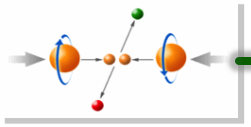


RHIC Spin Flipper Commissioning

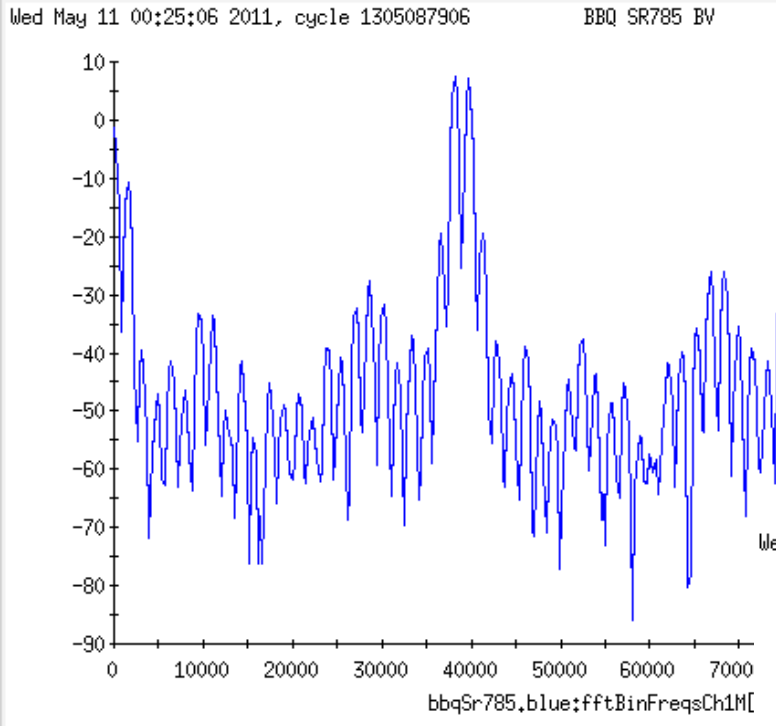
M. Bai, M. Brennan, C. Dawson, R. Hulsart, Y. Makdisi, P. Oddo,

