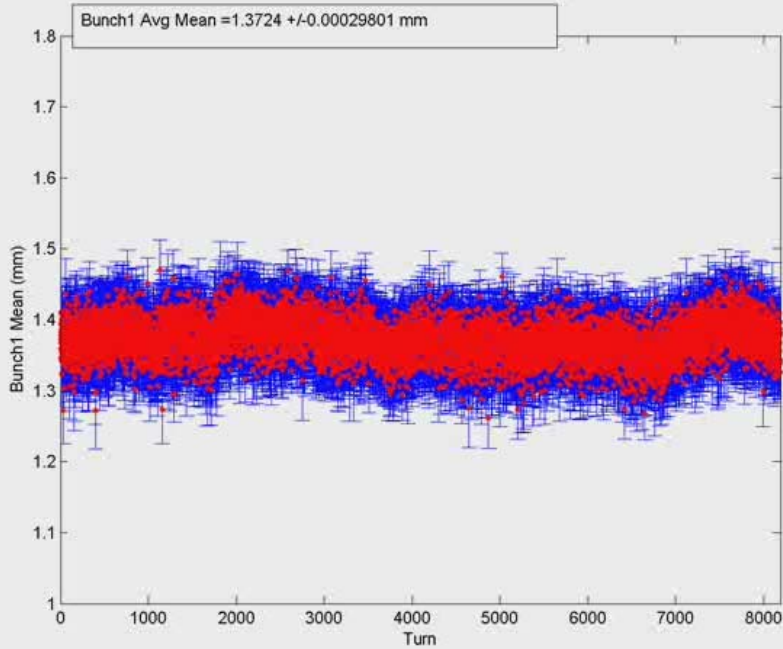
bsm23e01053 results **Strong signal at ν_s**
FFT of mean vertical position from 35-39 kHz



bsm23e01053 results
FFT of σ_v from 242.0-249.8 kHz



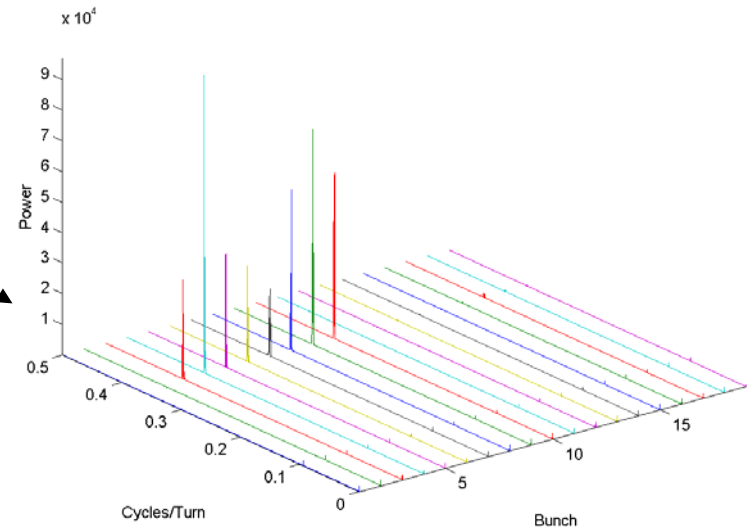
e+ vertical dynamics
Witness bunches 22,25-26,28,30,34,38,42
File: 1053



Vertical mean position (movie)



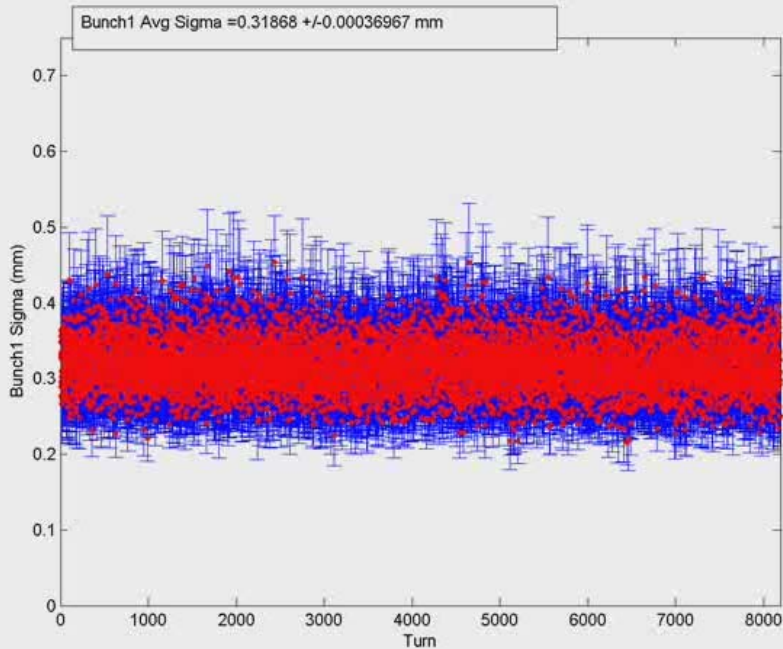
FFT Vertical position



e+ vertical dynamics

Witness bunches 20,22,25-26,28,30,34,38,42

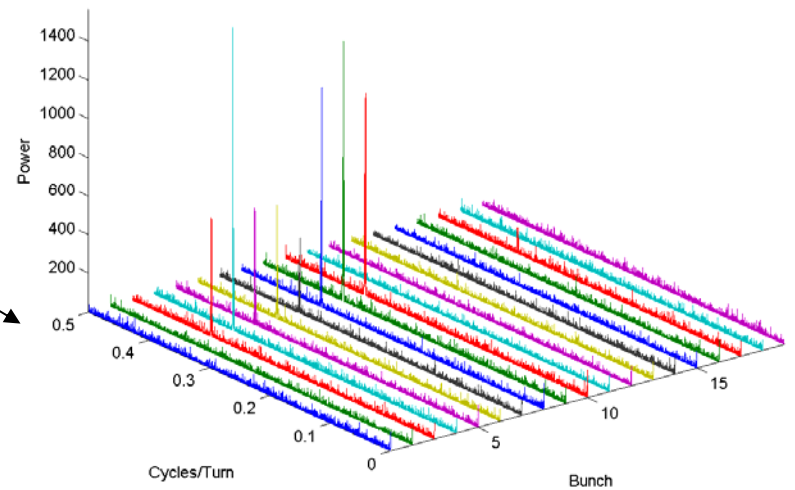
File: 1054



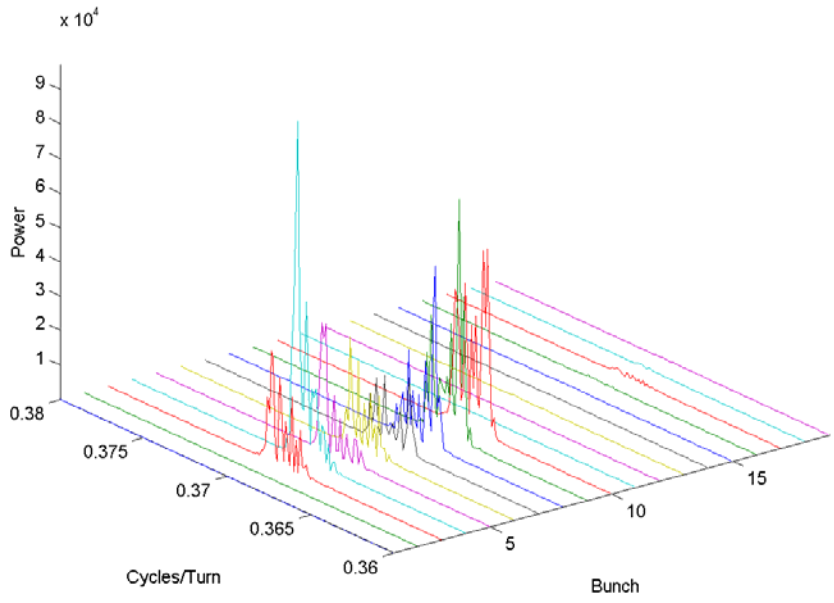
σ_v (movie)



FFT σ_v

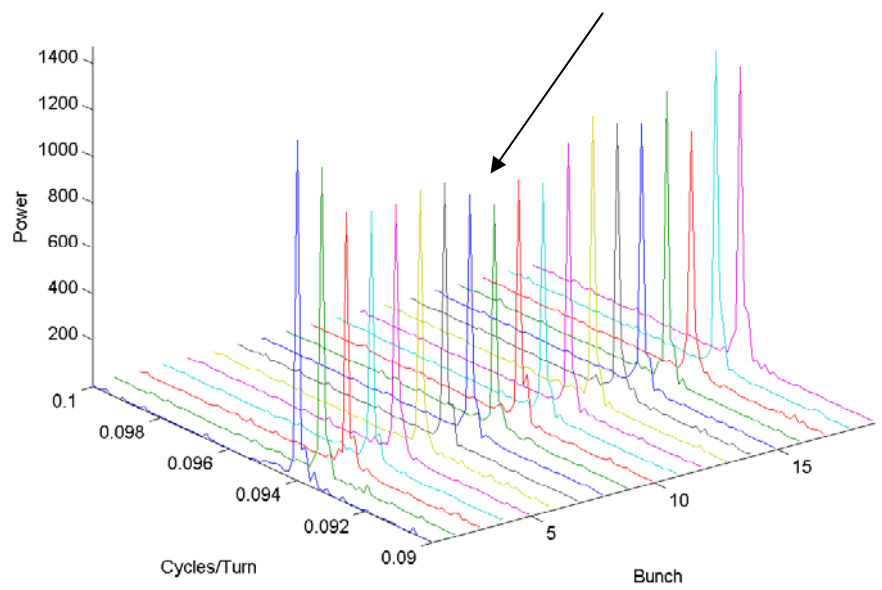


FFT of mean vertical position from 242.0-249.8 kHz

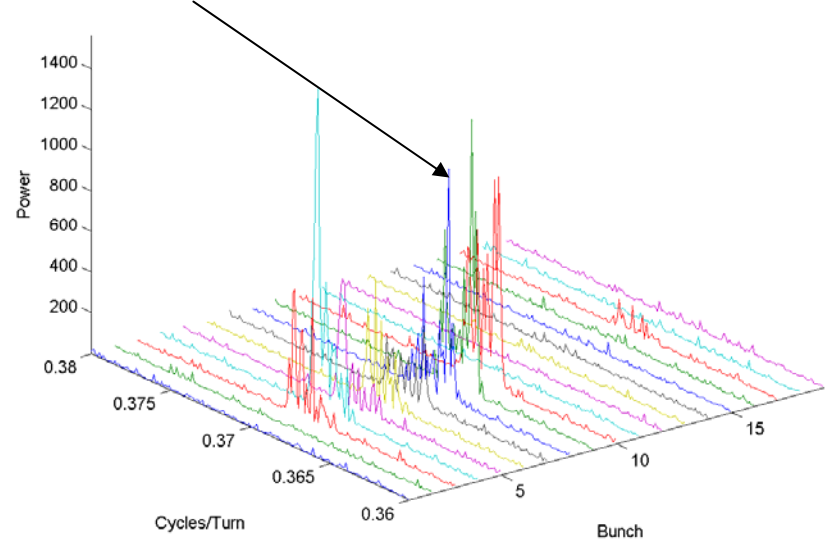


FFT of mean vertical position from 35-39 kHz

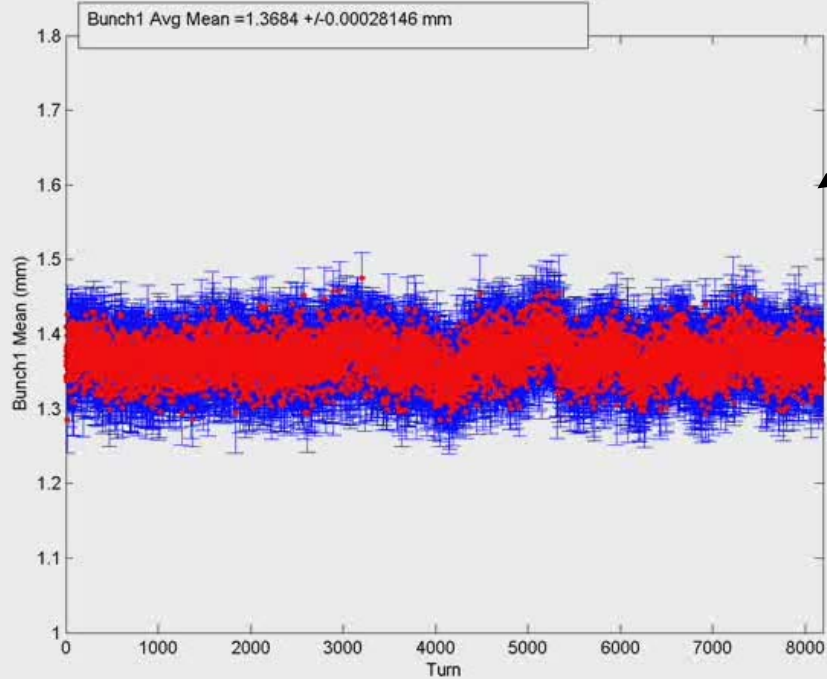
Strong signal at ν_s



FFT of σ_v from 242.0-249.8 kHz

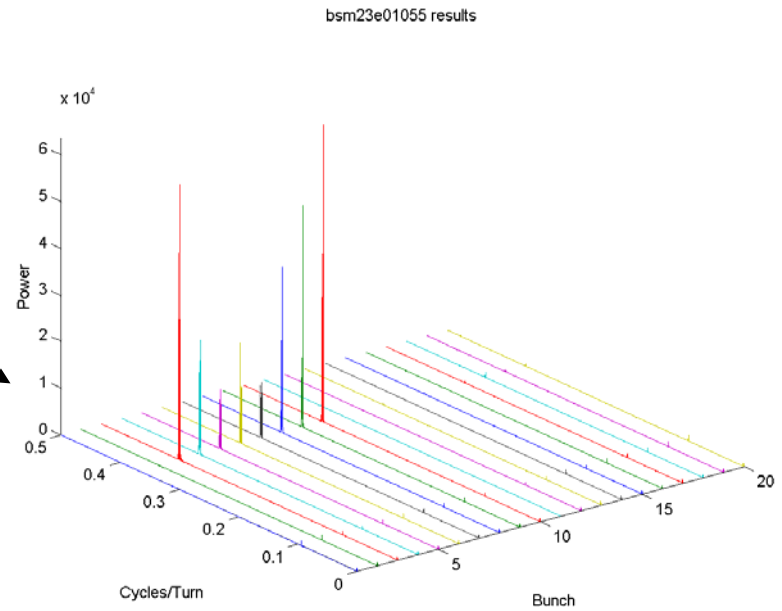


e+ vertical dynamics
 Witness bunches 20,22,25-26,28,30,34,38,42
 File: 1054



Vertical mean position (movie)

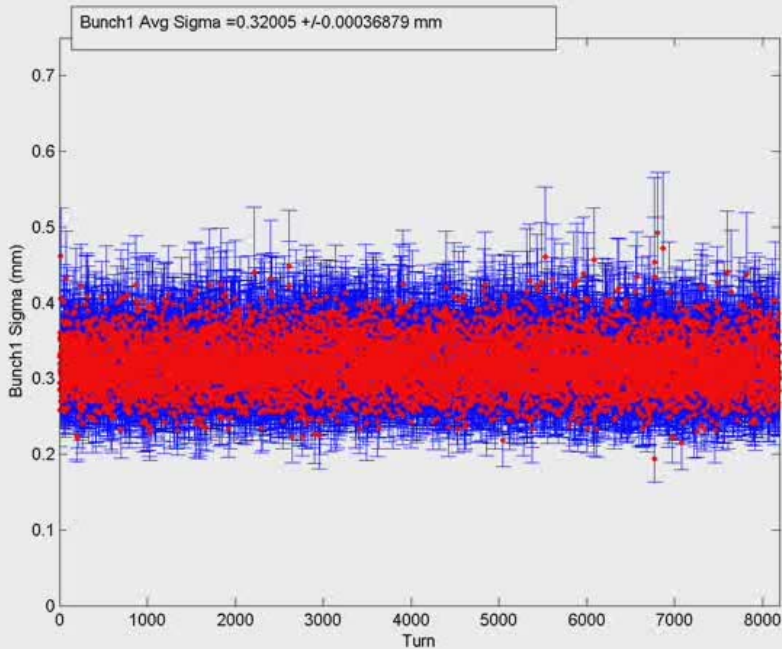
FFT Vertical position



e+ vertical dynamics

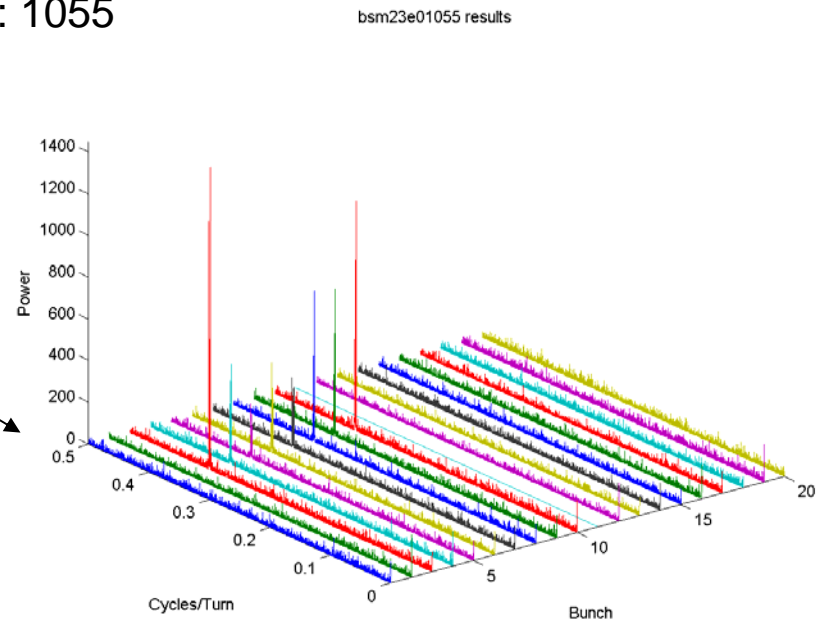
Witness bunches 20,22,25-26,28,30,34,38,42

File: 1055

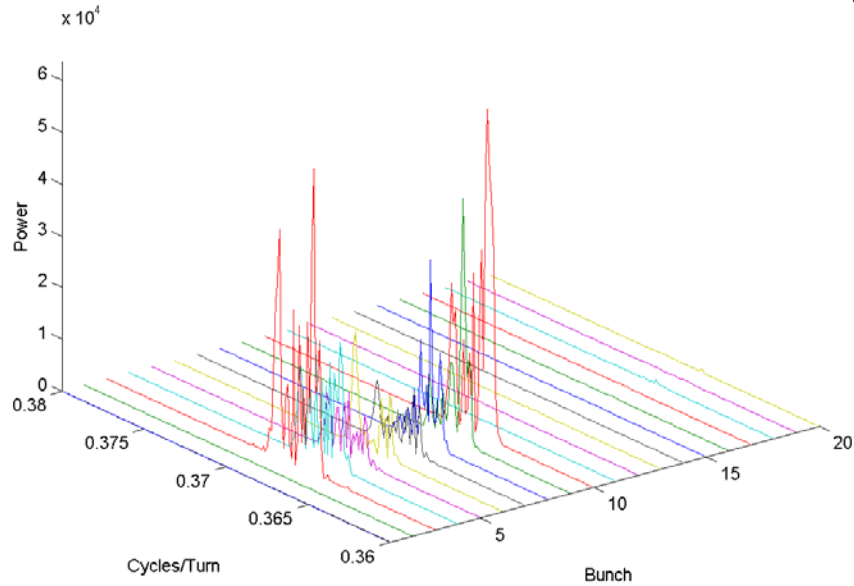


σ_v (movie)

