

Fast Dispersion Measurements

R. Helms 2007-05-03

- Procedure

- Shake bunch longitudinally by modulating the phase of the RF cavities at the synchrotron frequency.
- Using 1024-turn data, fit horizontal and vertical motion at each detector to a sine wave with at the shaking frequency
- Scale the amplitudes of the fit wave at each detector so that

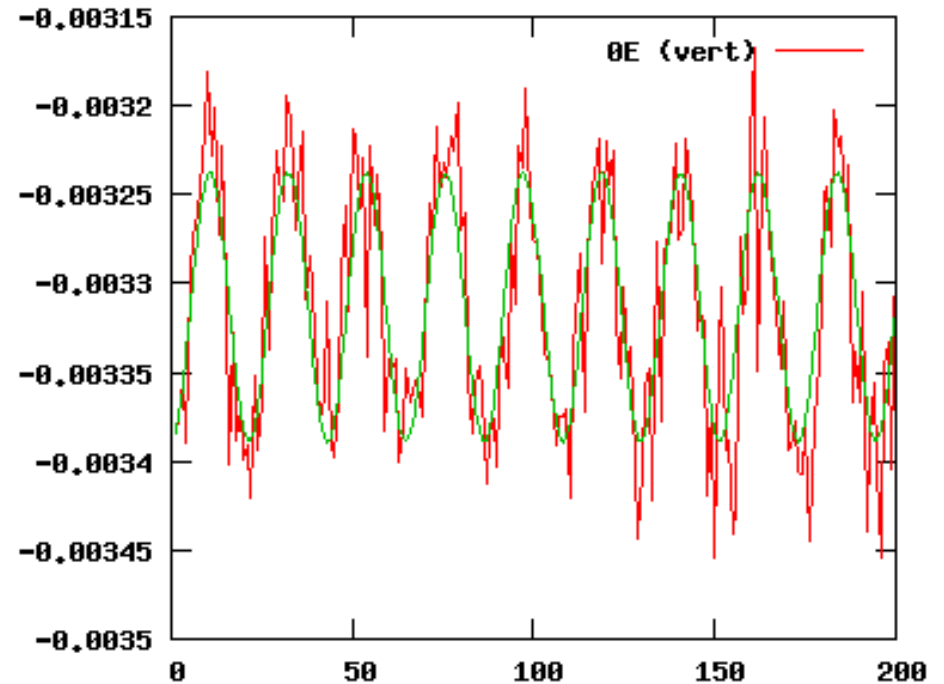
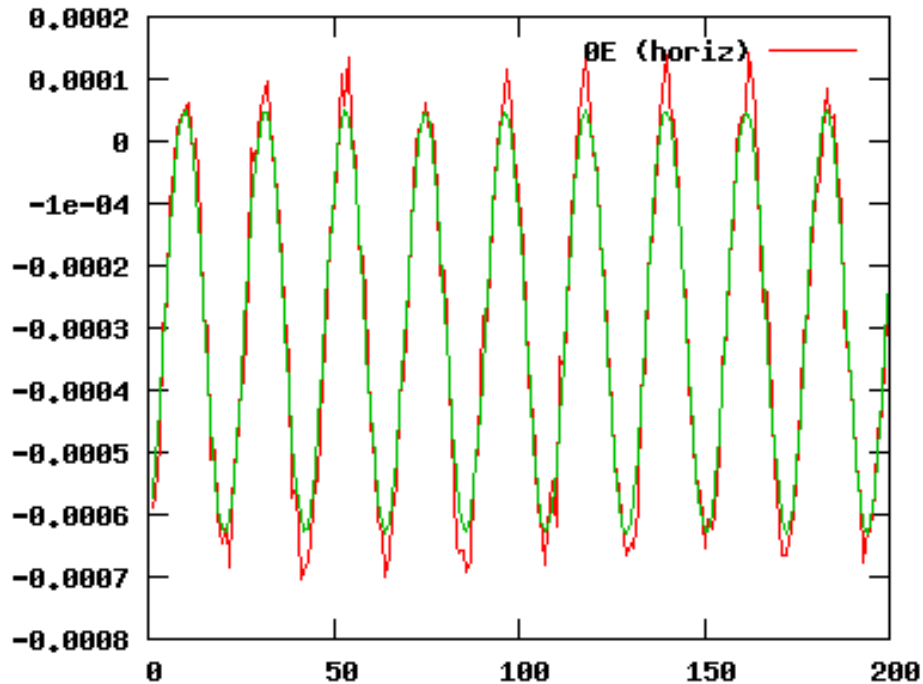
$$\langle A_x \rangle_{measured} = \langle \eta_x \rangle_{model}$$