C. Pai, P. Pile, P. Rosas, T. Roser

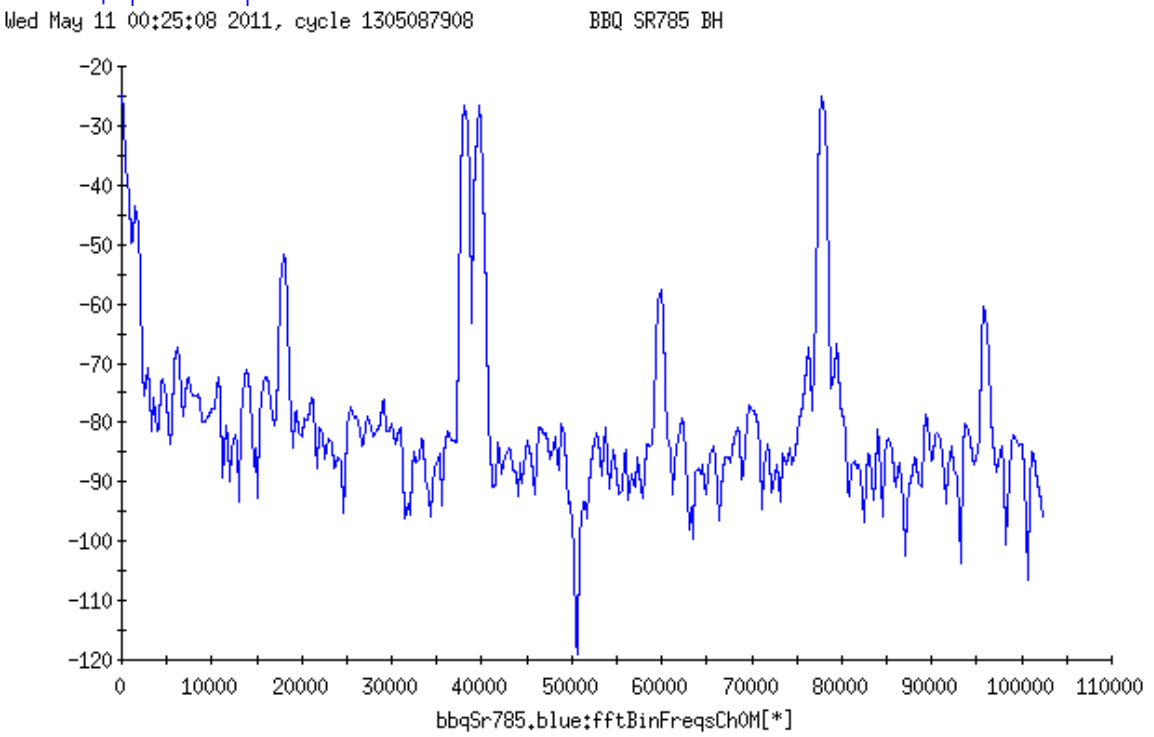
Summary of what was done

- Measured the DSA spectrum with single ac dipole #1, #2, #4 and #5. Both regular 1024 bpm turn by turn data as well as million turn bpm data were recorded
- Measured DSA spectrum with single ac dipole bumps and recorded turn by turn bpm data
- Measured DSA spectrum with two ac dipole bumps and recorded turn by turn bpm data