FFT σ_v

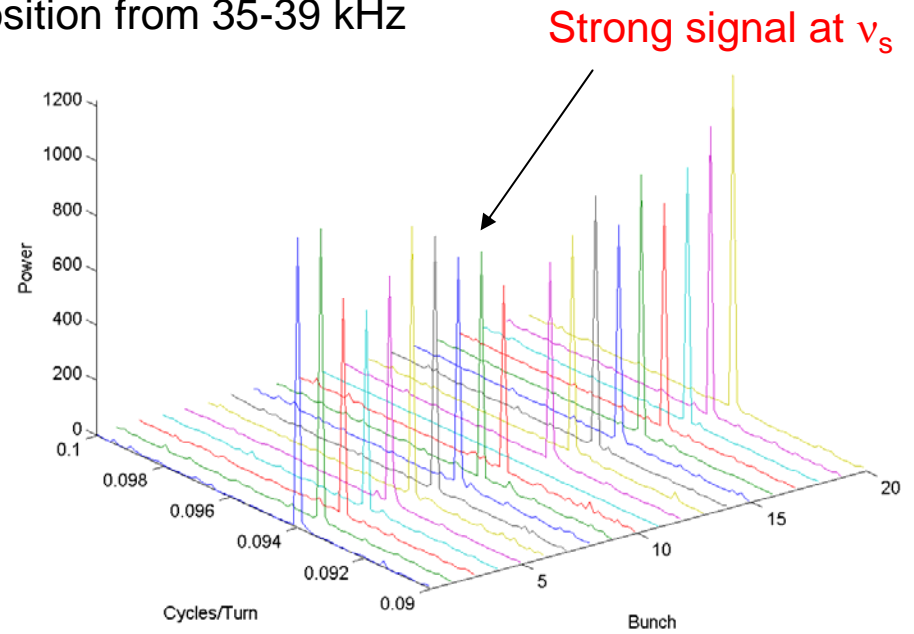


bsm23e01055 results
FFT of mean vertical position from 242.0-249.8 kHz

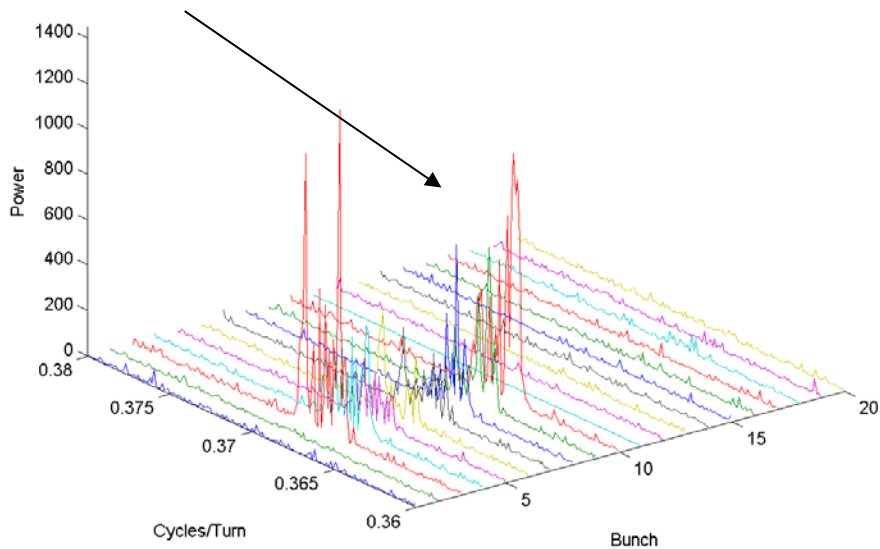


bsm23e01055 results

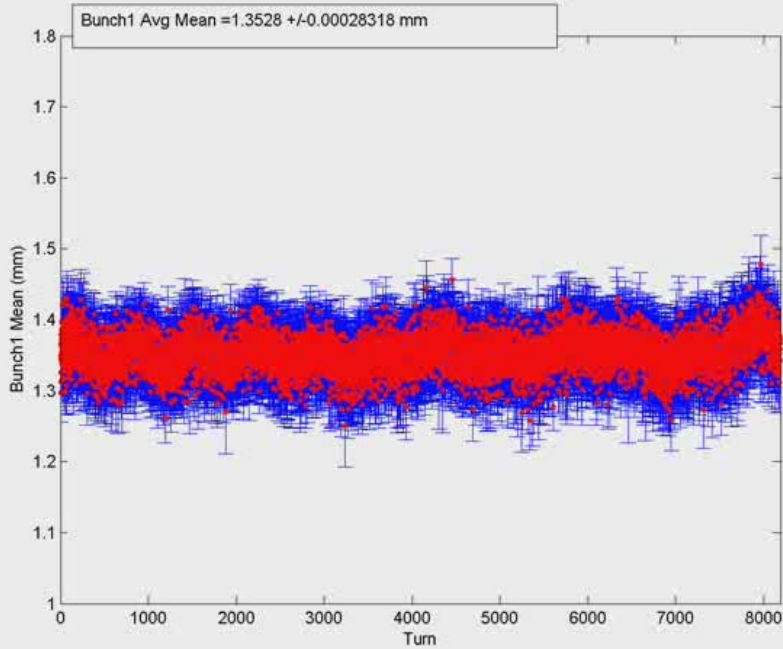
bsm23e01055 results
FFT of mean vertical position from 35-39 kHz



FFT of σ_v from 242.0-249.8 kHz



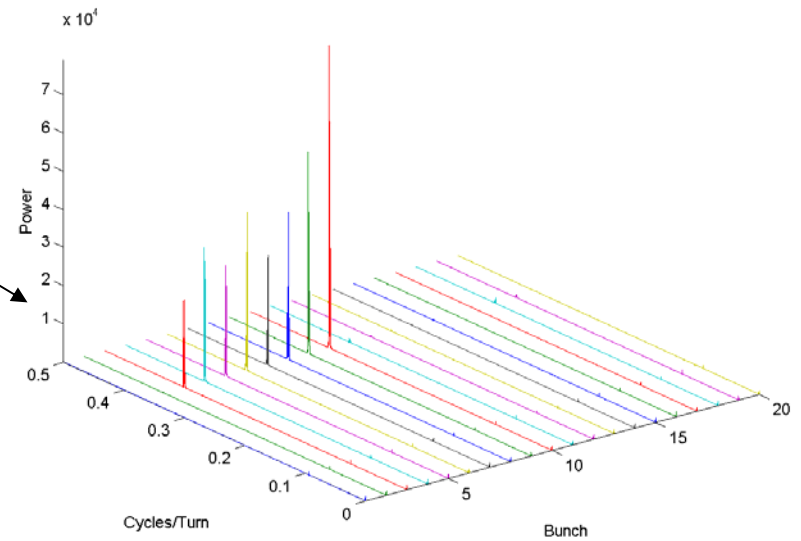
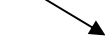
e+ vertical dynamics
Witness bunches 20,22,25-26,28,30,34,38,42
File: 1055



Vertical mean position (movie)



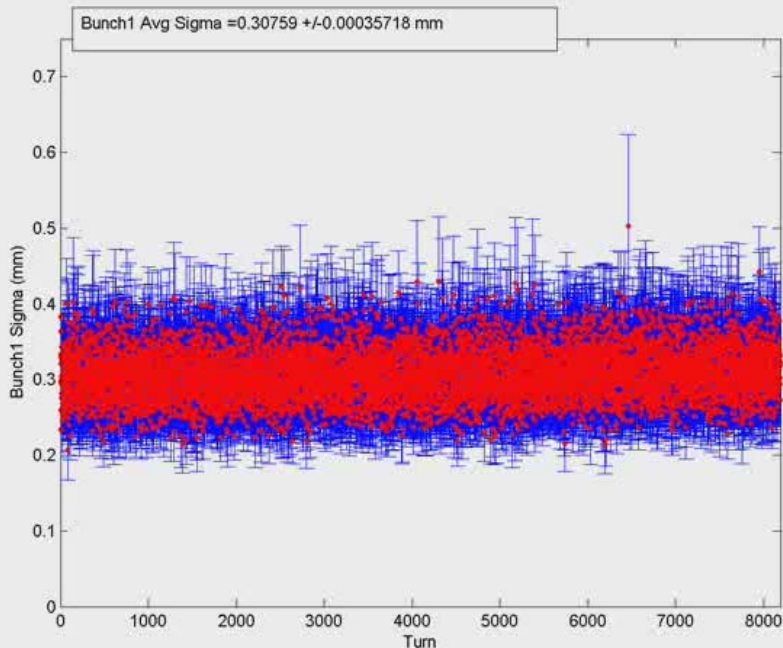
FFT Vertical position



e+ vertical dynamics

Witness bunches 19-20,22,25-26,28,30,34,38,42

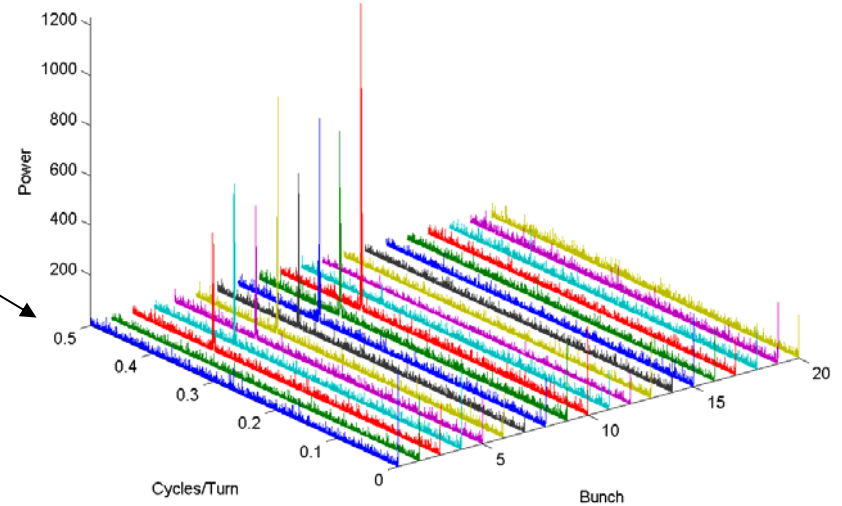
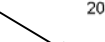
File: 1056



σ_v (movie)

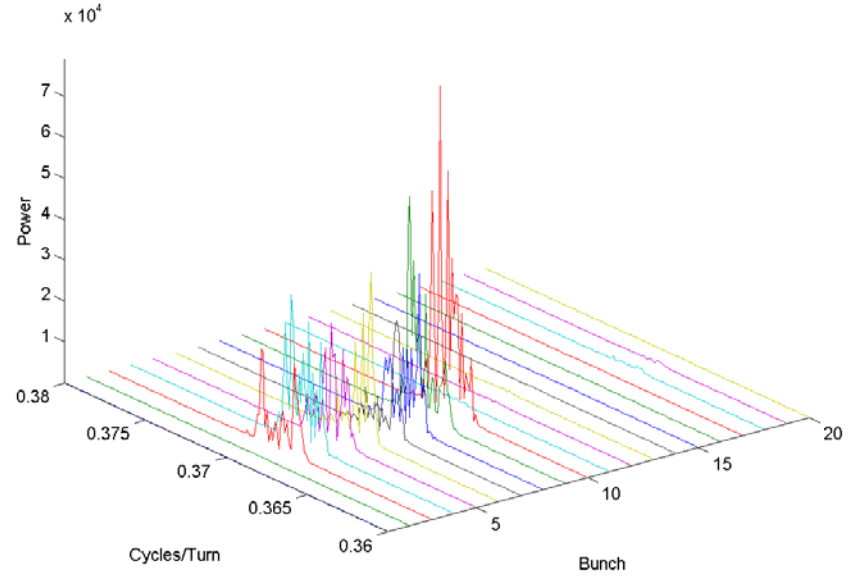


FFT σ_v



bsm23e01056 results

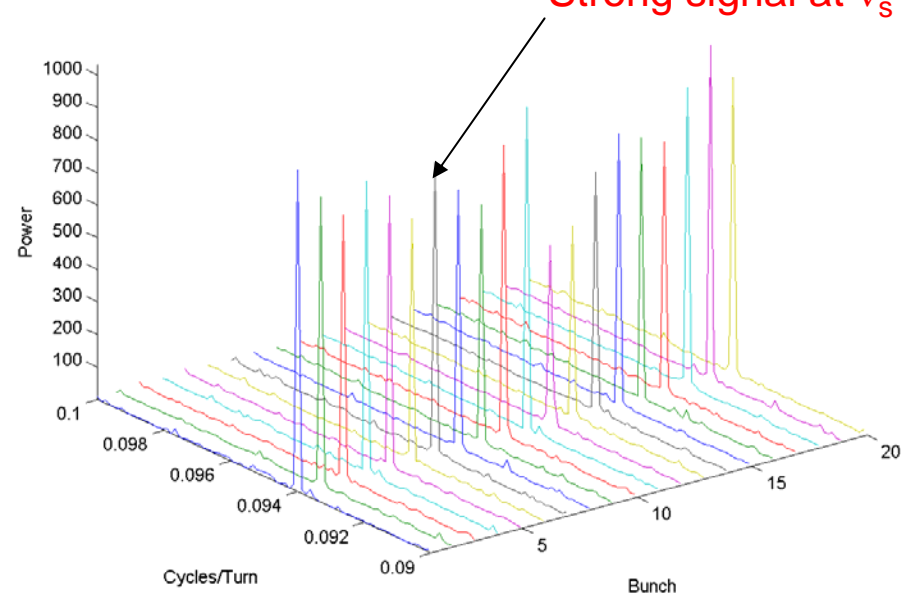
FFT of mean vertical position from 242.0-249.8 kHz



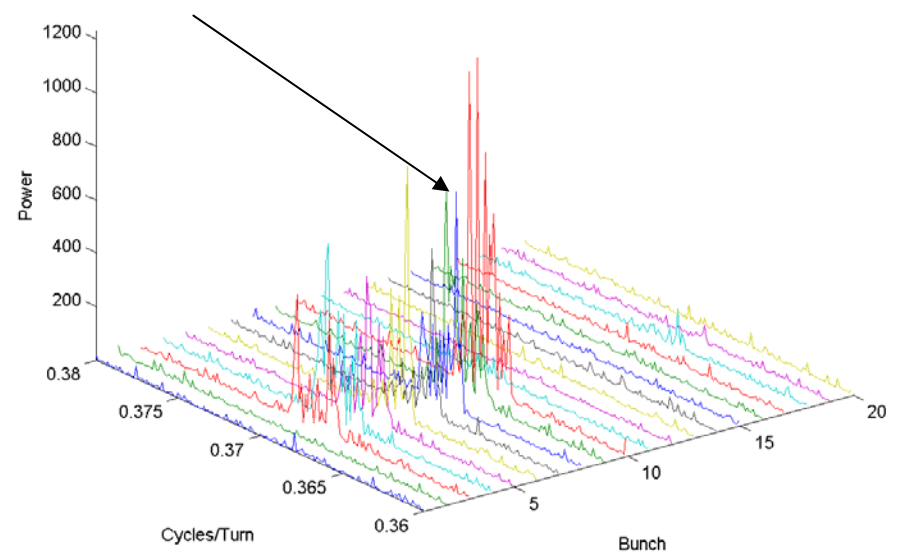
bsm23e01056 results

bsm23e01056 results

FFT of mean vertical position from 35-39 kHz



FFT of σ_v from 242.0-249.8 kHz

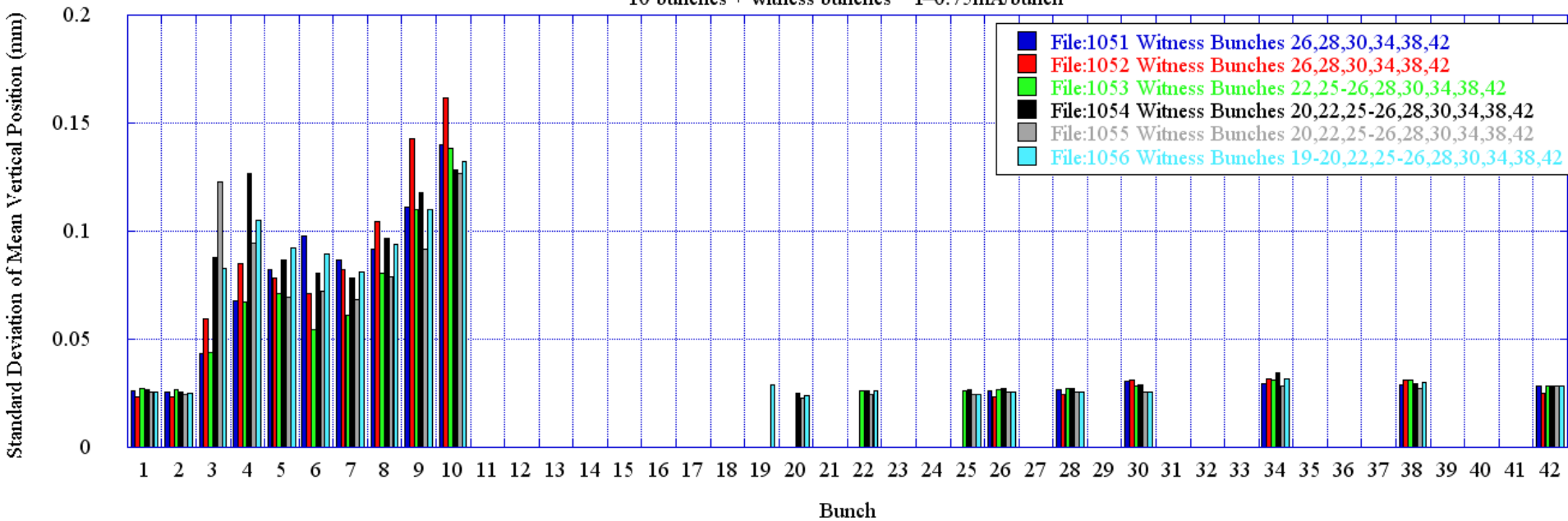


e+ vertical dynamics

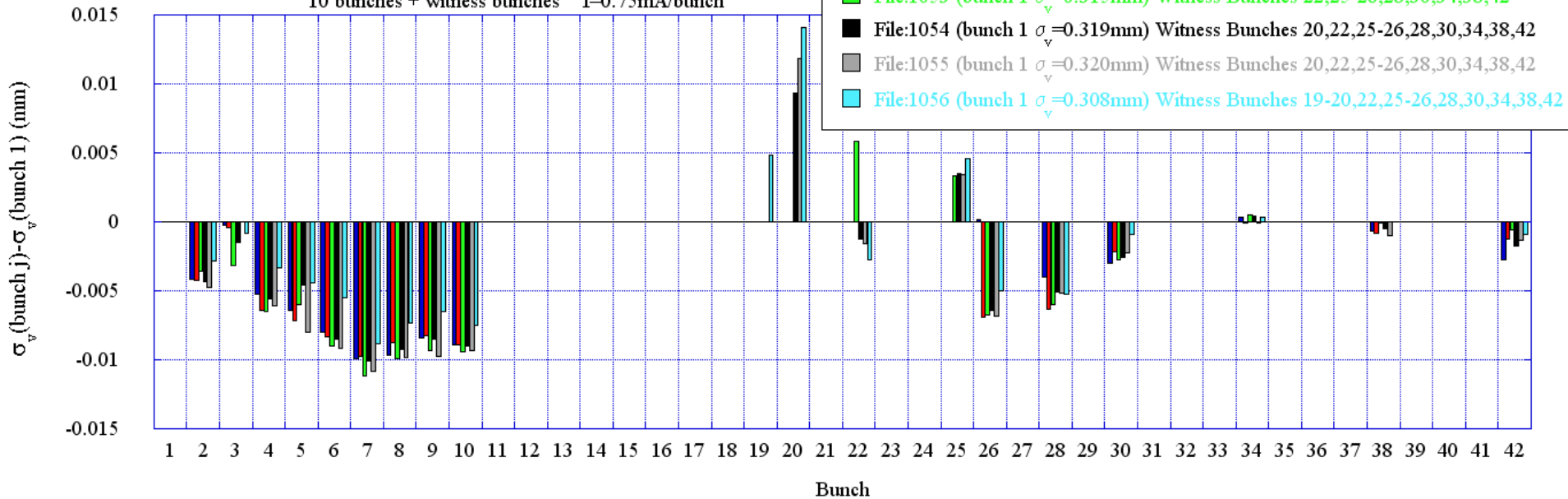
Witness bunches 19-20,22,25-26,28,30,34,38,42