- The scaled A_x are equal to the horizontal dispersion. Scale the vertical amplitudes be the same amount, then they are equal to the vertical dispersion.

more info: <http://www.lepp.cornell.edu/~helms/fasteta>

- Example

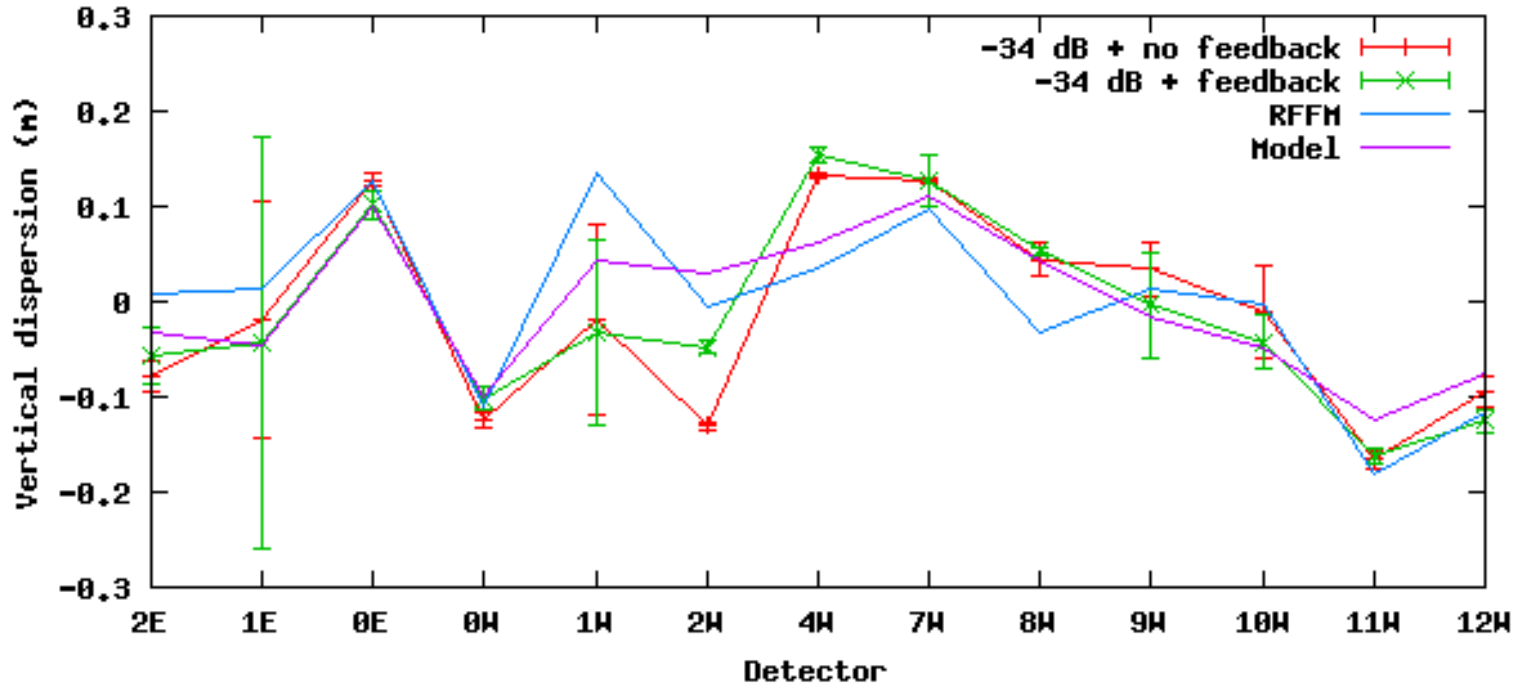
- Data and fit for detector 0E
- Drive ~ -14 dBm
- Longitudinal feedback on (helps broaden synchrotron tune peak and stabilize oscillation amplitude over 1024 turns)
- Shaking $dE/E \sim 7e-4$