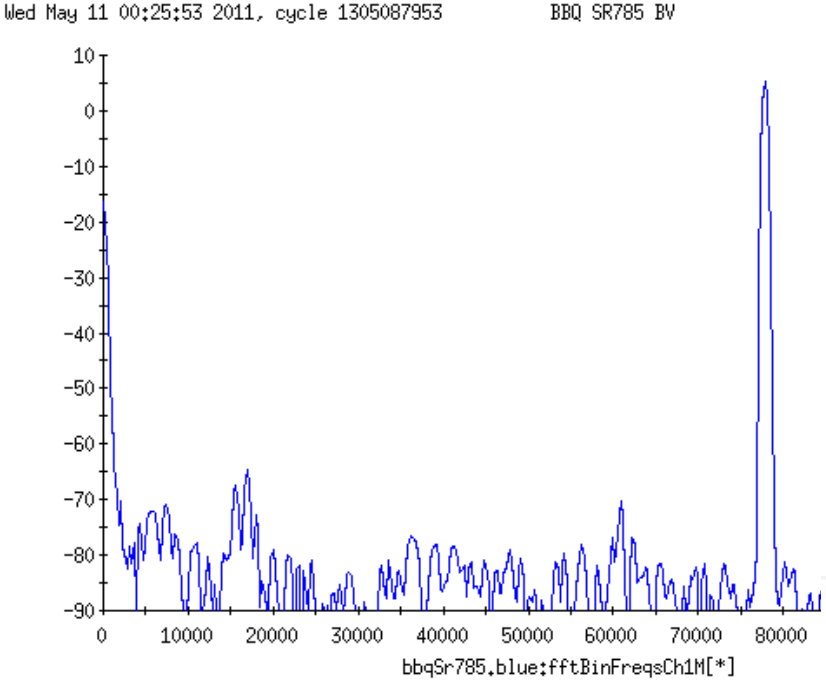
Single AC Dipole Response



- AC dipole #5 individually at 90A

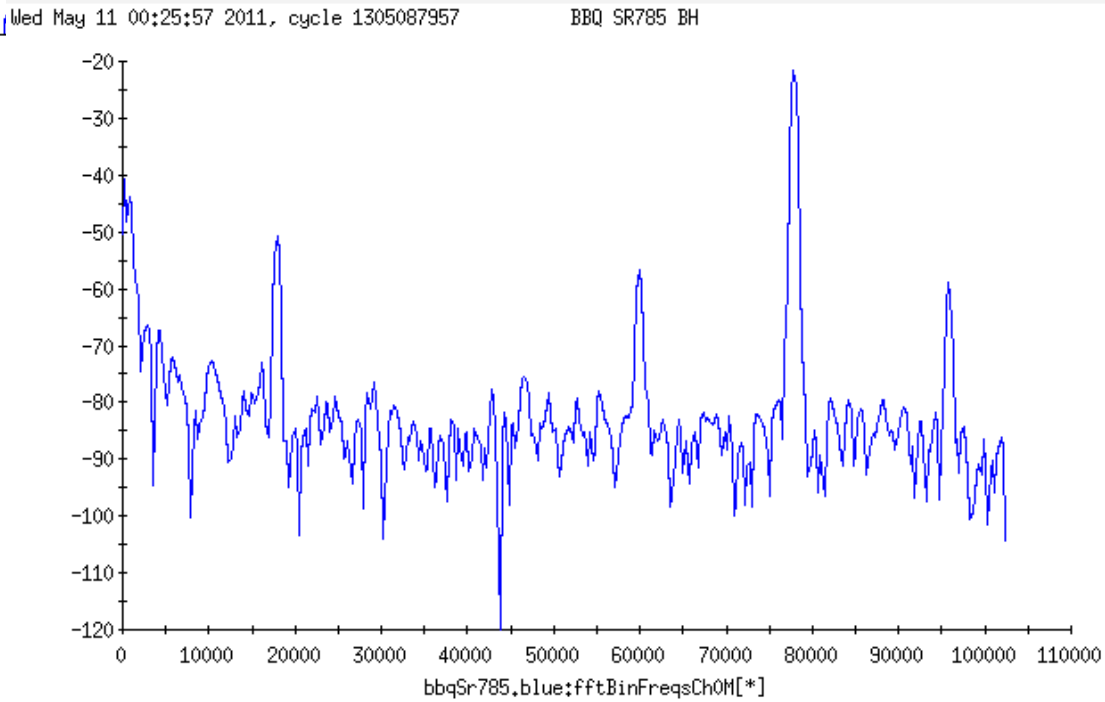


zero AC Dipole Response

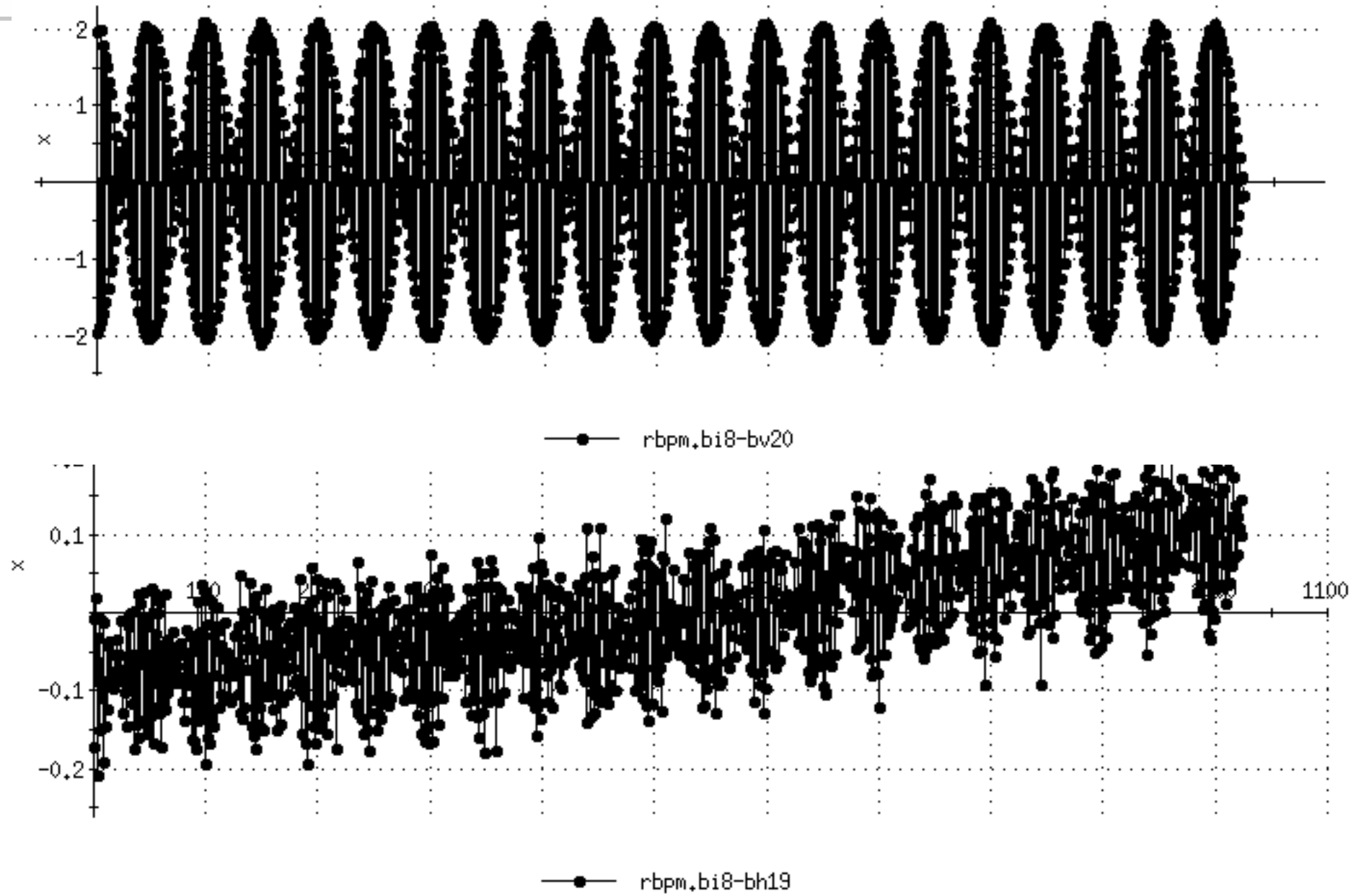