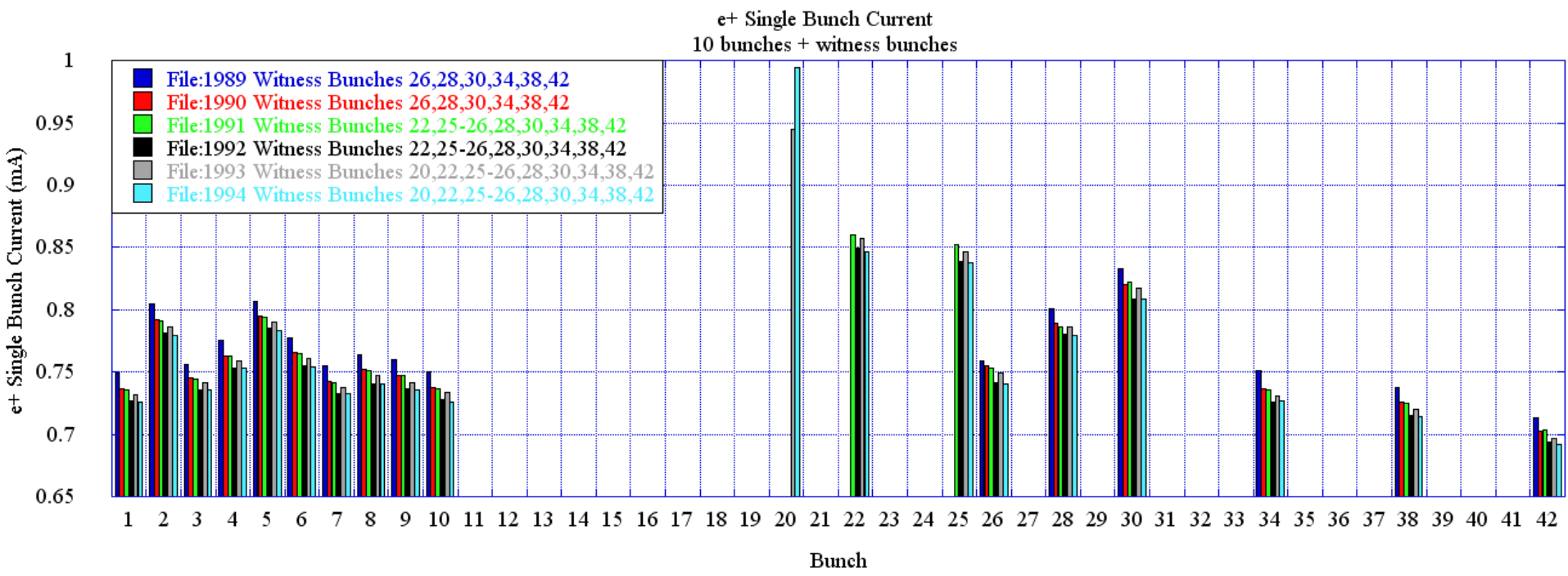
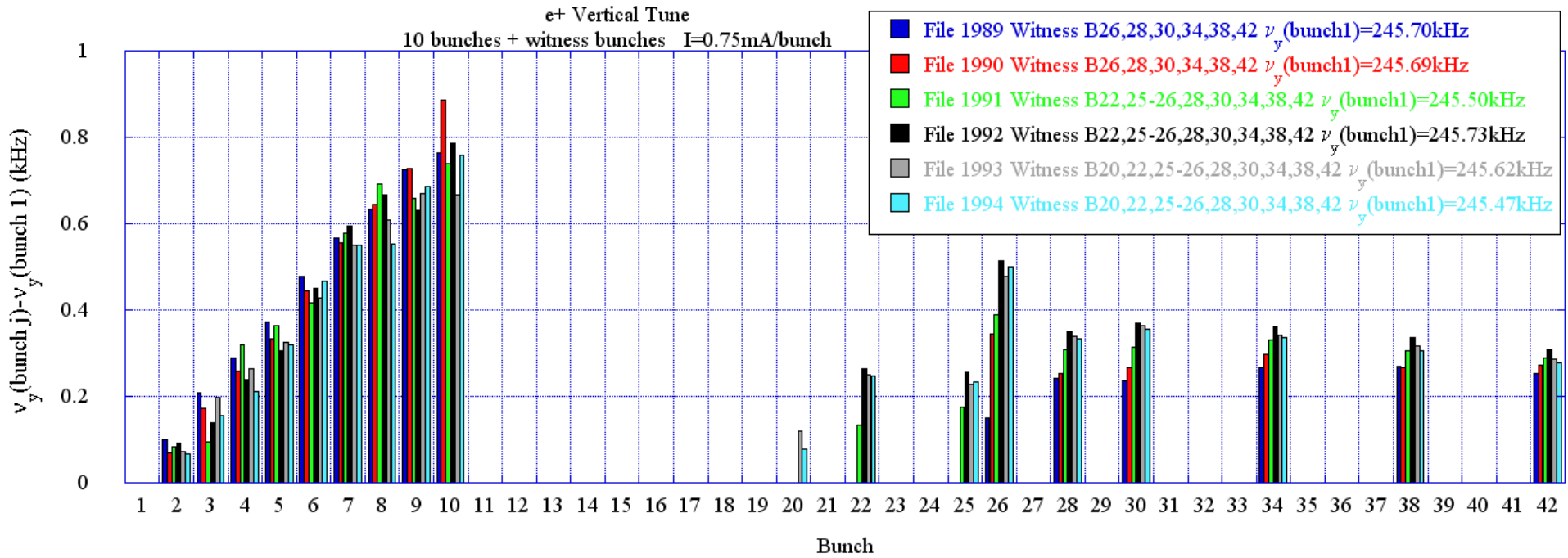
File: 1056

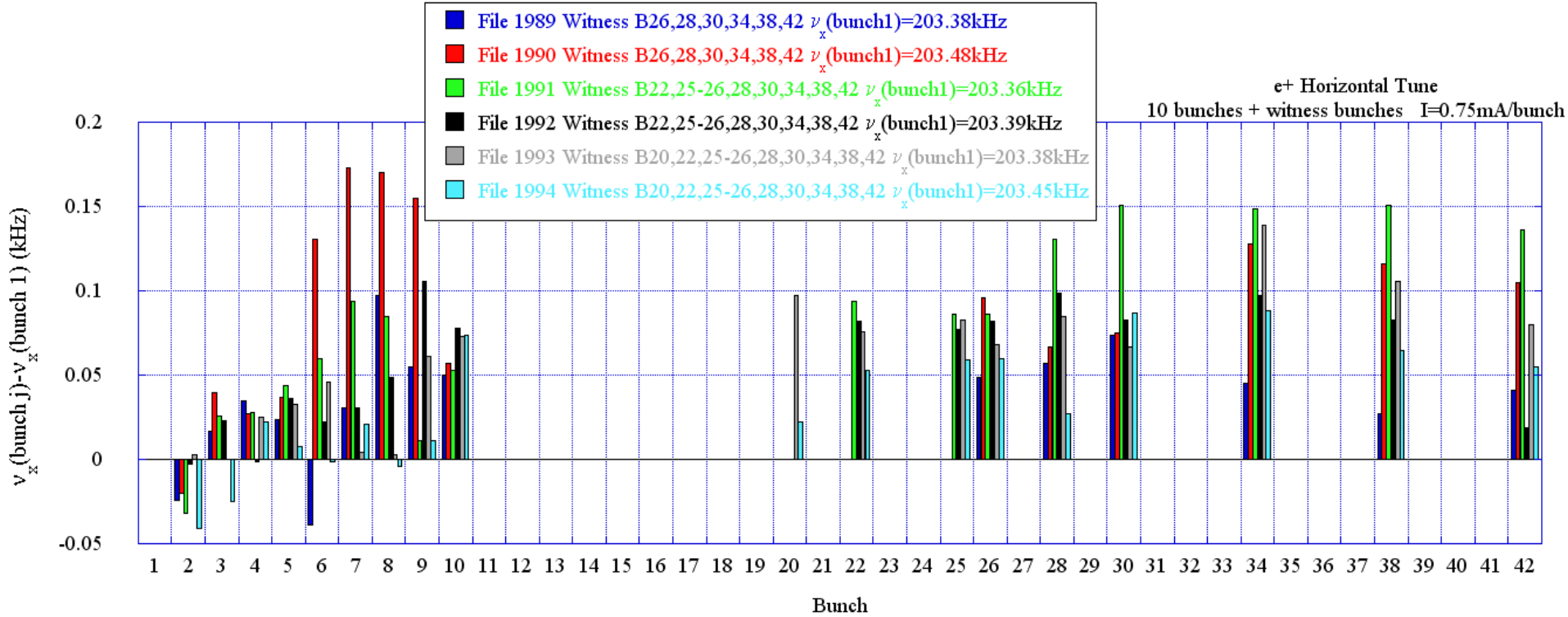
e+ Vertical Oscillation Amplitude
10 bunches + witness bunches I=0.75mA/bunch

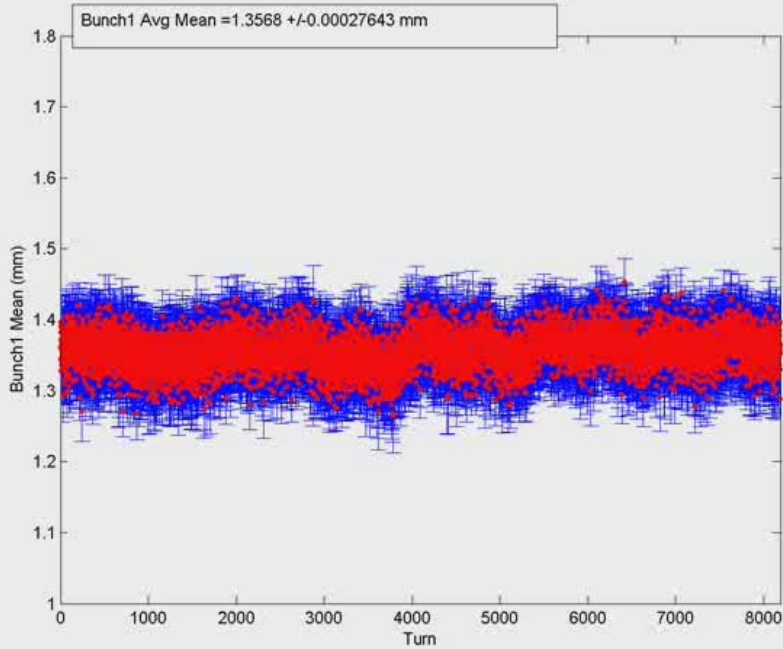


e+ Mean Vertical Beam Size
10 bunches + witness bunches I=0.75mA/bunch





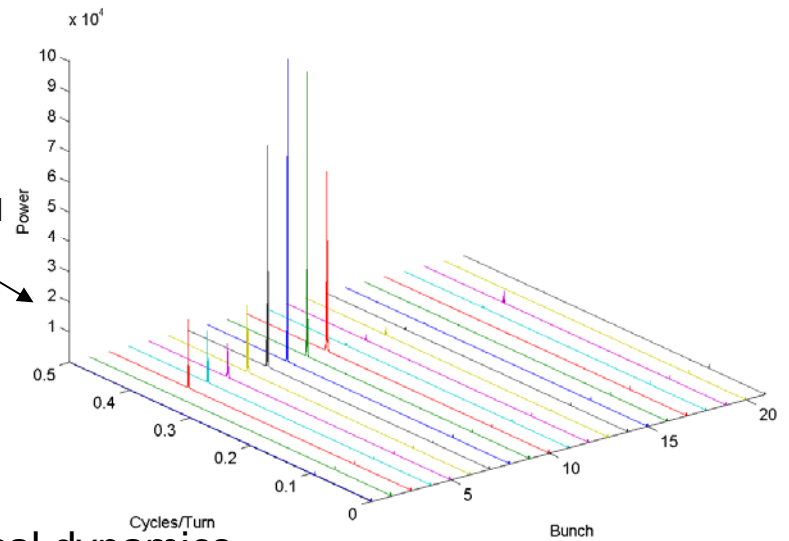




Vertical mean position (movie)



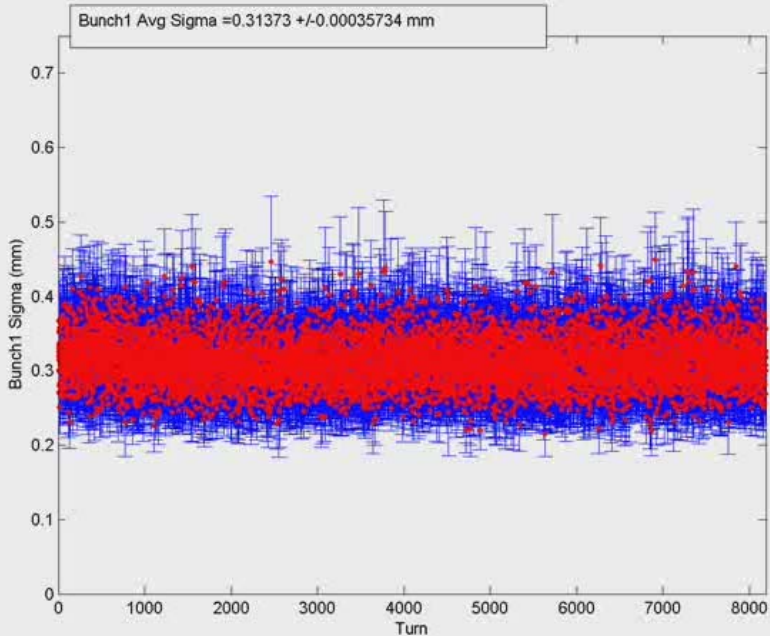
FFT Vertical position



e+ vertical dynamics

Witness bunches 18-20,22,25-26,28,30,34,38,42

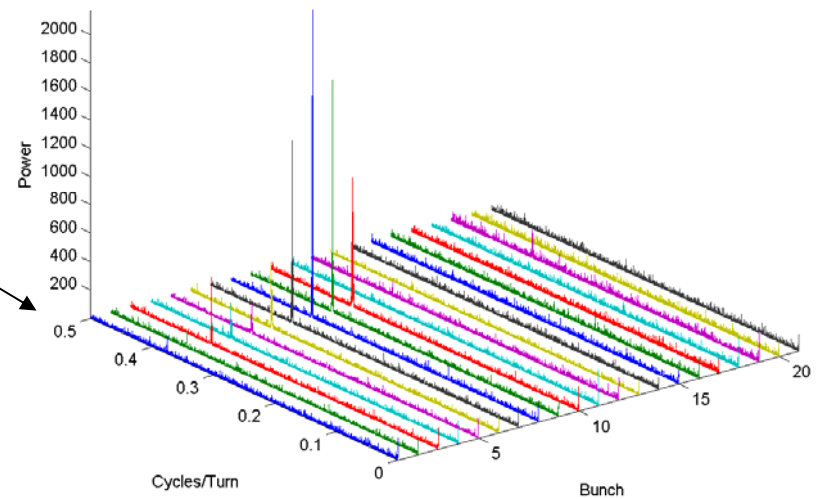
File: 1057



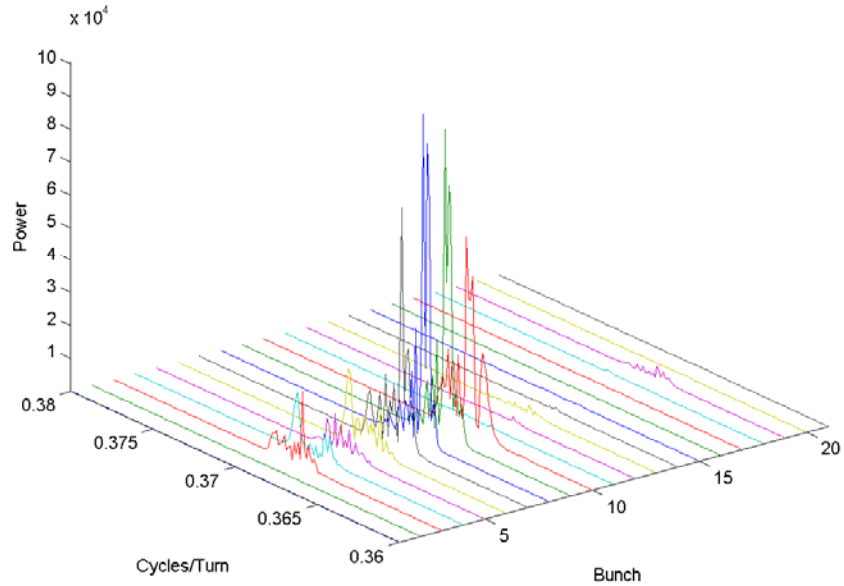
σ_v (movie)



FFT σ_v

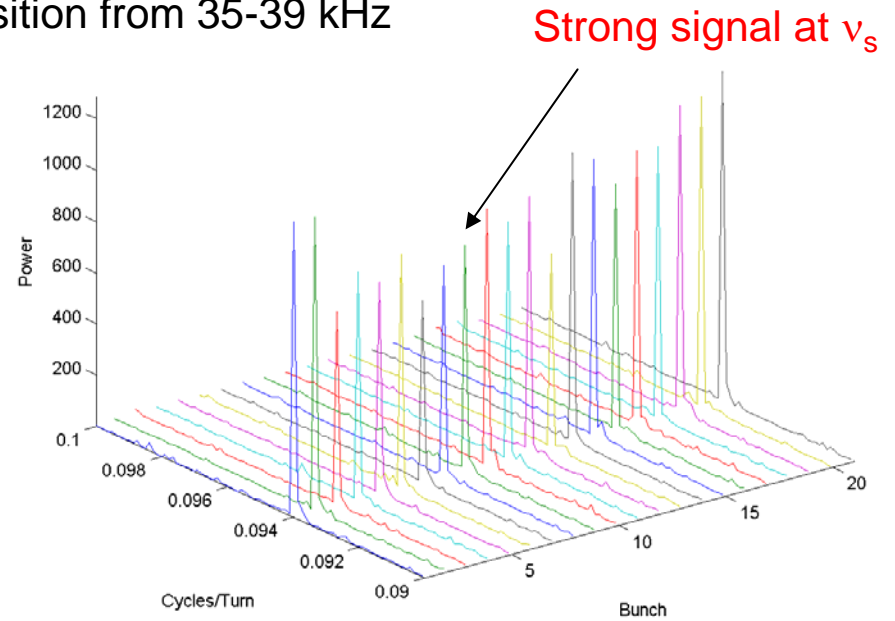


bsm23e01057 results
 FFT of mean vertical position from 242.0-249.8 kHz

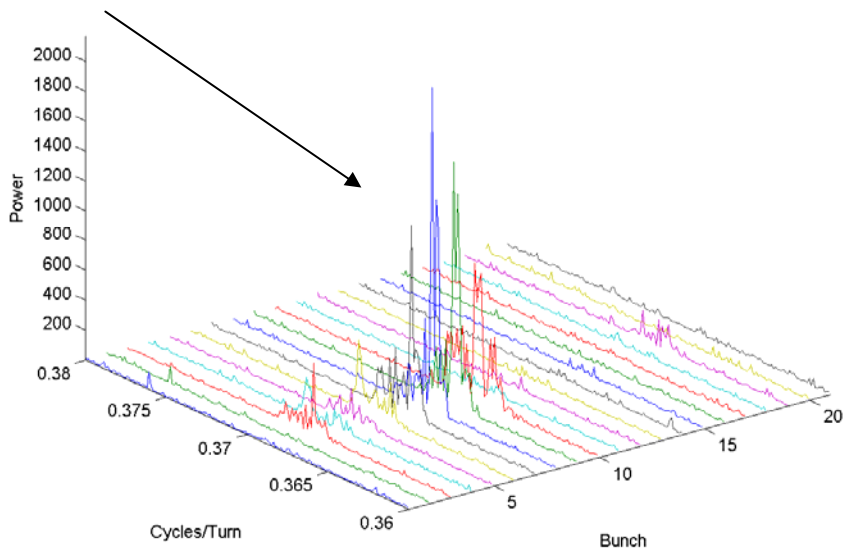


bsm23e01057 results

bsm23e01057 results
 FFT of mean vertical position from 35-39 kHz



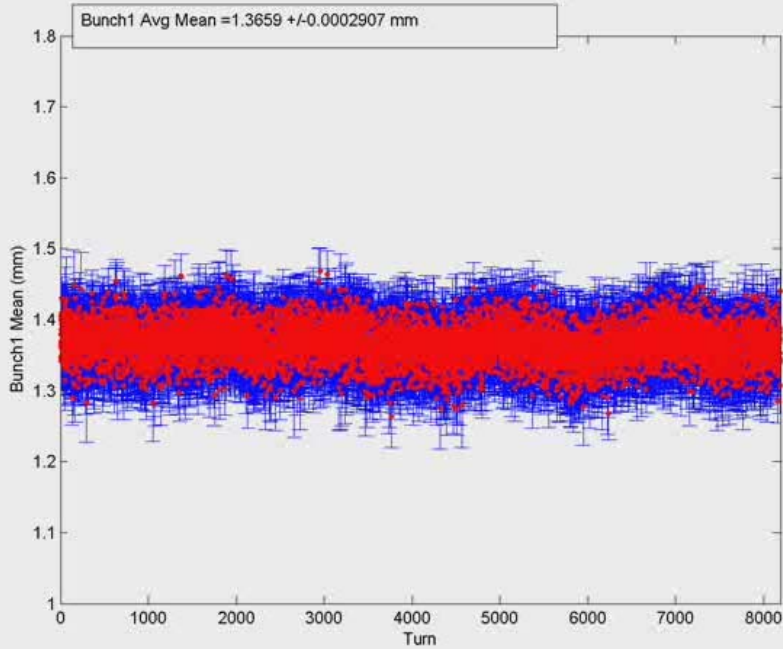
bsm23e01057 results
 FFT of σ_v from 242.0-249.8 kHz



e+ vertical dynamics

Witness bunches 18-20,22,25-26,28,30,34,38,42

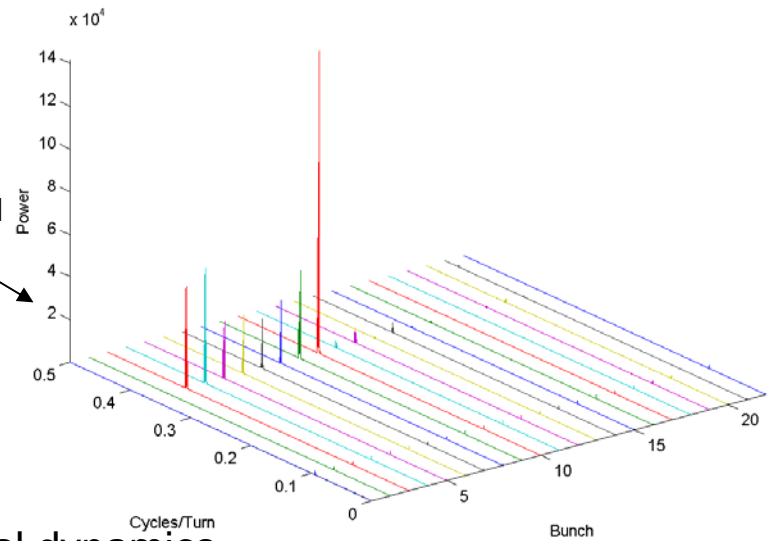
File: 1057



Vertical mean position (movie)



