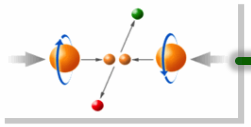


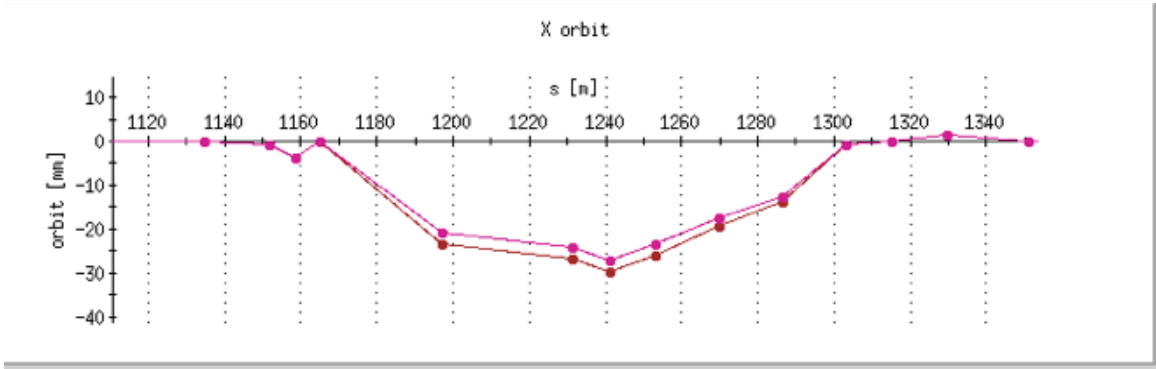
RHIC Spin Flipper Commissioning

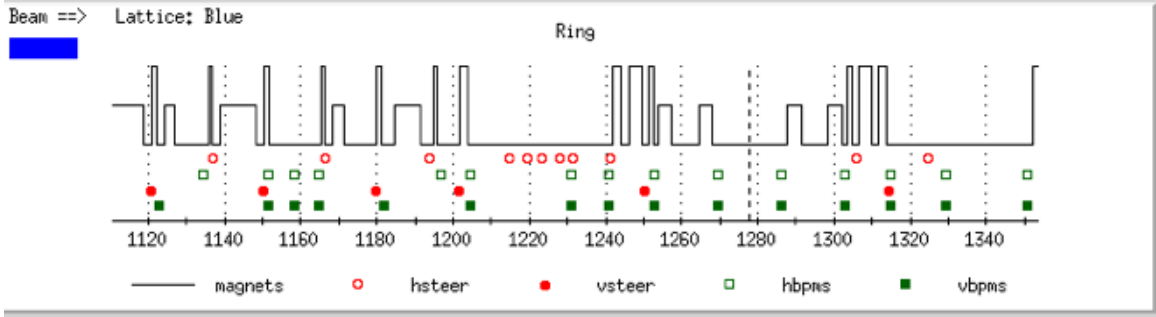
M. Bai, M. Brennan, C. Dawson, Y. Makdisi, P. Oddo,
C. Pai, P. Pile, P. Rosas, T. Roser

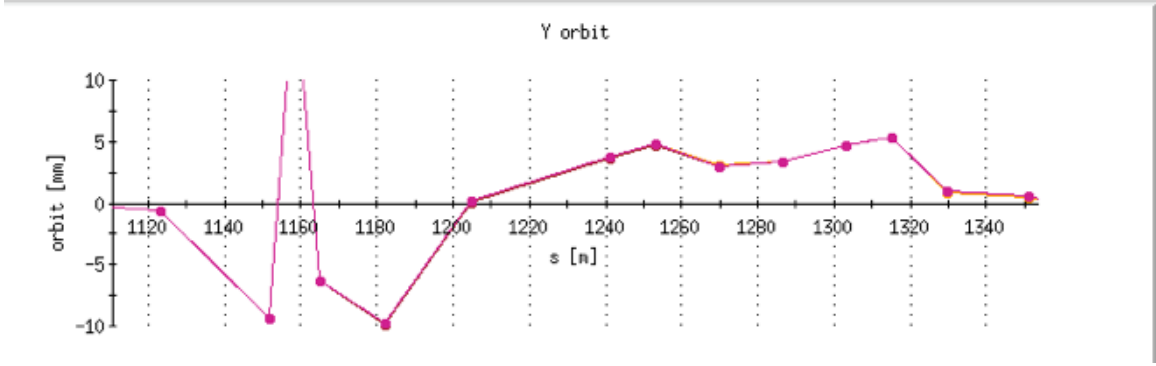
What was done in April 13 APEX Session?