- All AC dipoles off

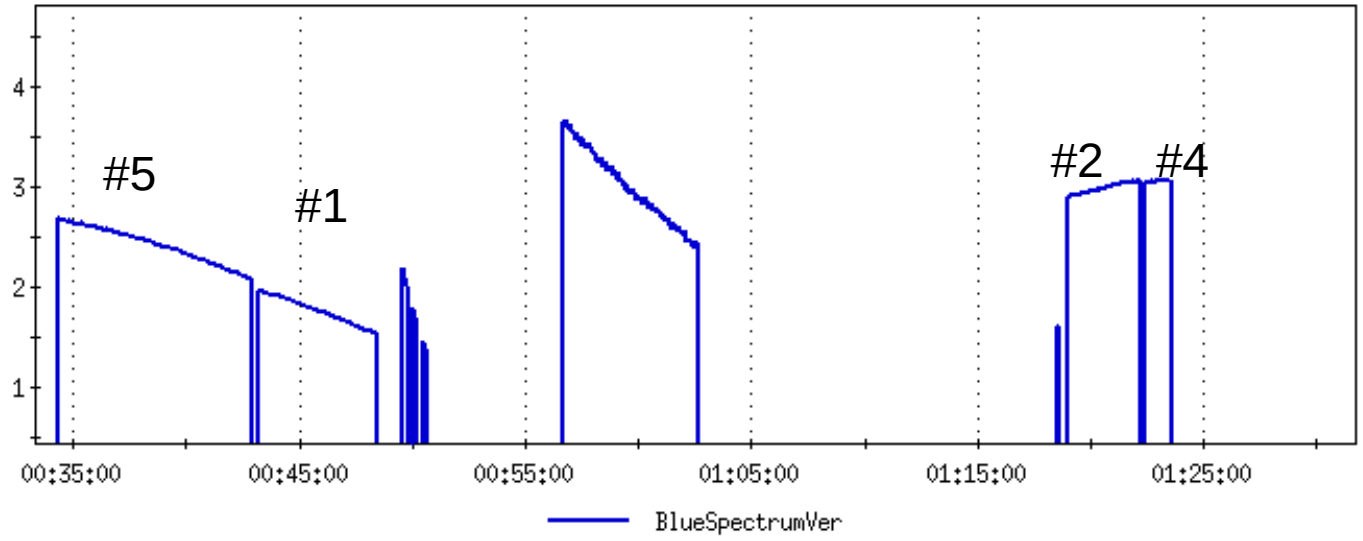
- H DSA response at revolution frequency is due to the bunch revolution, i.e. independent of ac dipole excitation