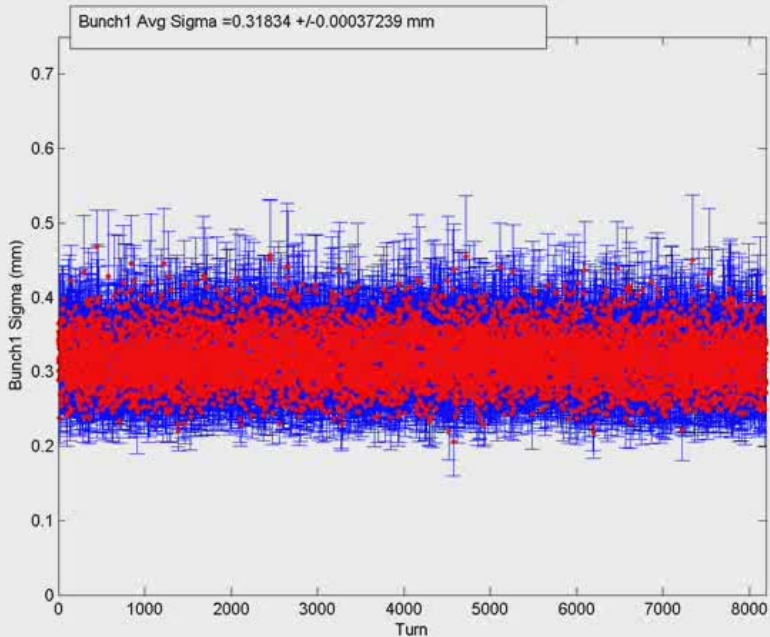
FFT Vertical position



e+ vertical dynamics

Witness bunches 17-20,22,25-26,28,30,34,38,42

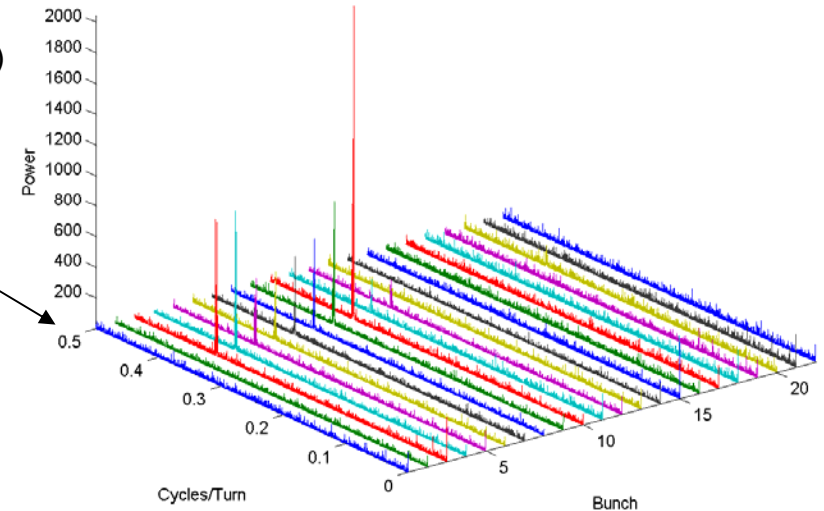
File: 1058



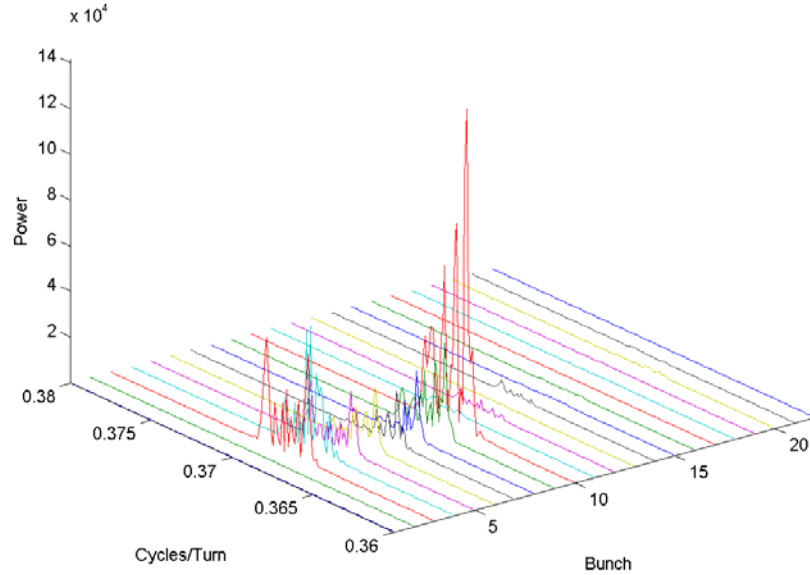
σ_v (movie)



FFT σ_v

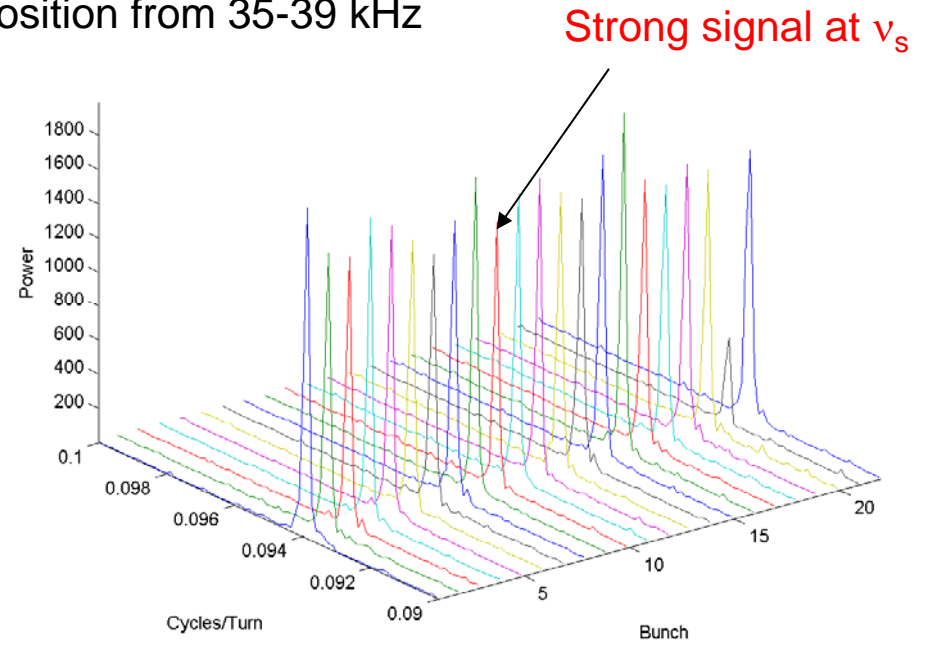


FFT of mean vertical position from 242.0-249.8 kHz

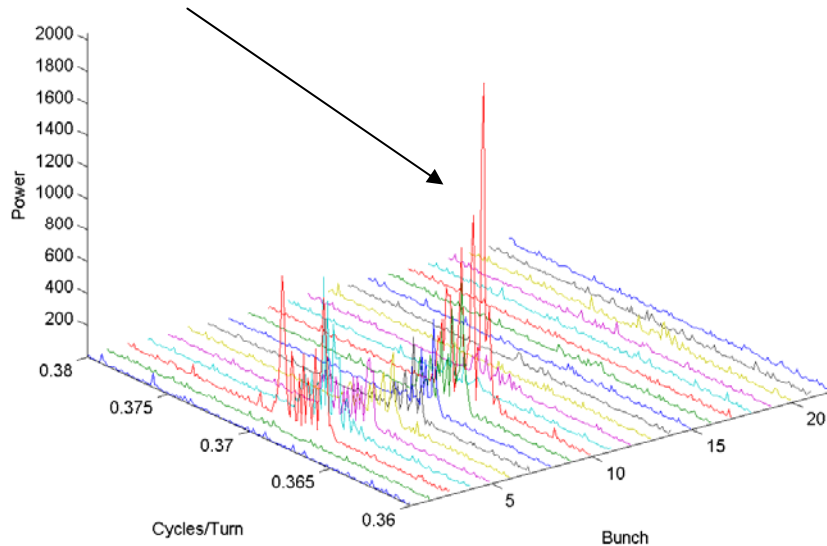


bsm23e01058 results

FFT of mean vertical position from 35-39 kHz



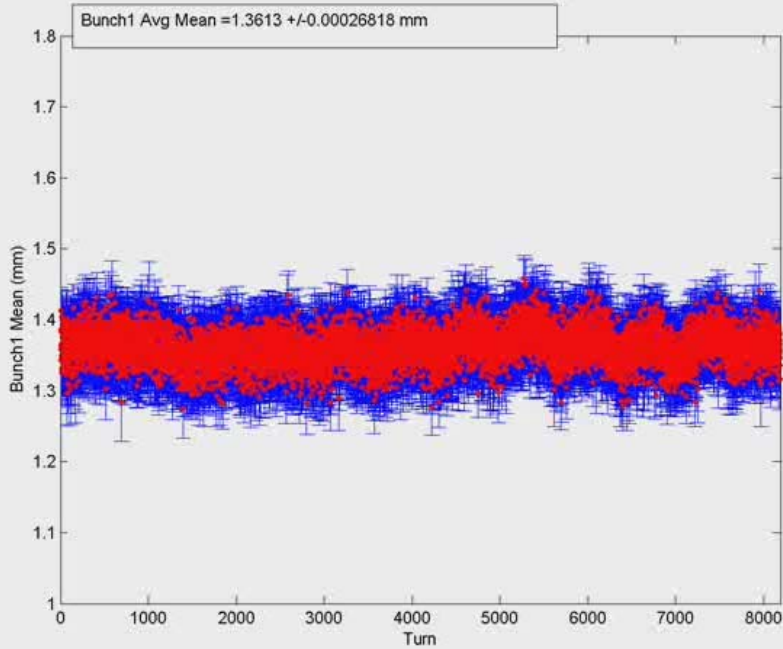
FFT of σ_v from 242.0-249.8 kHz



e+ vertical dynamics

Witness bunches 17-20,22,25-26,28,30,34,38,42

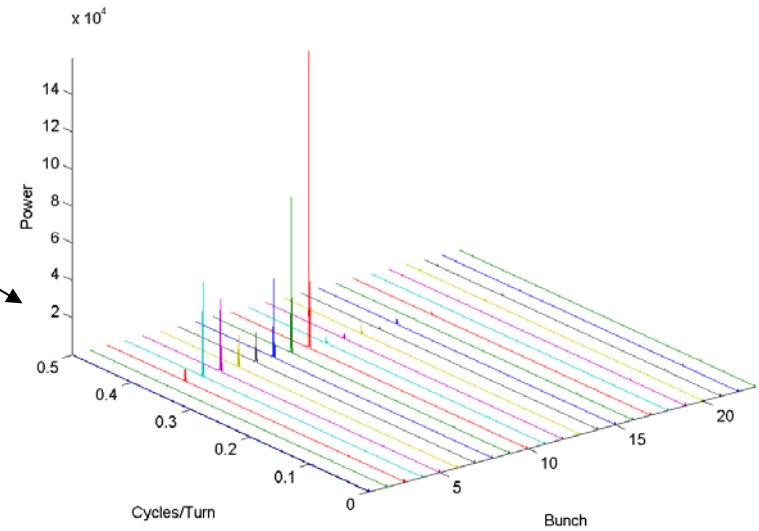
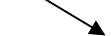
File: 1058



Vertical mean position (movie)



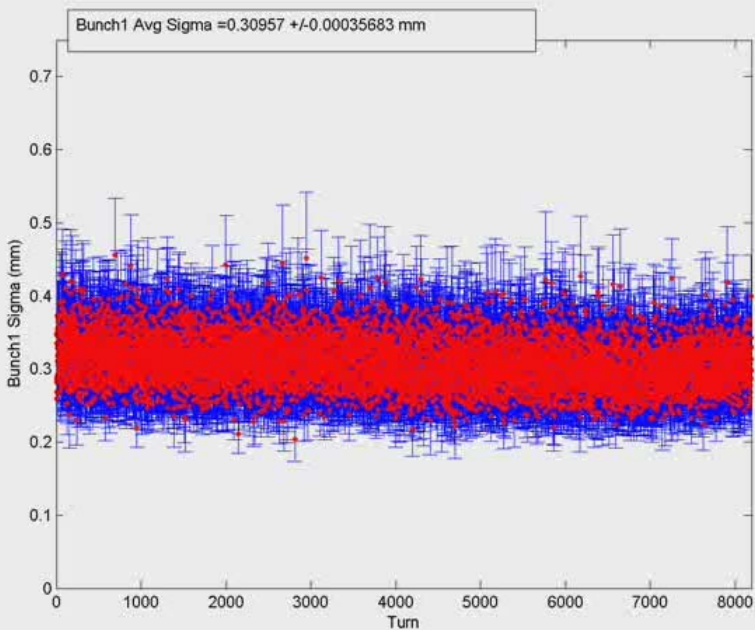
FFT Vertical position



e+ vertical dynamics

Witness bunches 16-20,22,25-26,28,30,34,38,42

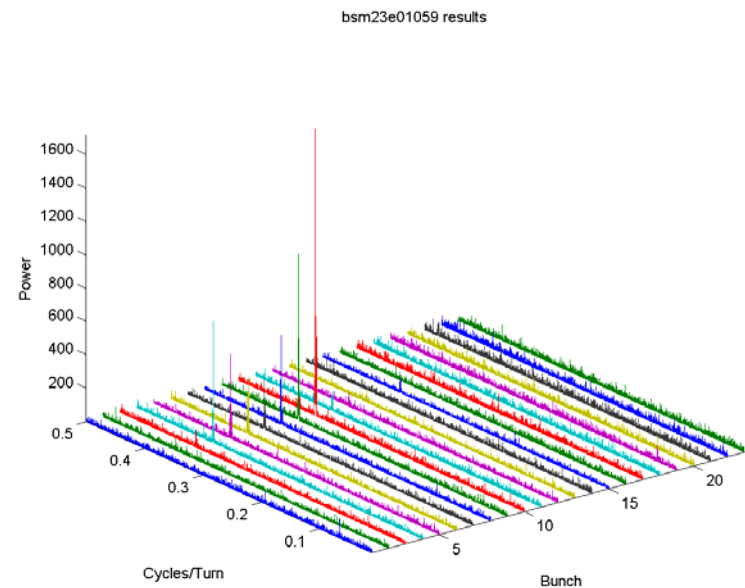
File: 1059



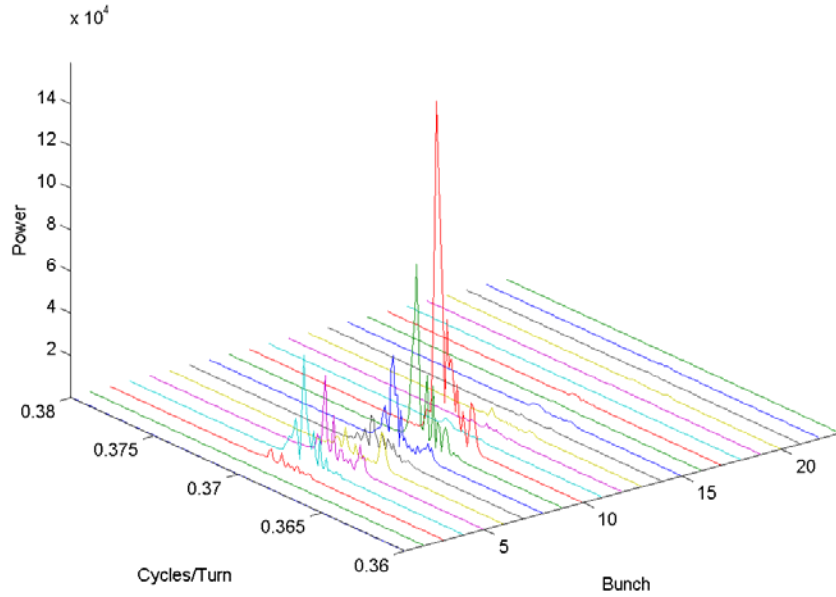
σ_v (movie)



FFT σ_v

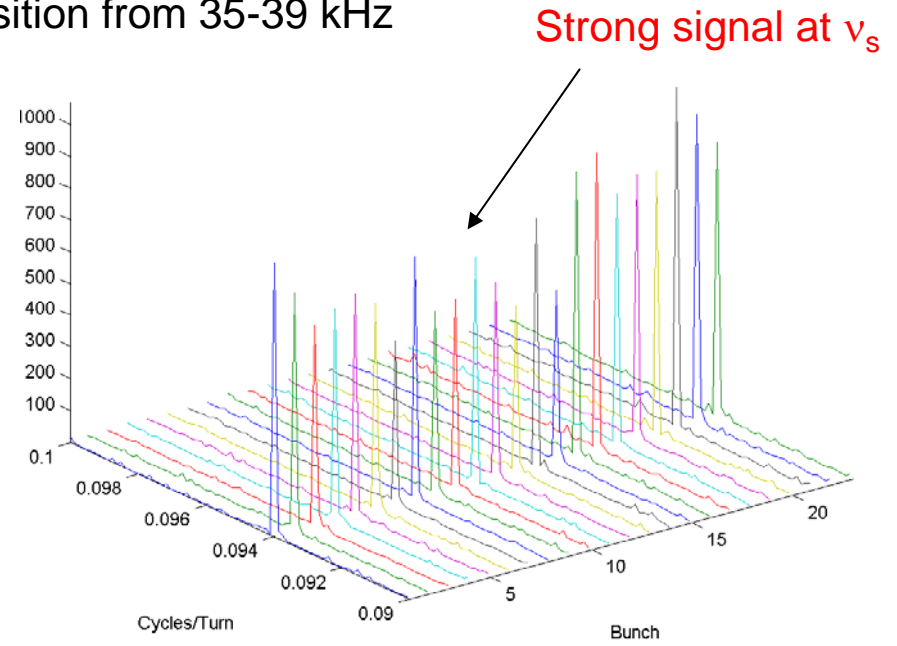


bsm23e01059 results
FFT of mean vertical position from 242.0-249.8 kHz

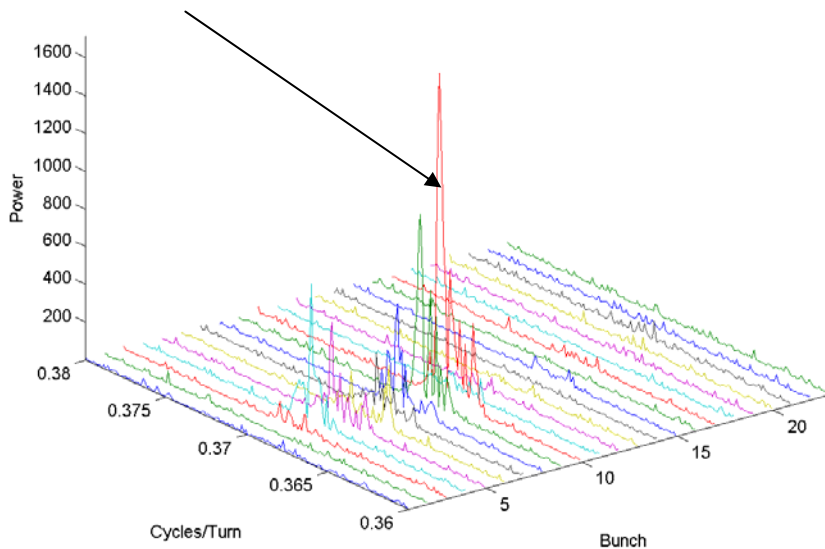


bsm23e01059 results

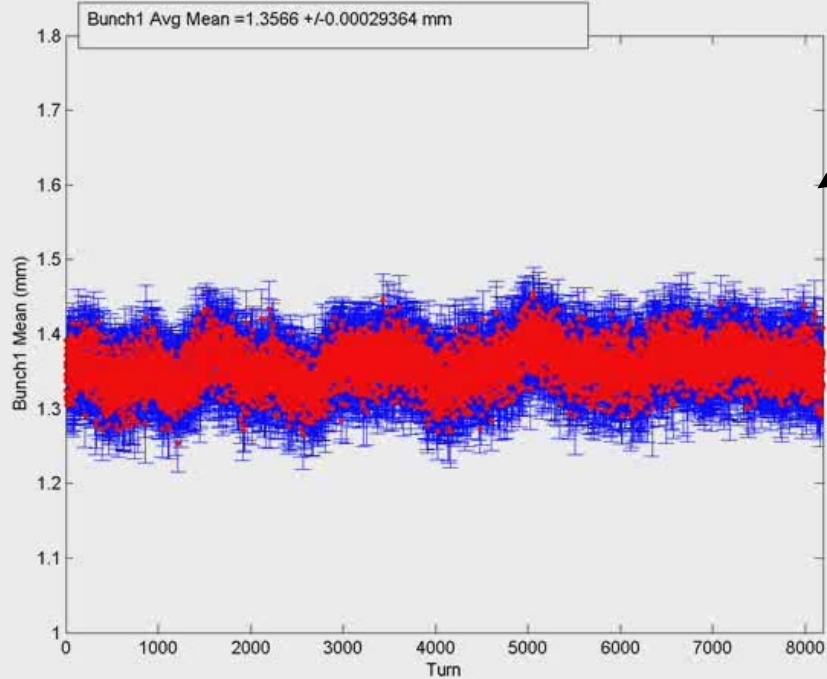
bsm23e01059 results
FFT of mean vertical position from 35-39 kHz



bsm23e01059 results
FFT of σ_v from 242.0-249.8 kHz

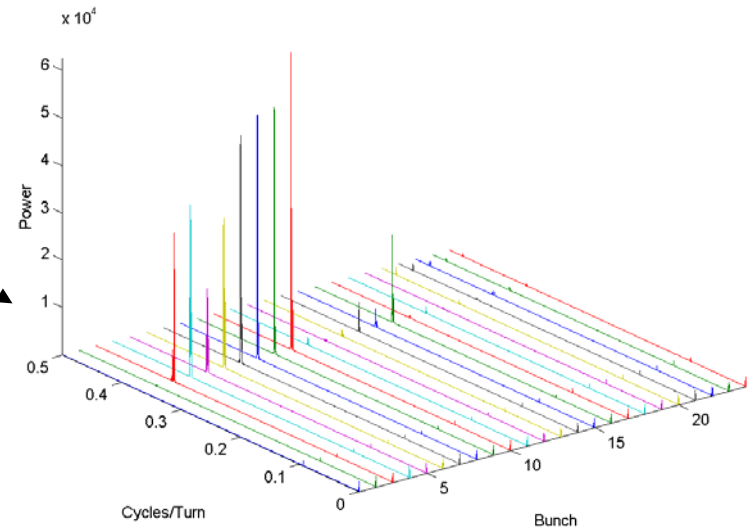


e+ vertical dynamics
Witness bunches 16-20,22,25-26,28,30,34,38,42
File: 1059



Vertical mean position (movie)