For the vertical

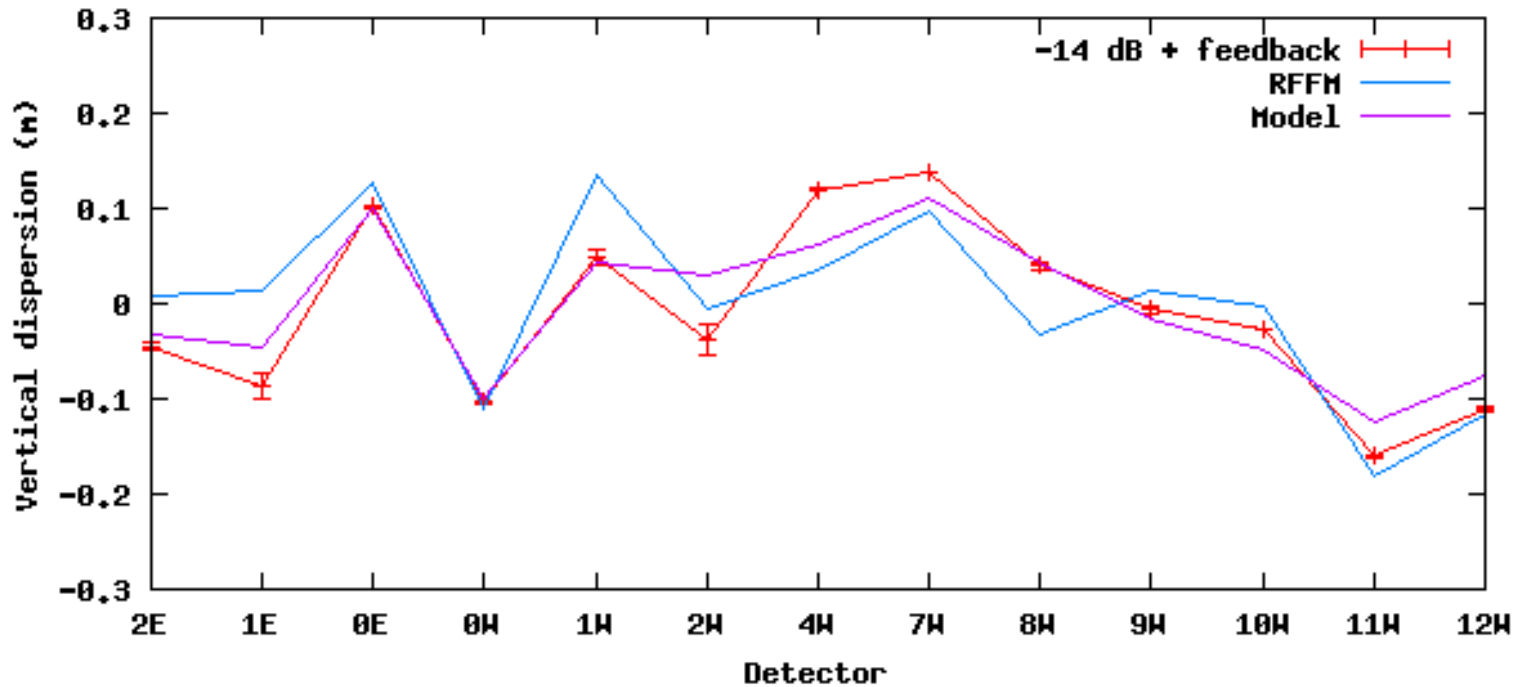
It isn't clear that the feedback makes much difference

pk-pk amp at 0W
0.7mm



But large enough drive amplitude amplitude is important

pk-pk amp at 0W
7mm



This clears up this morning's confusion.

Labels may be wrong, but they're consistent with the previous plot.