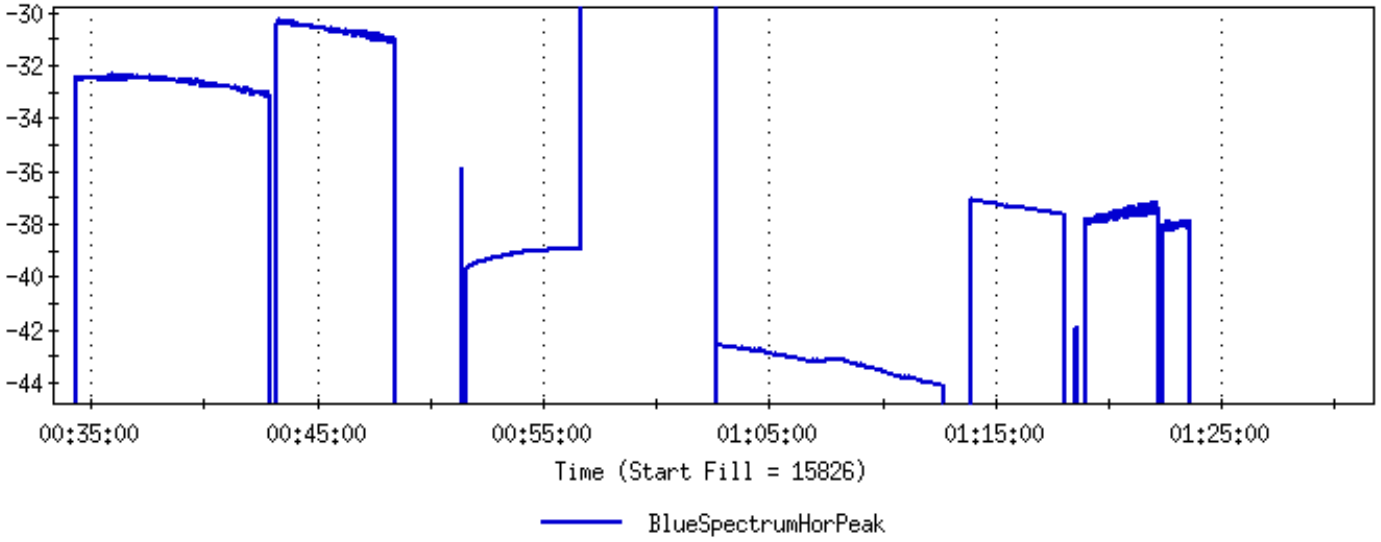


Coherent Oscillation by #5 ac dipole

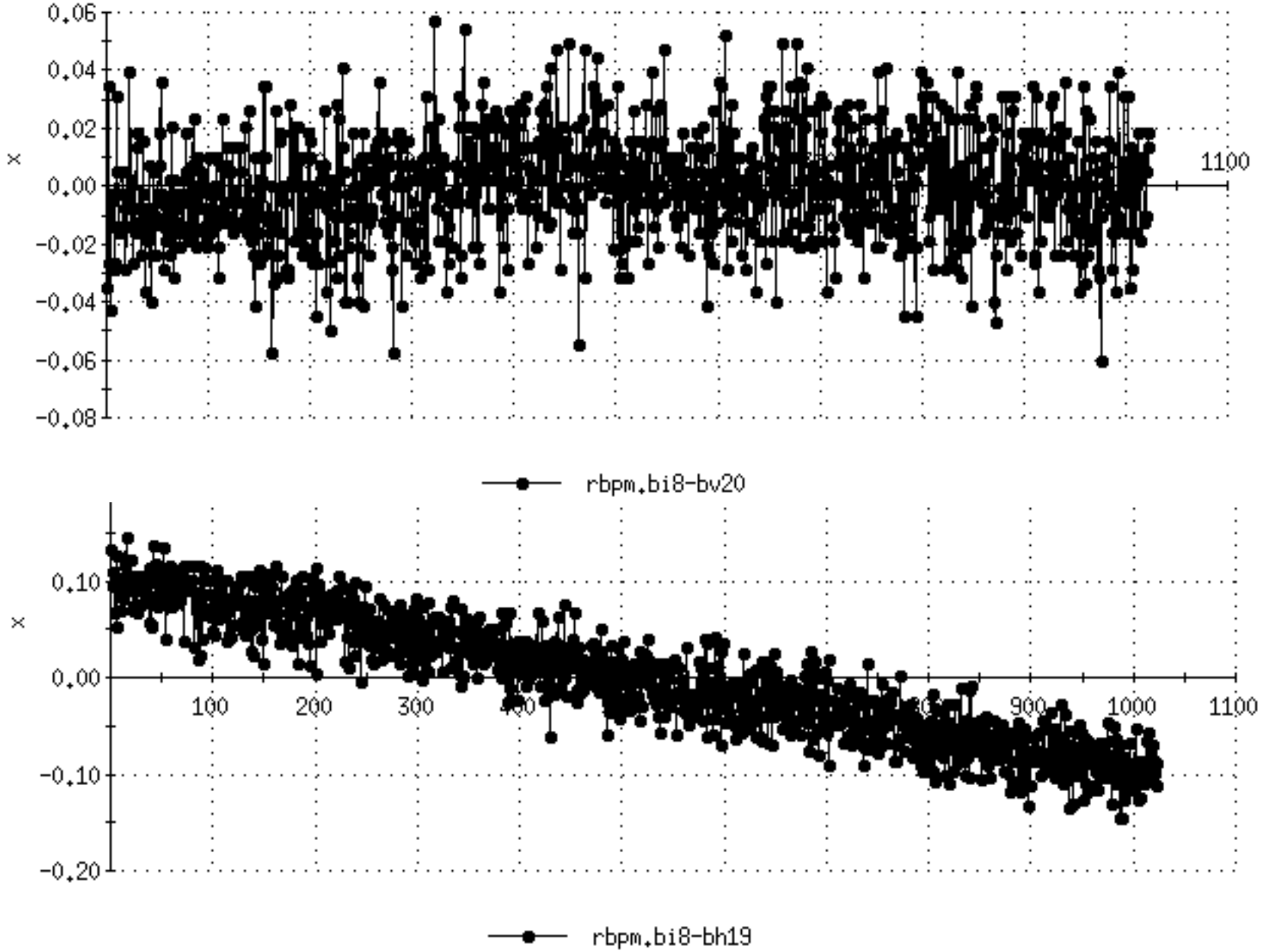


DSA Response of Each AC Dipole

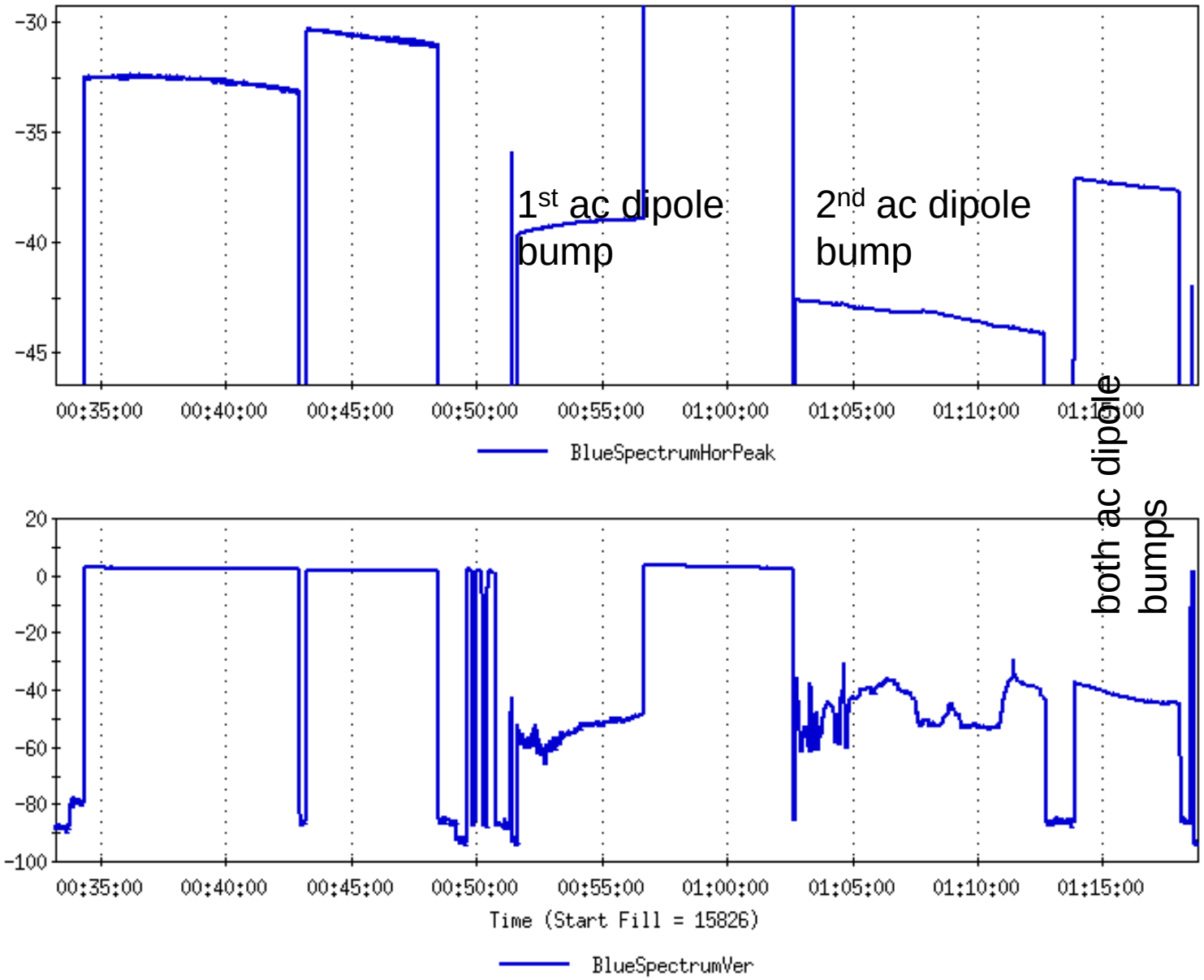




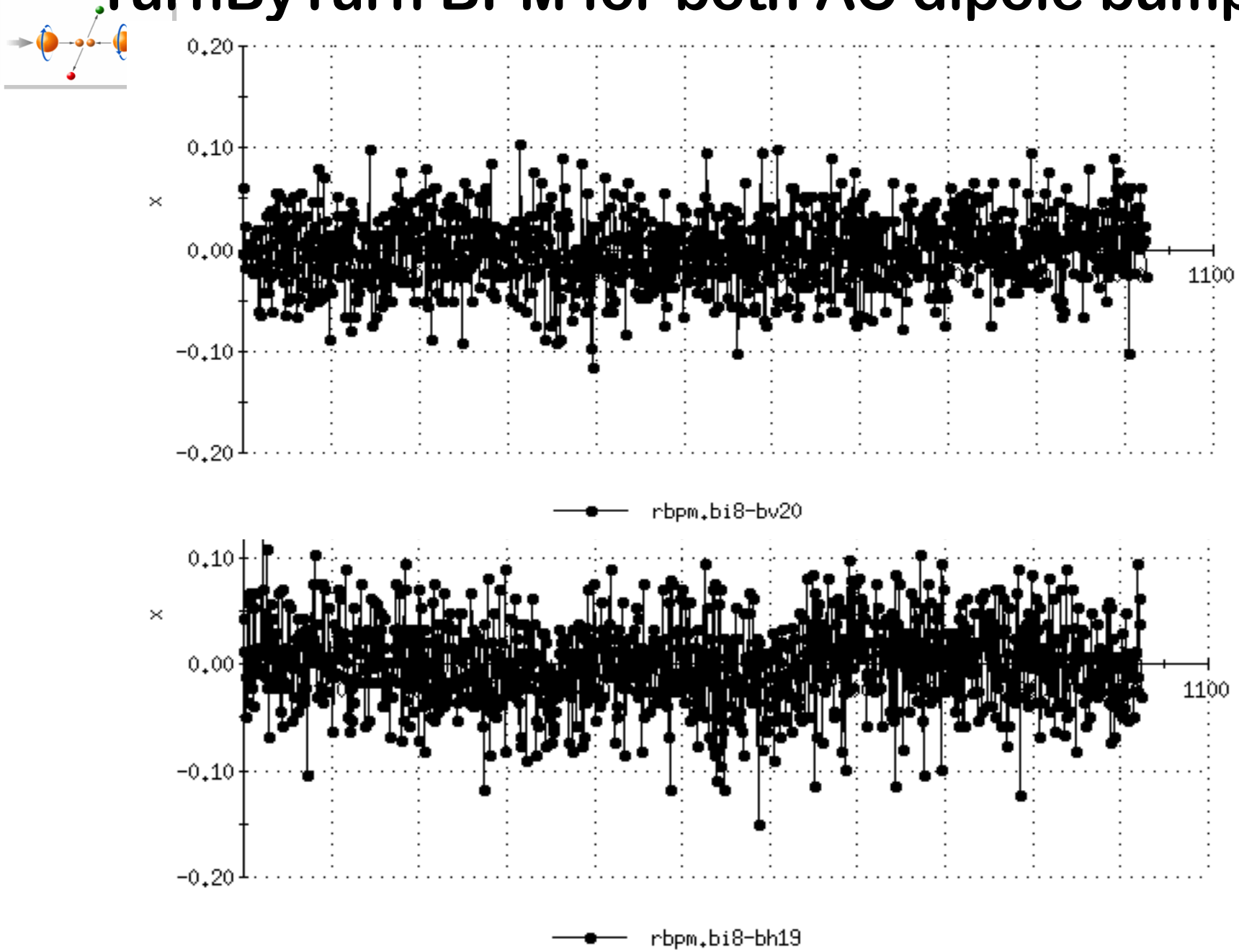
Excitation of First AC dipole Bump