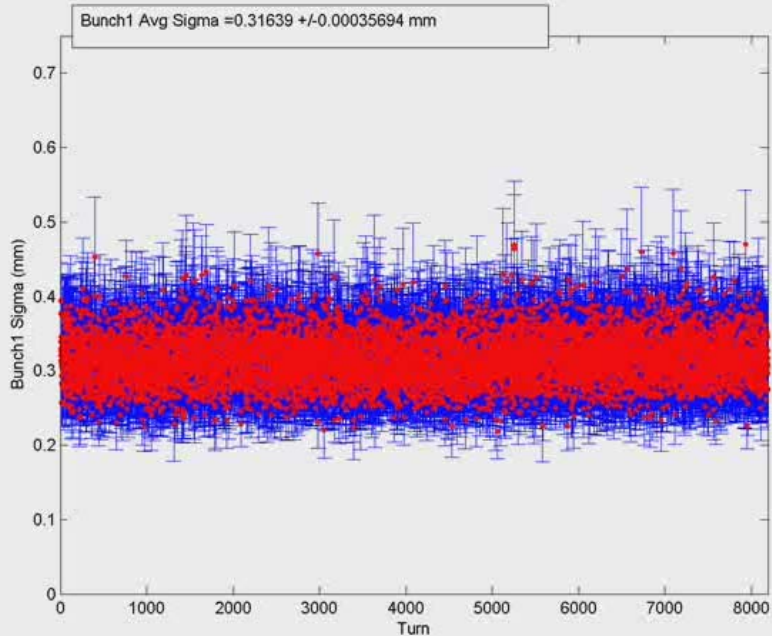
FFT Vertical position



e+ vertical dynamics

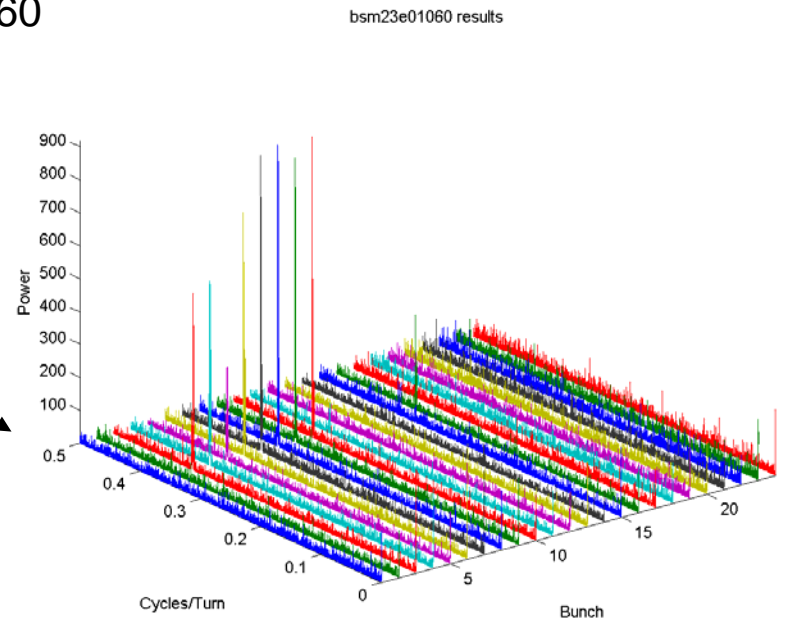
Witness bunches 15-20,22,25-26,28,30,34,38,42

File: 1060



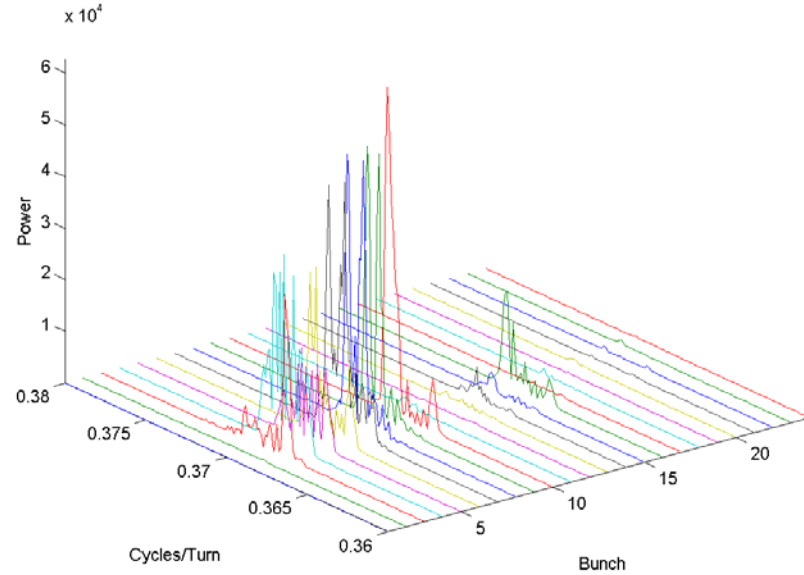
σ_v (movie)

FFT σ_v



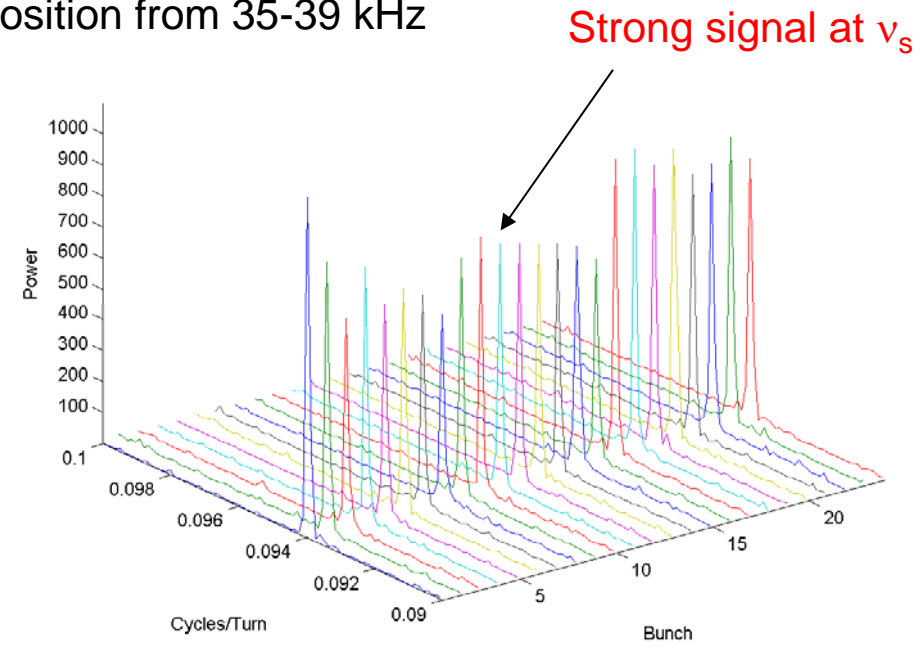
bsm23e01060 results

FFT of mean vertical position from 242.0-249.8 kHz



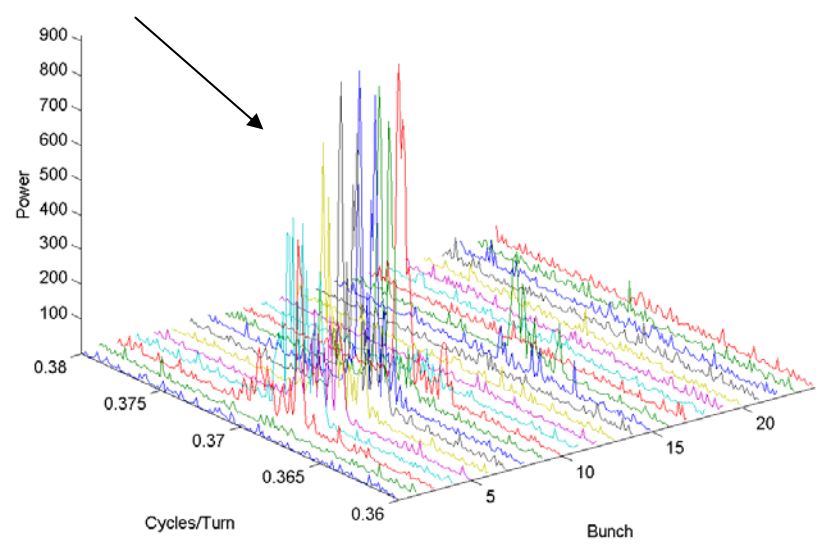
bsm23e01060 results

FFT of mean vertical position from 35-39 kHz



bsm23e01060 results

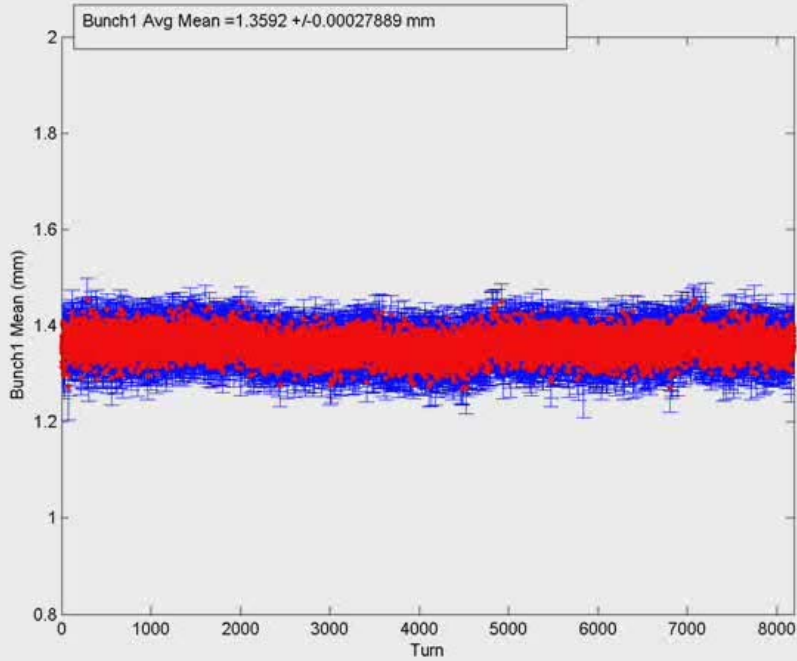
FFT of σ_v from 242.0-249.8 kHz



e+ vertical dynamics

Witness bunches 15-20,22,25-26,28,30,34,38,42

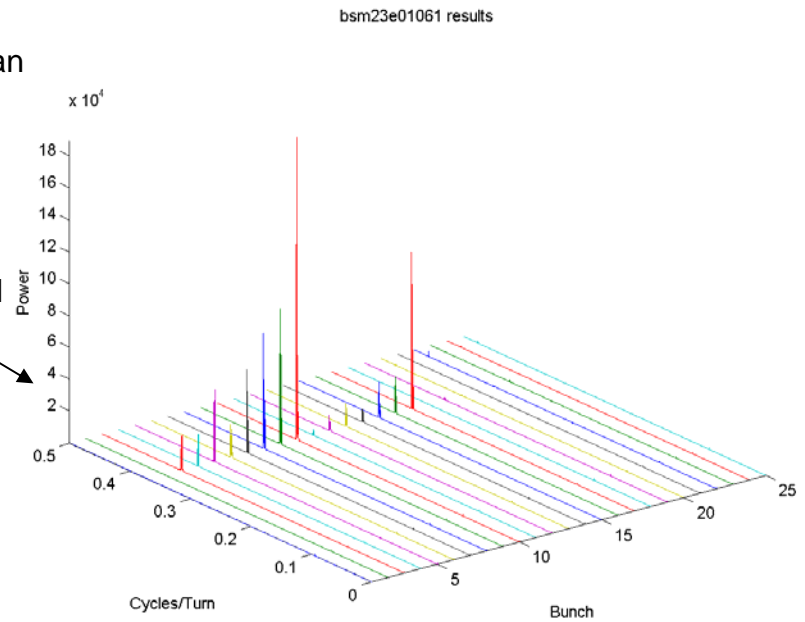
File: 1060



Vertical mean
position
(movie)



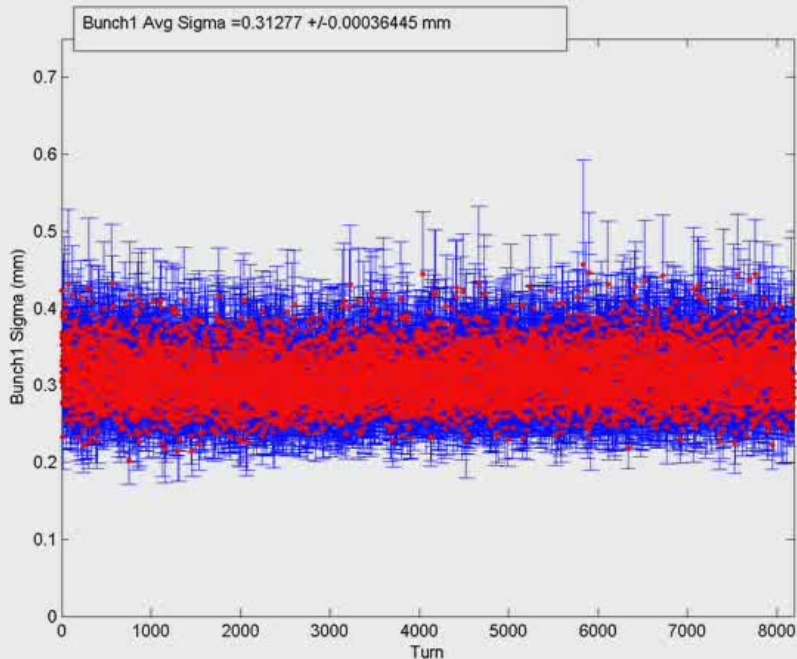
FFT Vertical
position



e+ vertical dynamics

Witness bunches 14-20,22,25-26,28,30,34,38,42

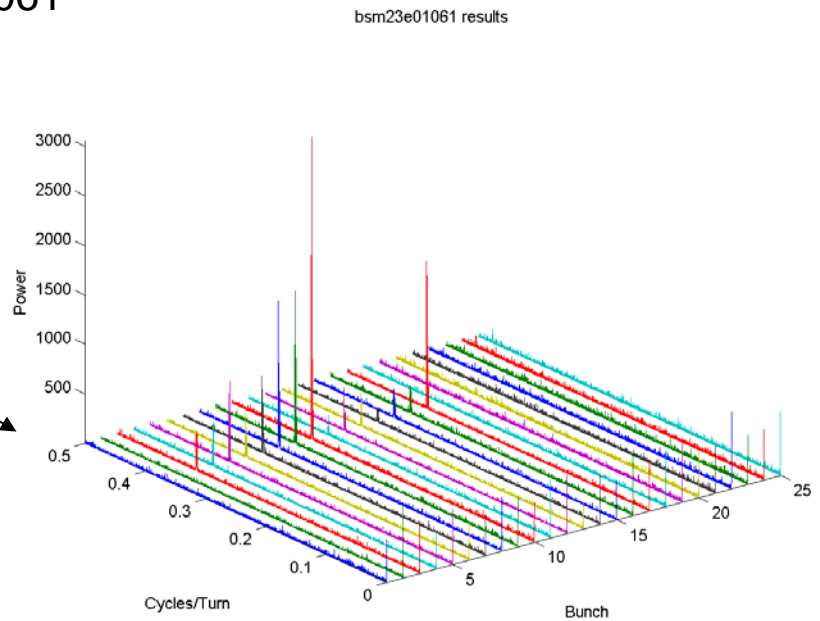
File: 1061



σ_v
(movie)

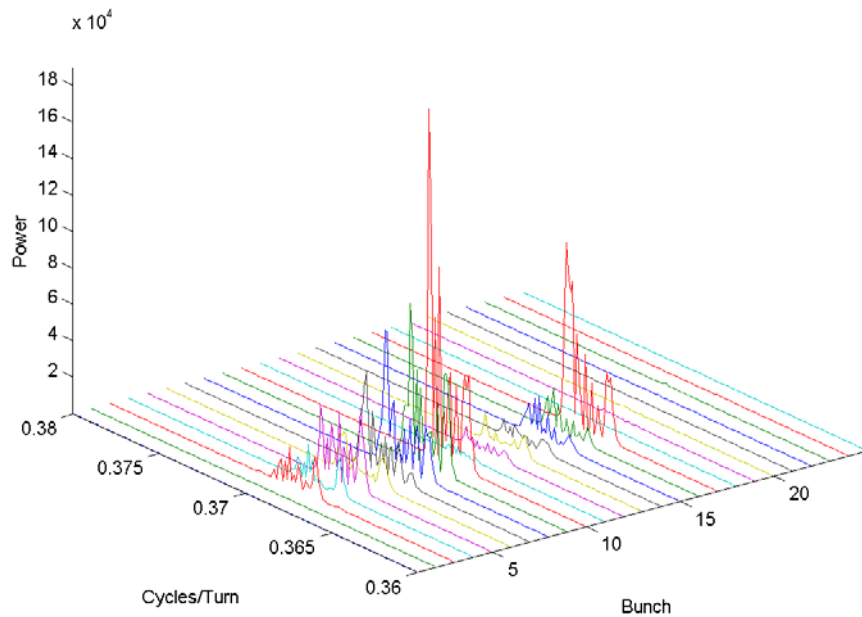


FFT σ_v



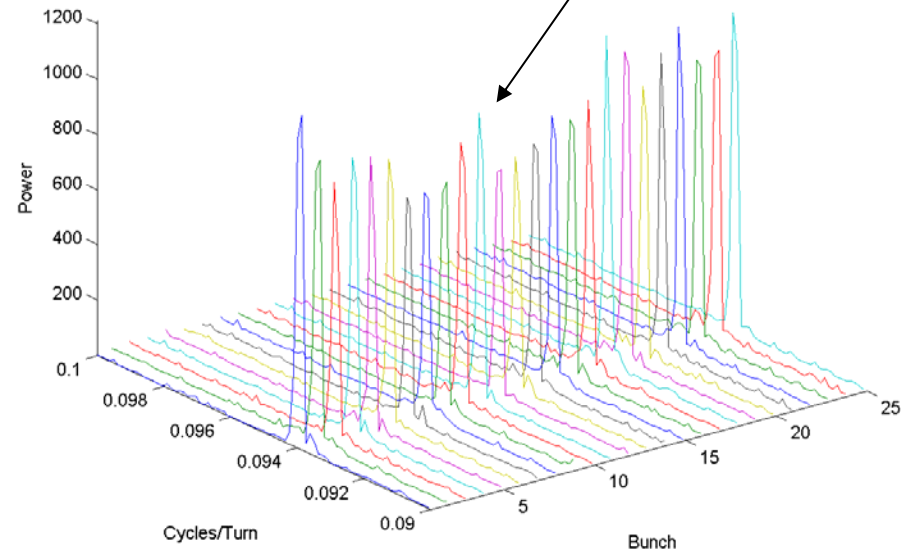
FFT of mean vertical position from 242.0-249.8 kHz