DSA Response to AC dipole Bump(s)



TurnByTurn BPM for both AC dipole bumps



Conclusions

- H DSA response is due to the tilts of ac dipoles. The data also show that each ac dipole tilts slightly different. Plan to analyze the TbT bpm data to see how much roll of each ac dipole.

- Plan to ask for another hour of beam time at injection to
  - Measure #3 response
  - Measure response with both ac dipole bumps but sweeping the ac dipole tune from 0.49 to 0.51

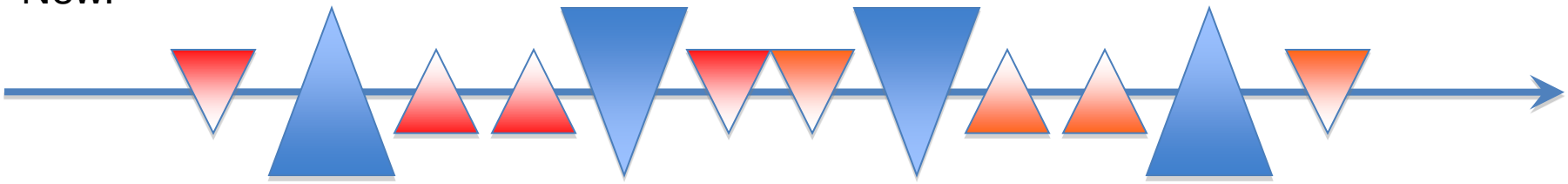
New Spin Flipper Design: Thomas

Now:

Rotating field strength: $2\psi_V \sin(2\psi_H) + orbit\ effect\ (non-rotating)$

$$= 1.00\ \psi_V \ \ for\ \psi_H = 15^o$$

New:



Rotating field strength: $4\psi_V \sin(\psi_H/2)\sin(\psi_H)$

$$= 0.14\ \psi_V \ \ for\ \psi_H = 15^o$$

$$= 0.52\ \psi_V \ \ for\ \psi_H = 30^o$$

$$= 1.08\ \psi_V \ \ for\ \psi_H = 45^o$$