bsm23e01061 results



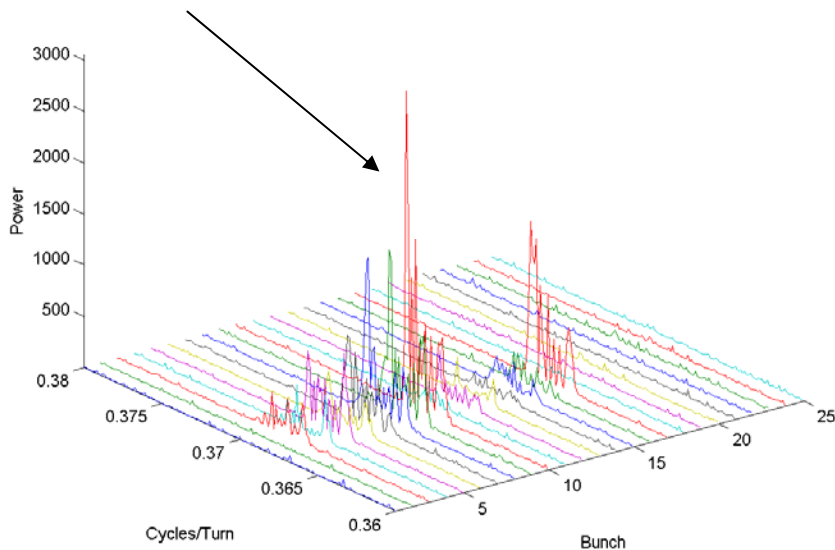
FFT of mean vertical position from 35-39 kHz

bsm23e01061 results



FFT of σ_v from 242.0-249.8 kHz

bsm23e01061 results

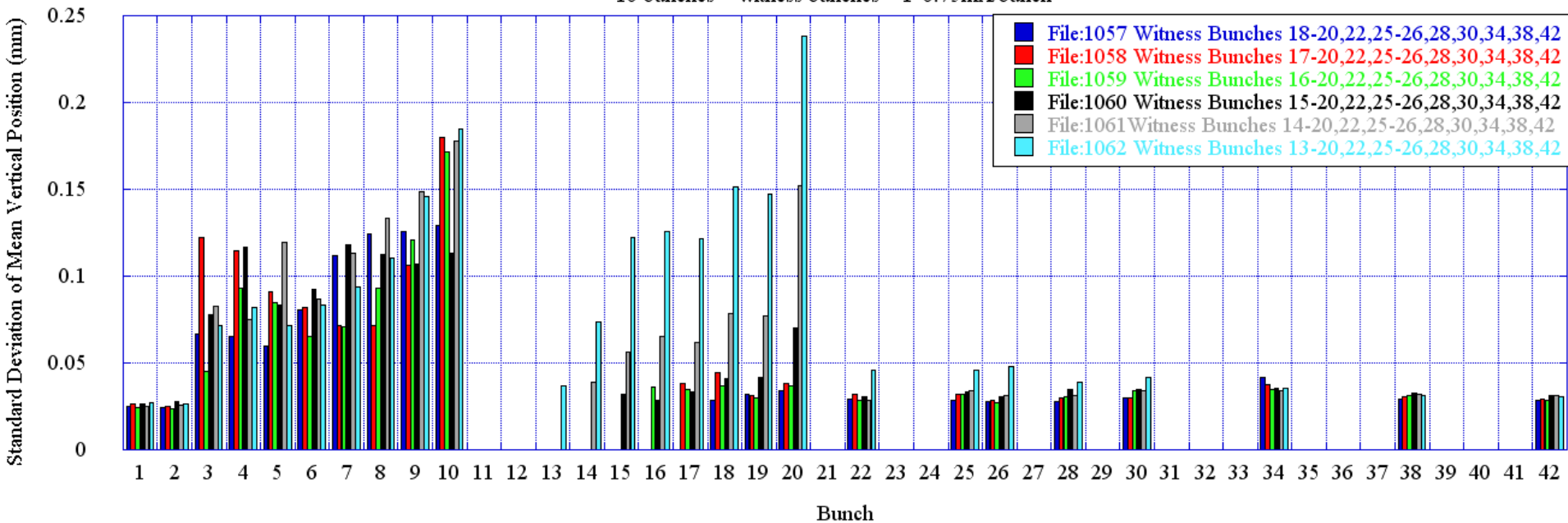


e+ vertical dynamics

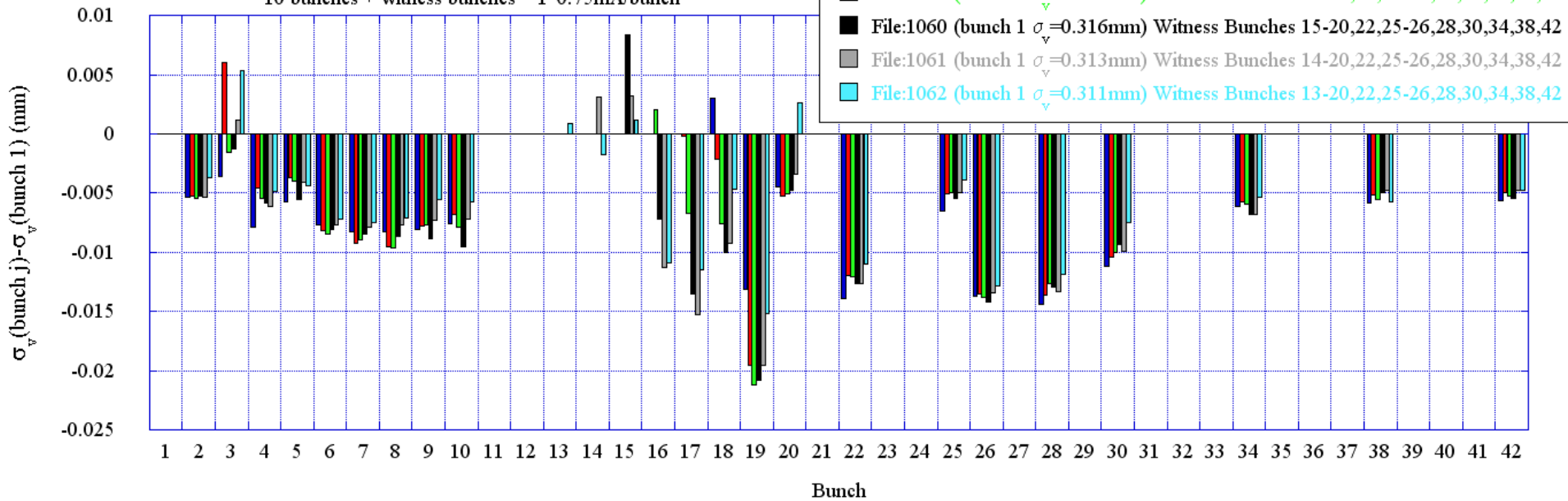
Witness bunches 14-20,22,25-26,28,30,34,38,42

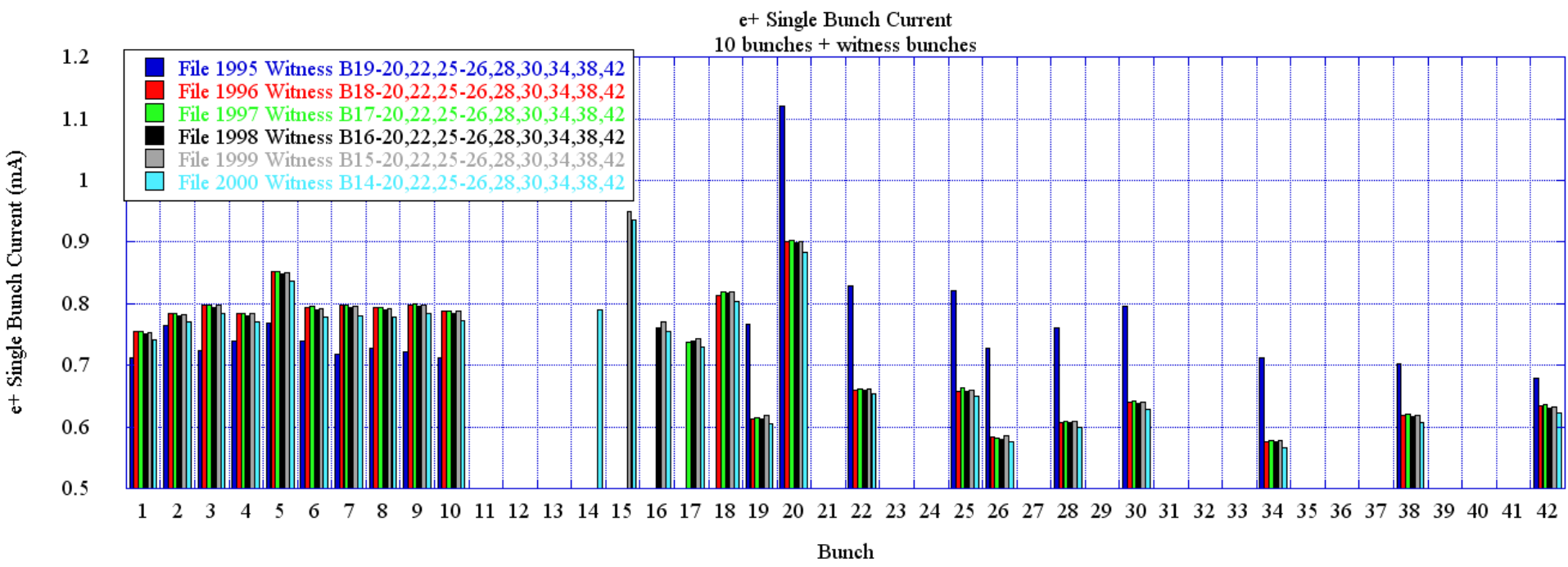
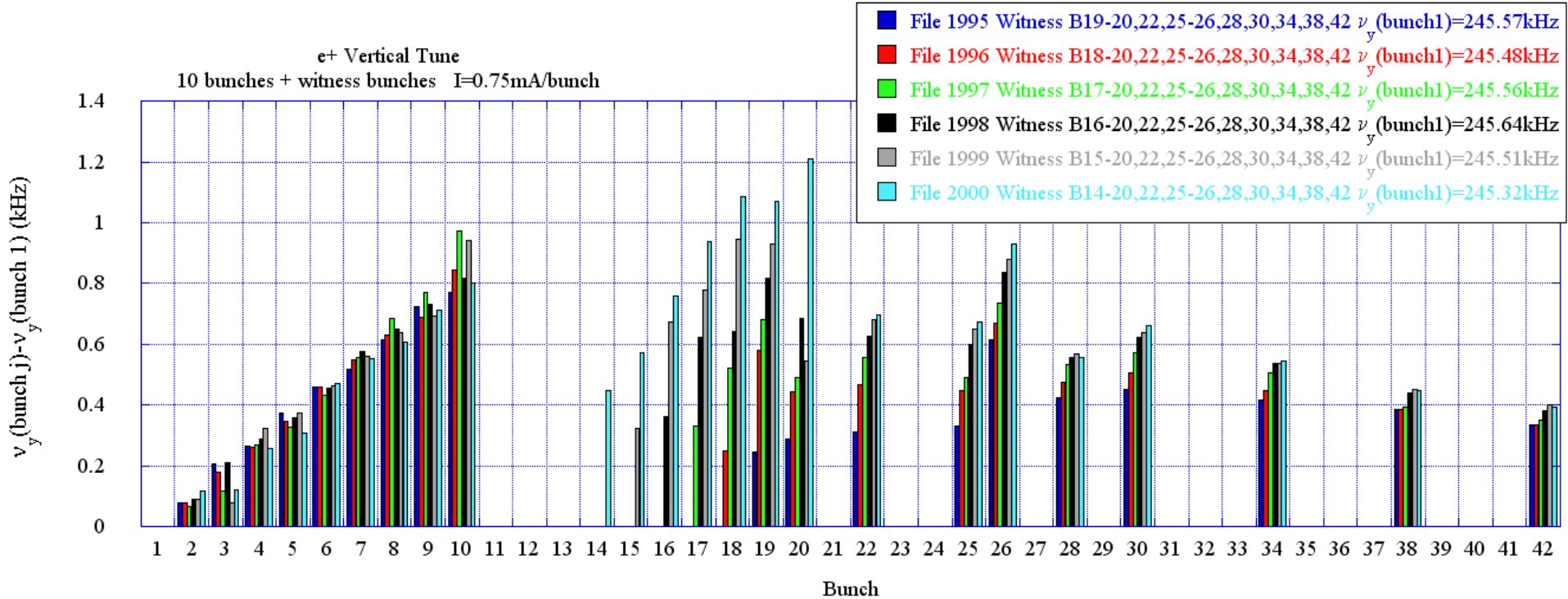
File: 1061

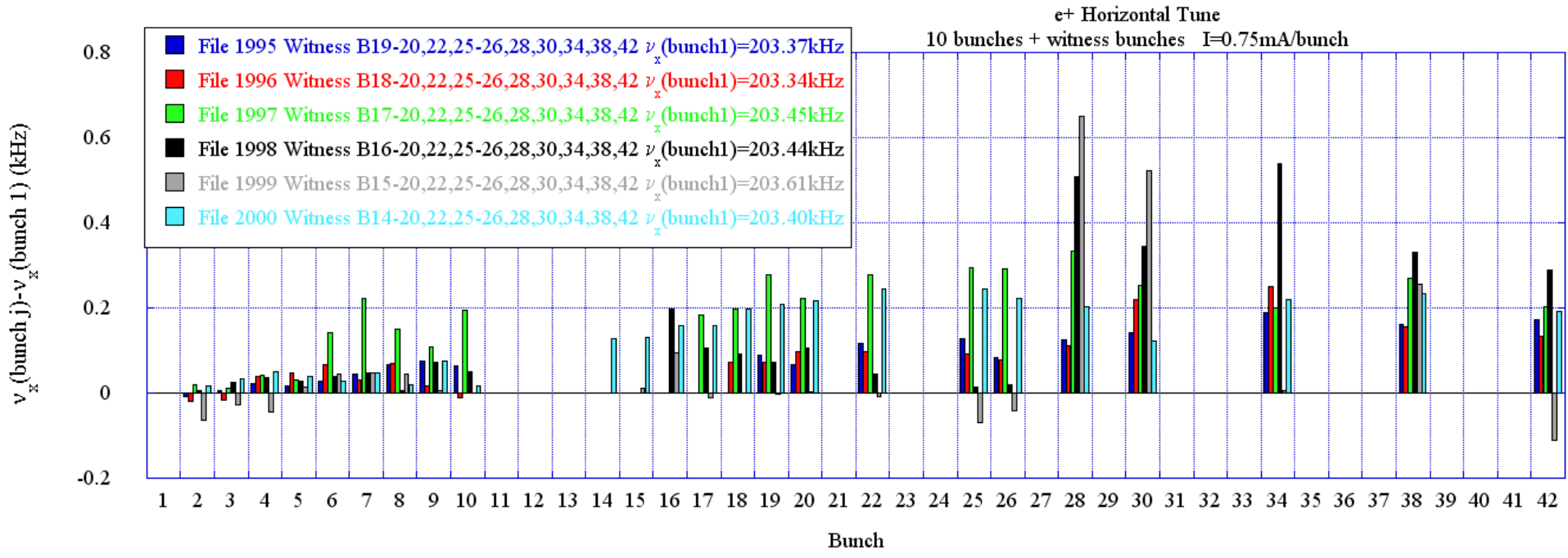
e+ Vertical Oscillation Amplitude
10 bunches + witness bunches I=0.75mA/bunch

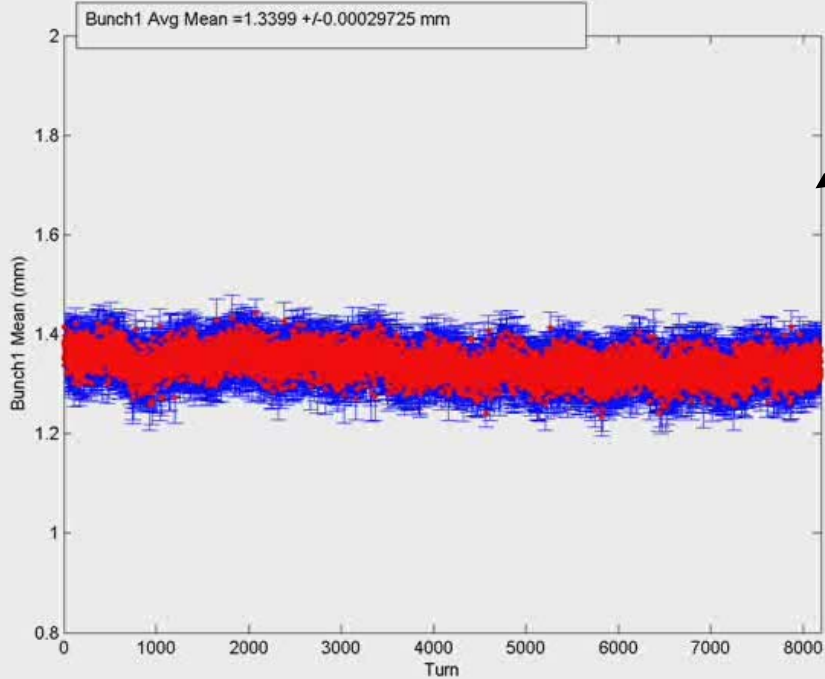


e+ Mean Vertical Beam Size
10 bunches + witness bunches I=0.75mA/bunch



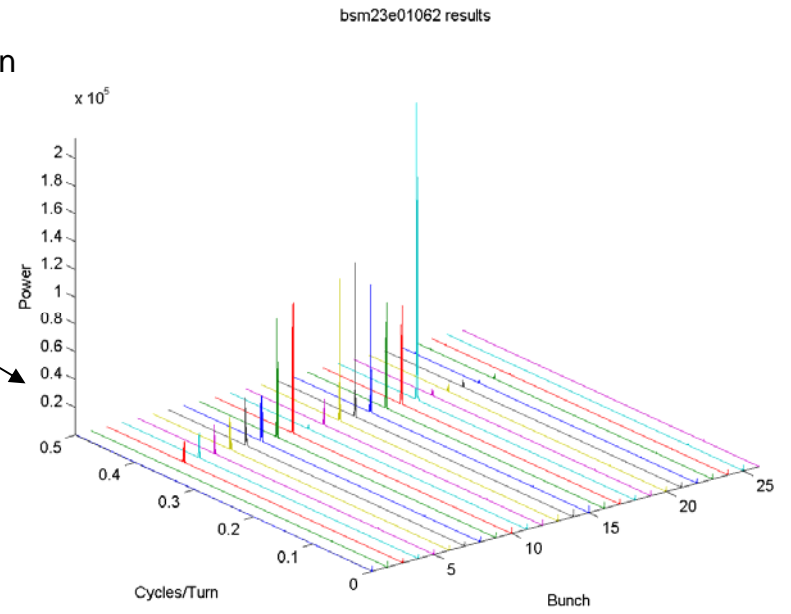






Vertical mean position (movie)

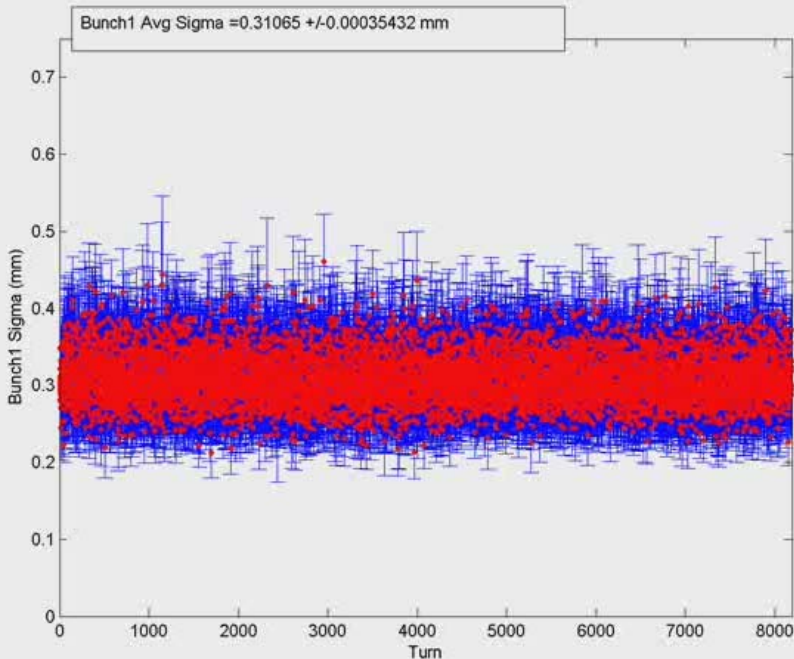
FFT Vertical position



e+ vertical dynamics

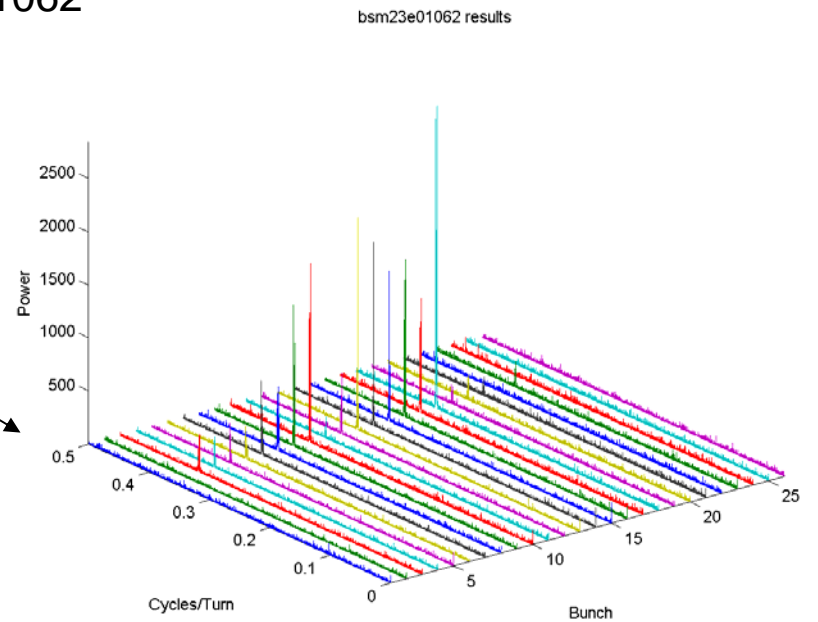
Witness bunches 13-20,22,25-26,28,30,34,38,42

File: 1062

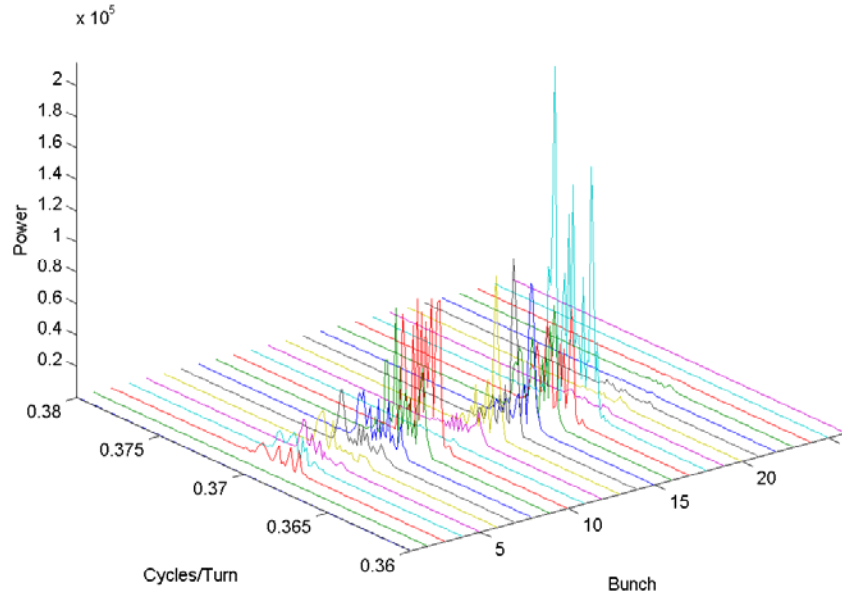


σ_v (movie)

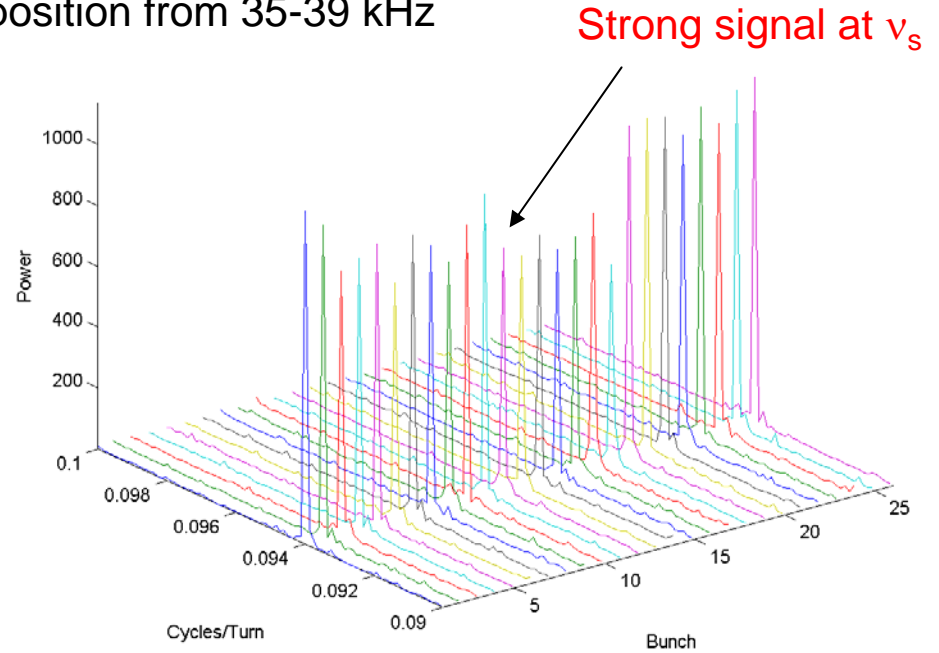
FFT σ_v



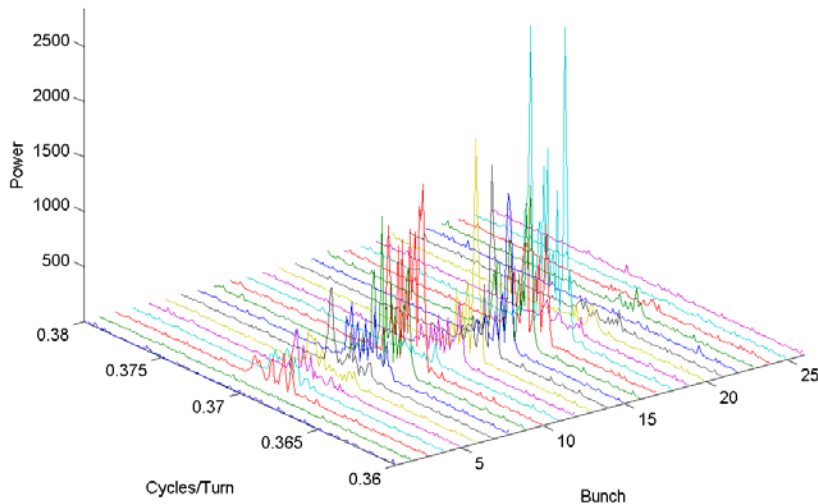
bsm23e01062 results
 FFT of mean vertical position from 242.0-249.8 kHz



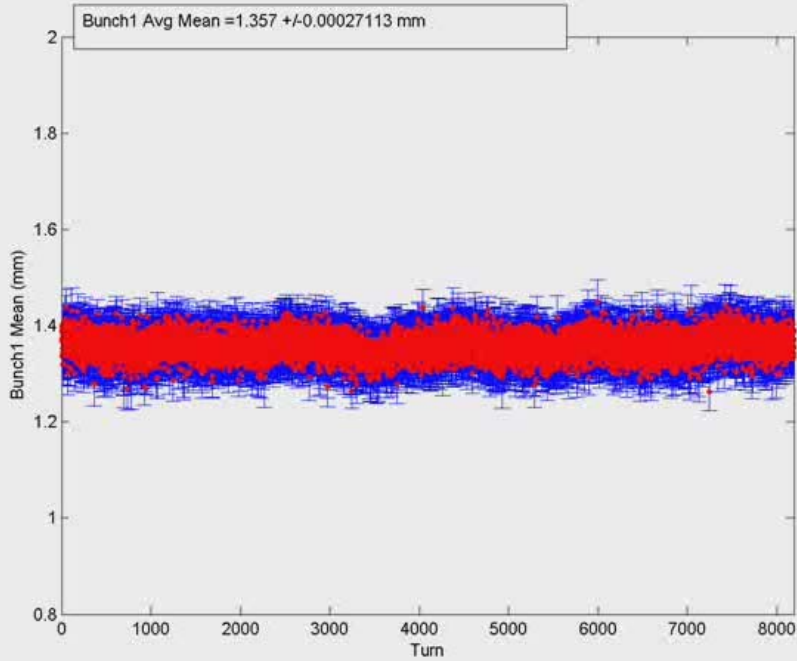
bsm23e01062 results
 FFT of mean vertical position from 35-39 kHz



bsm23e01062 results
 FFT of σ_v from 242.0-249.8 kHz

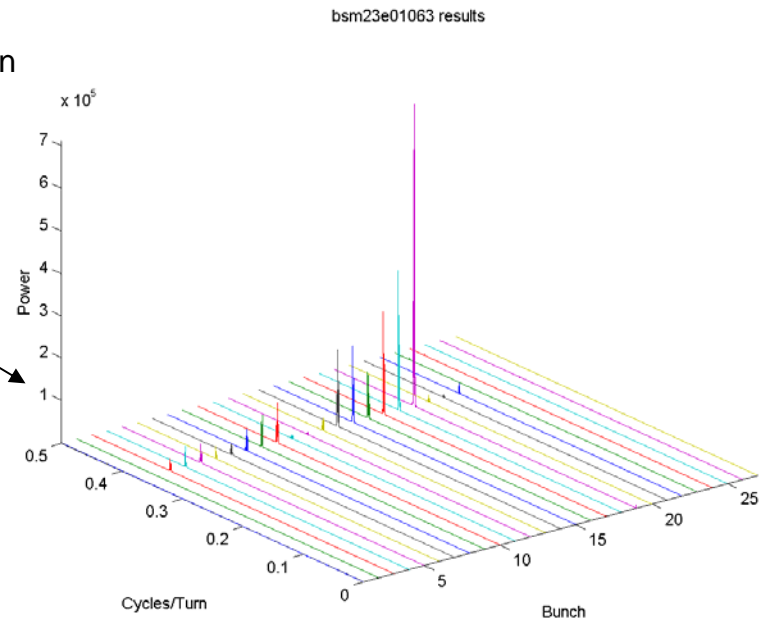


e+ vertical dynamics
 Witness bunches 13-20,22,25-26,28,30,34,38,42
 File: 1062



Vertical mean position (movie)

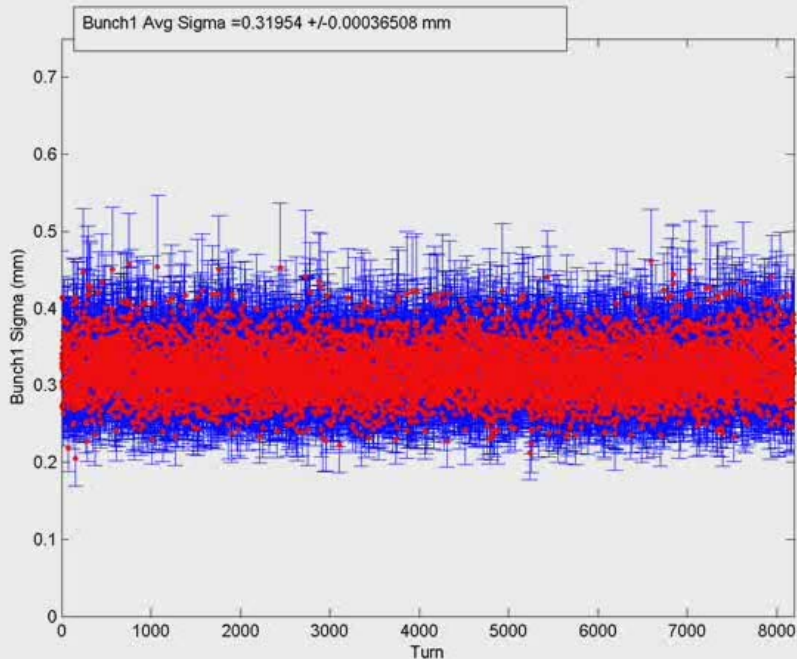
FFT Vertical position



e+ vertical dynamics

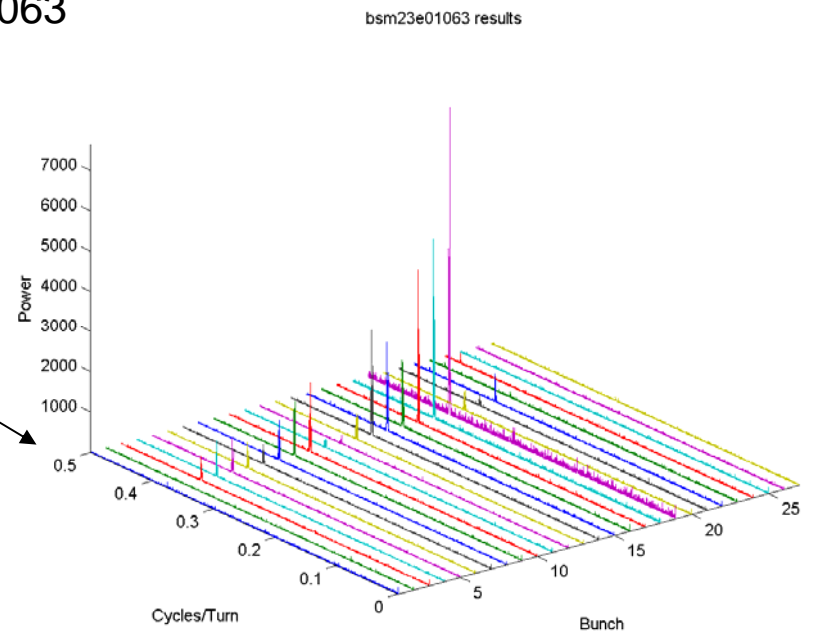
Witness bunches 12-20,22,25-26,28,30,34,38,42

File: 1063

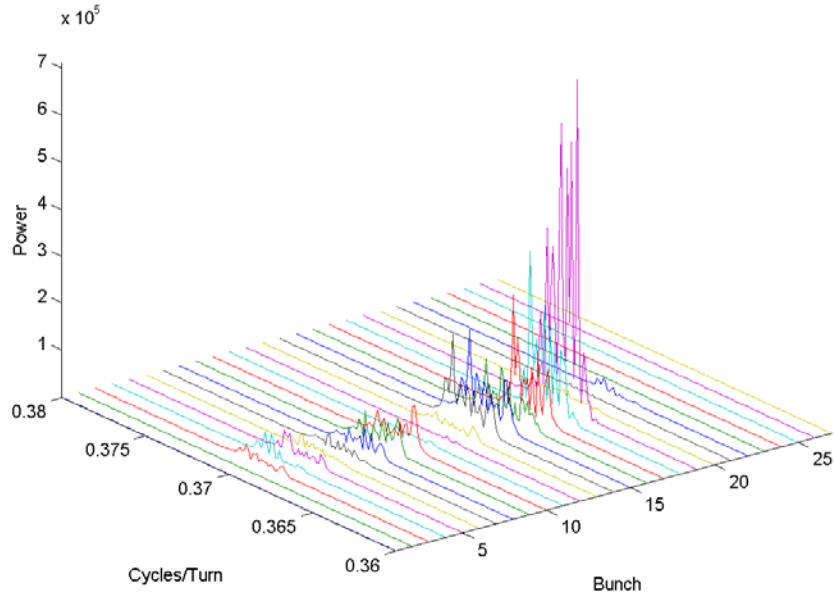


σ_v (movie)

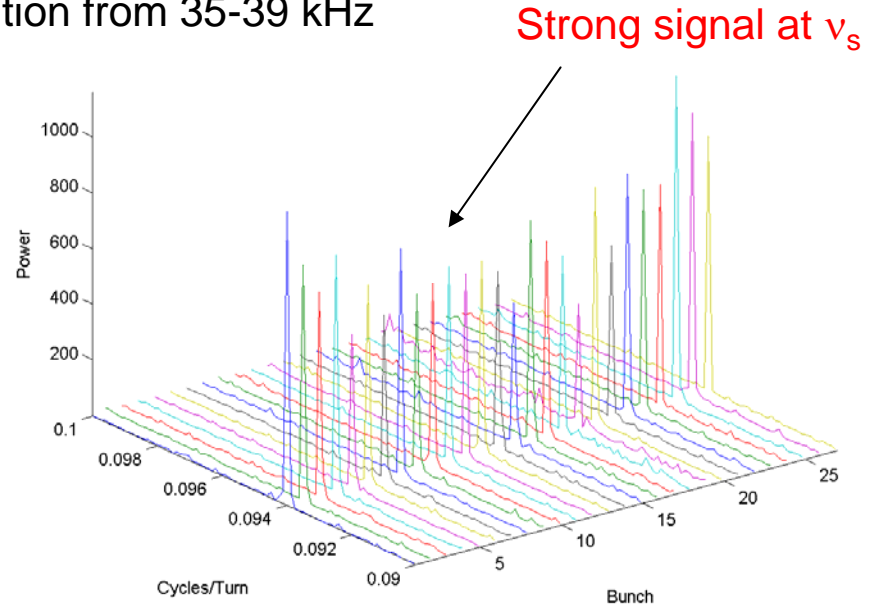
FFT σ_v



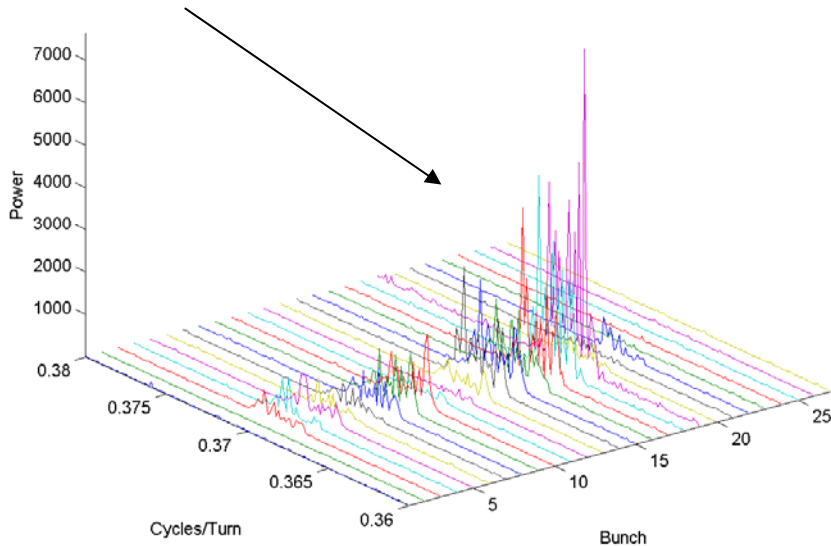
bsm23e01063 results
 FFT of mean vertical position from 242.0-249.8 kHz



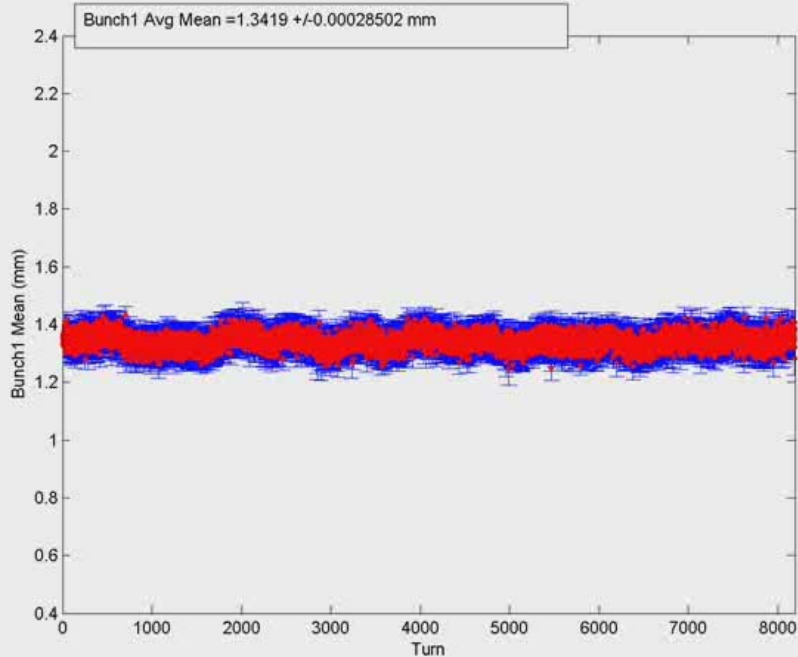
bsm23e01063 results
 FFT of mean vertical position from 35-39 kHz



bsm23e01063 results
 FFT of σ_v from 242.0-249.8 kHz

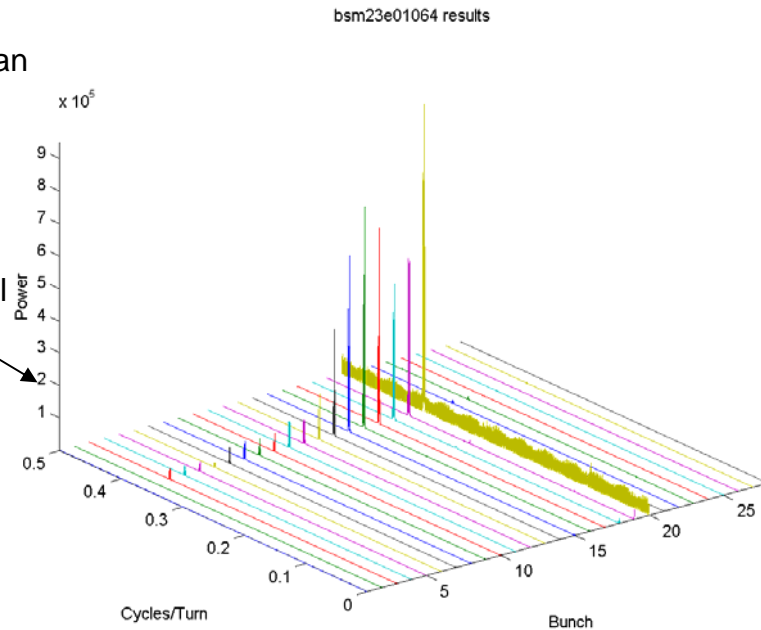


e+ vertical dynamics
 Witness bunches 12-20,22,25-26,28,30,34,38,42
 File: 1063



Vertical mean position (movie)

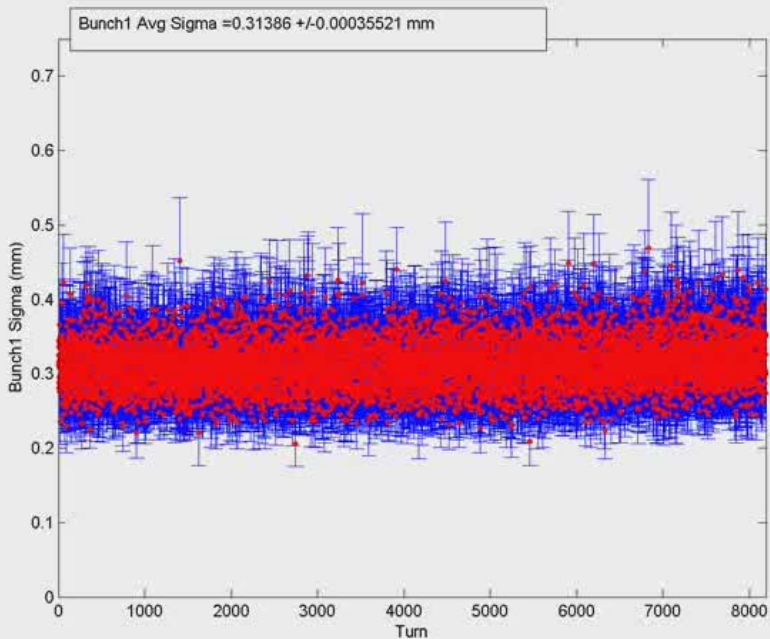
FFT Vertical position



e+ vertical dynamics

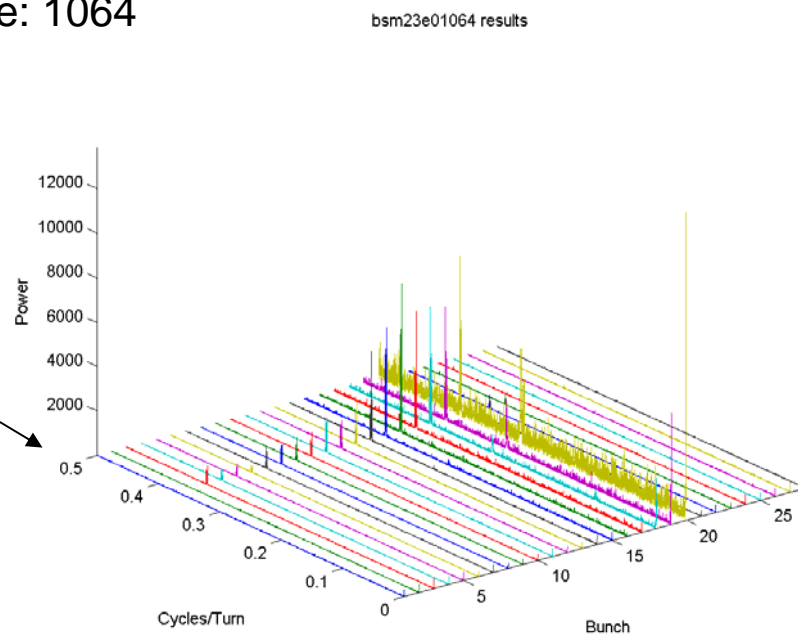
Witness bunches 22,25-26,28,30,34,38,42

File: 1064

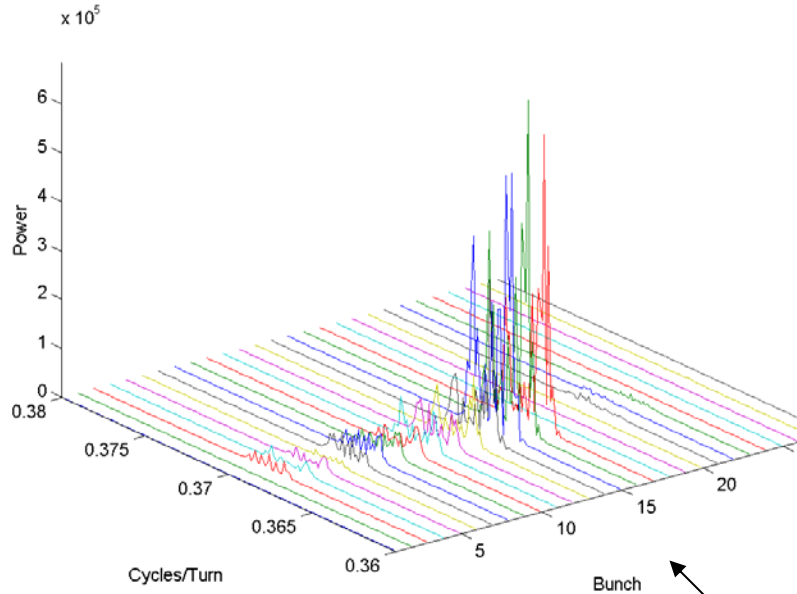


σ_v (movie)

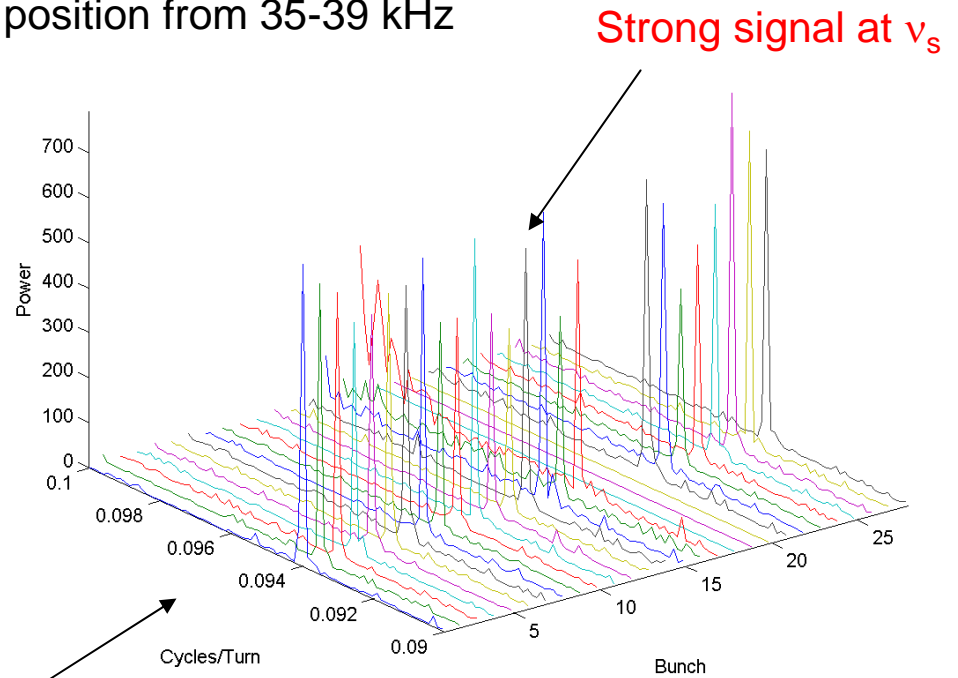
FFT σ_v



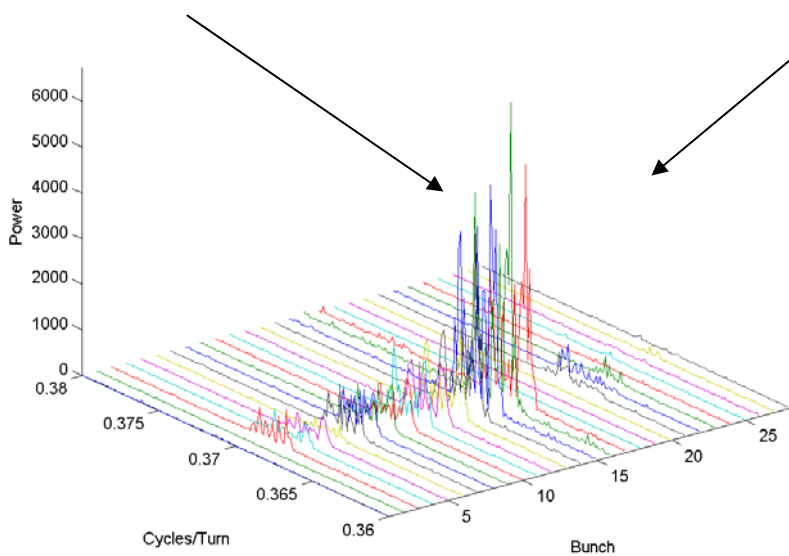
bsm23e01064 results
FFT of mean vertical position from 242.0-249.8 kHz



bsm23e01064 results
FFT of mean vertical position from 35-39 kHz



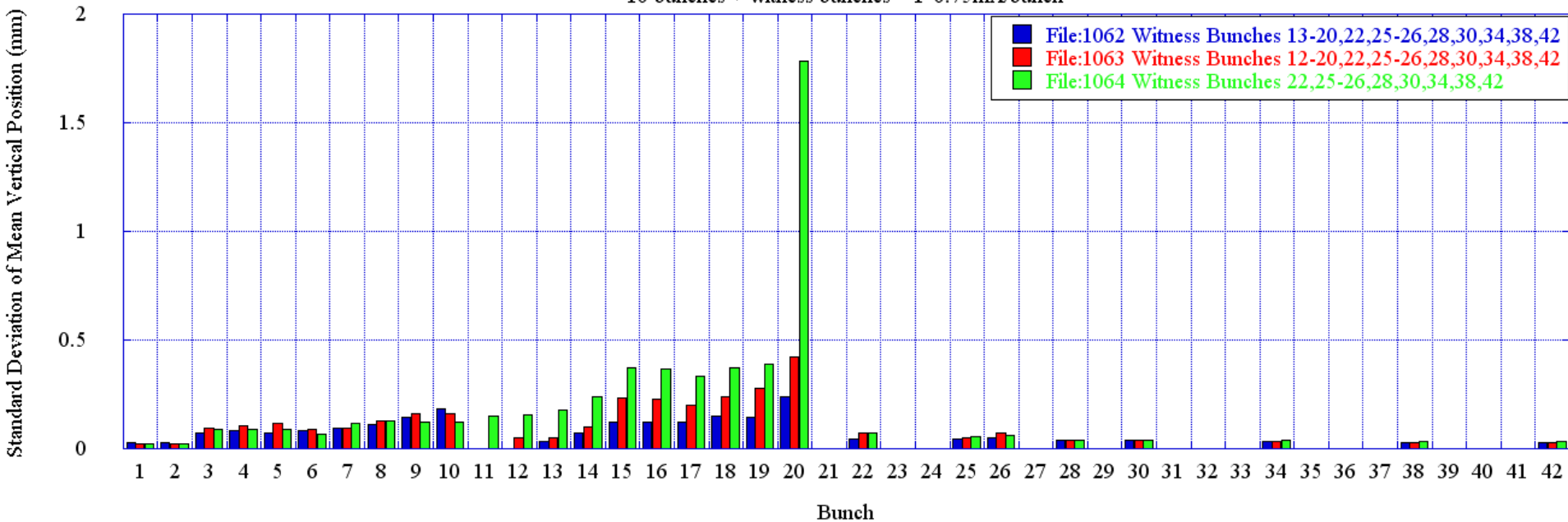
bsm23e01064 results
FFT of σ_v from 242.0-249.8 kHz



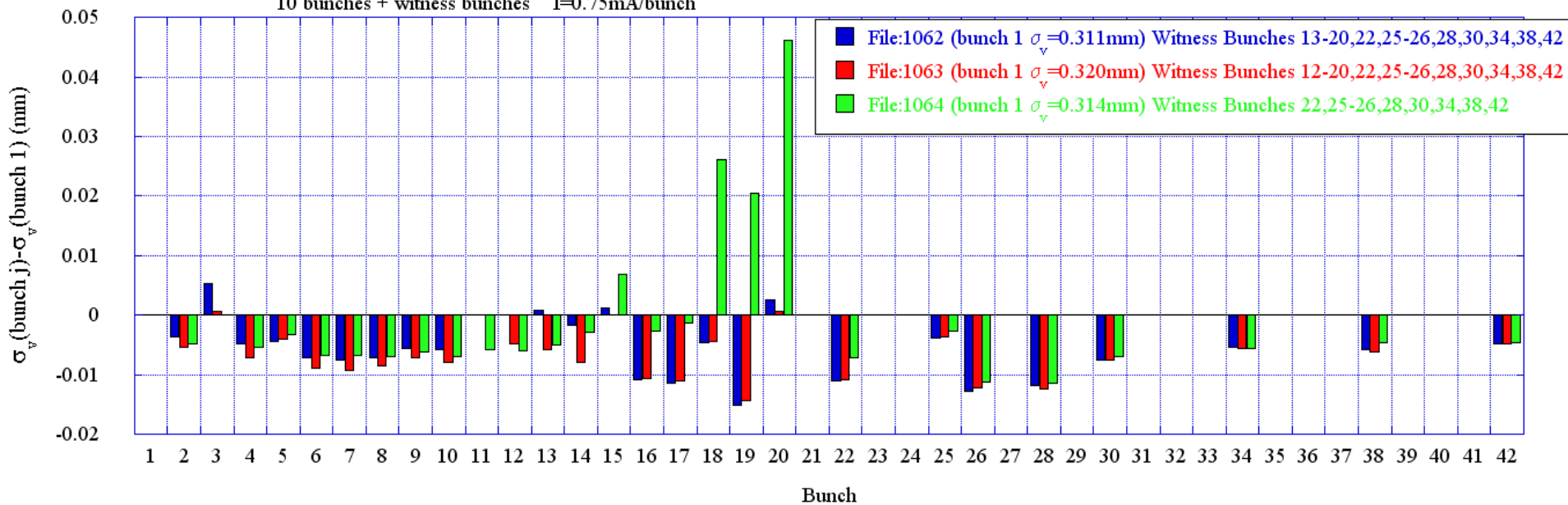
Cut bunches 18-20

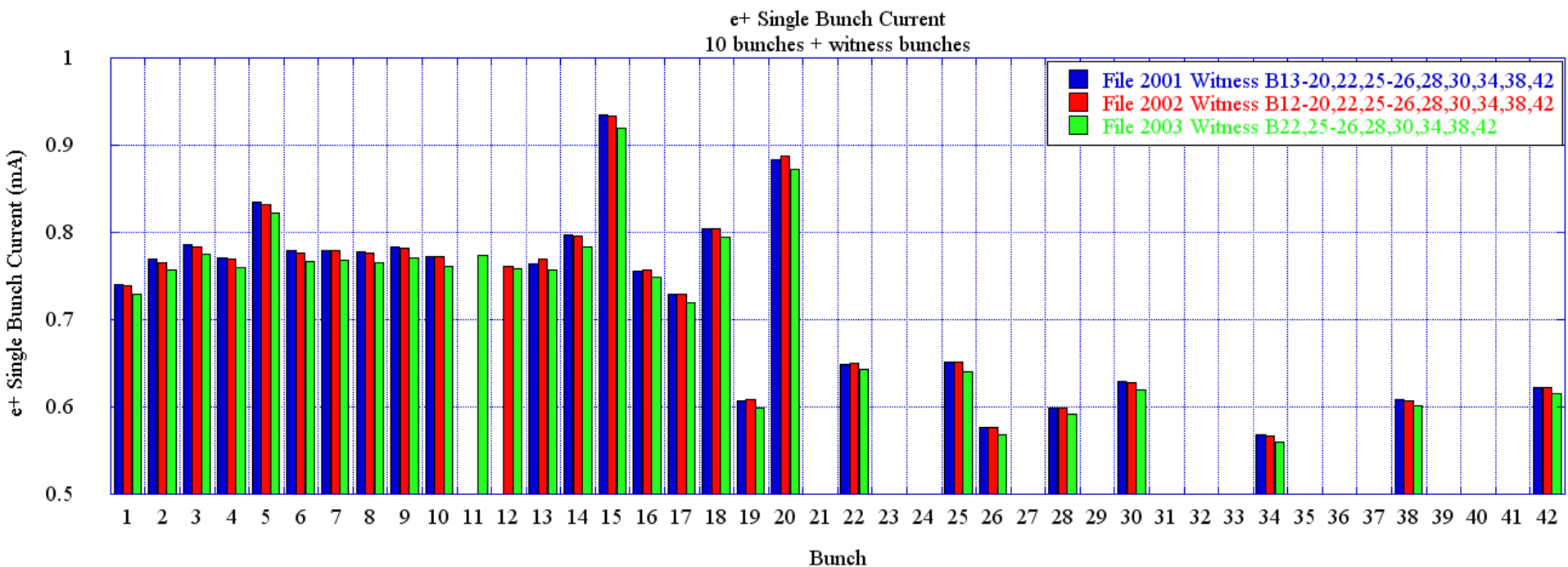
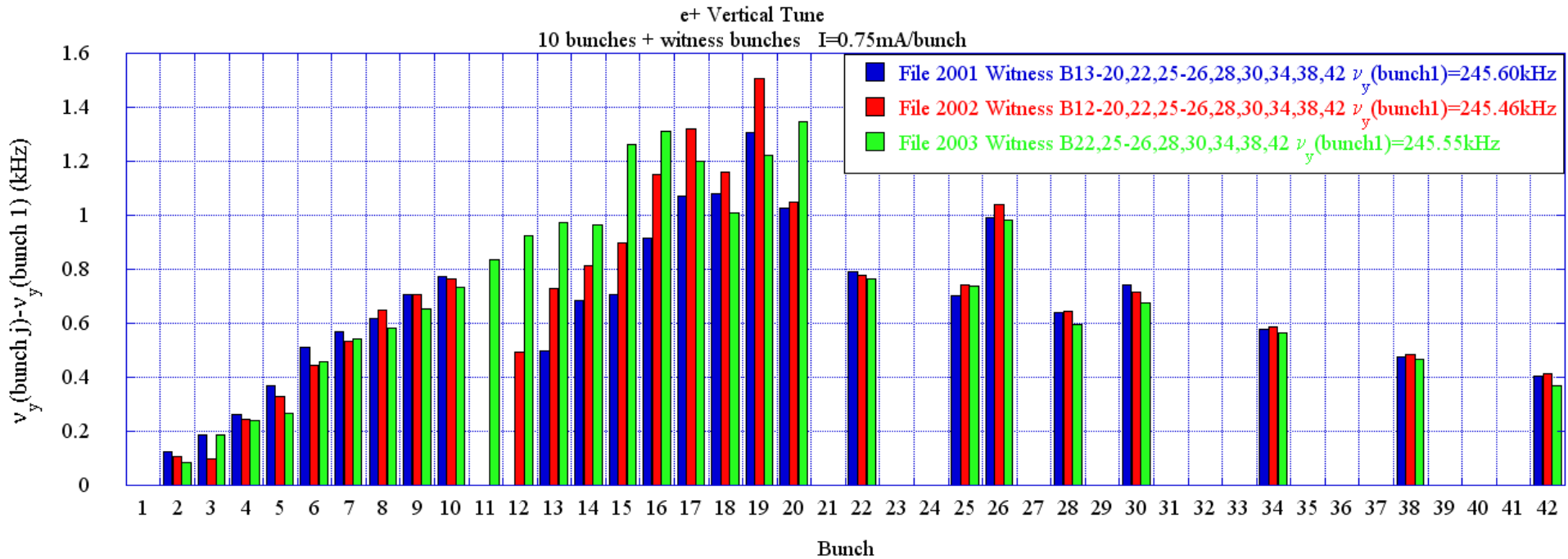
e+ vertical dynamics
Witness bunches 22,25-26,28,30,34,38,42
File: 1064

e+ Vertical Oscillation Amplitude
10 bunches + witness bunches I=0.75mA/bunch



e+ Mean Vertical Beam Size
10 bunches + witness bunches I=0.75mA/bunch





e+ Horizontal Tune
10 bunches + witness bunches I=0.75mA/bunch