- Can only turn DC dipoles to 1000A with two opposite bumps at Q4 and Q3

- This limit is due to the physical aperture limit at Q4 and Q3



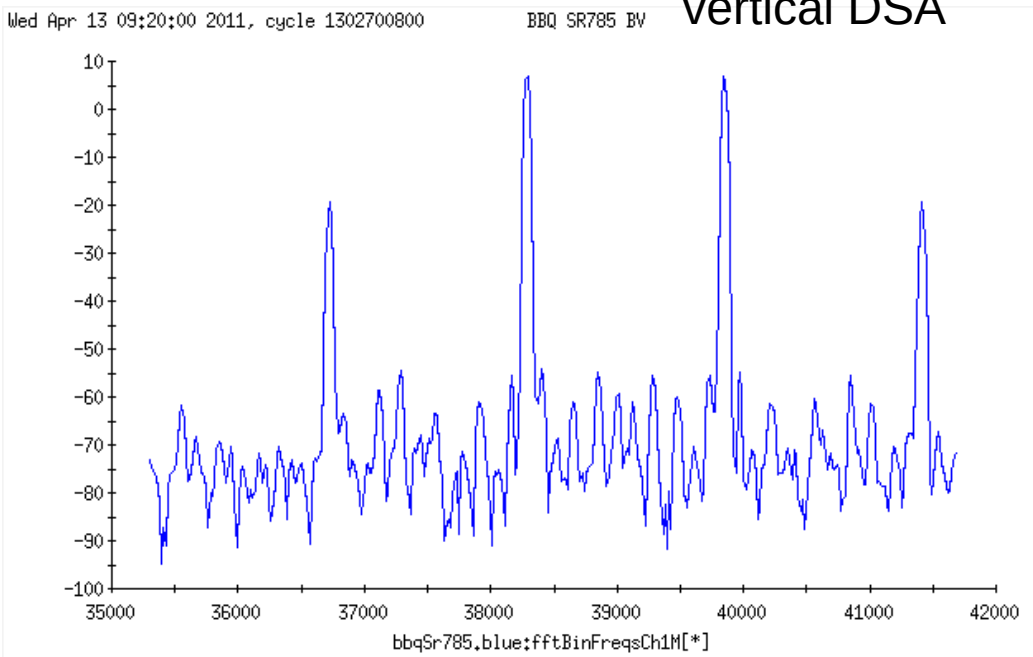




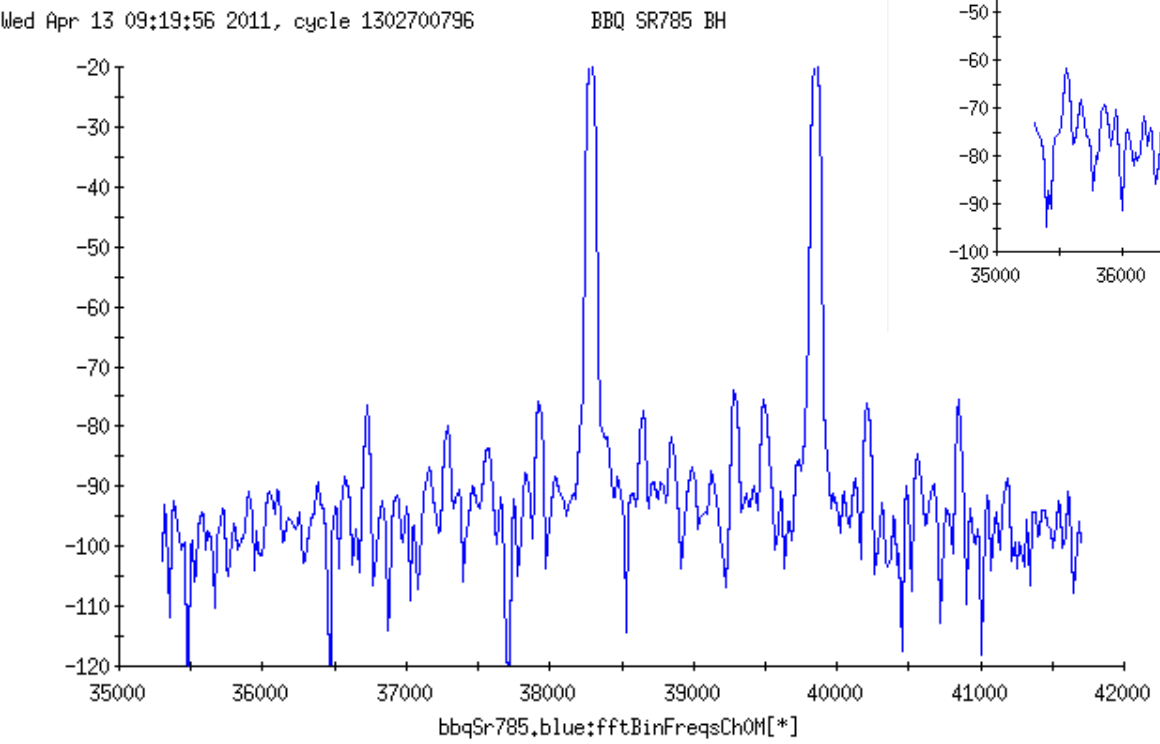
What was done in April 13 APEX Session

- Checked each AC dipole individually at 117.9A. And found out #4 wasn't able to be on at high current

vertical DSA

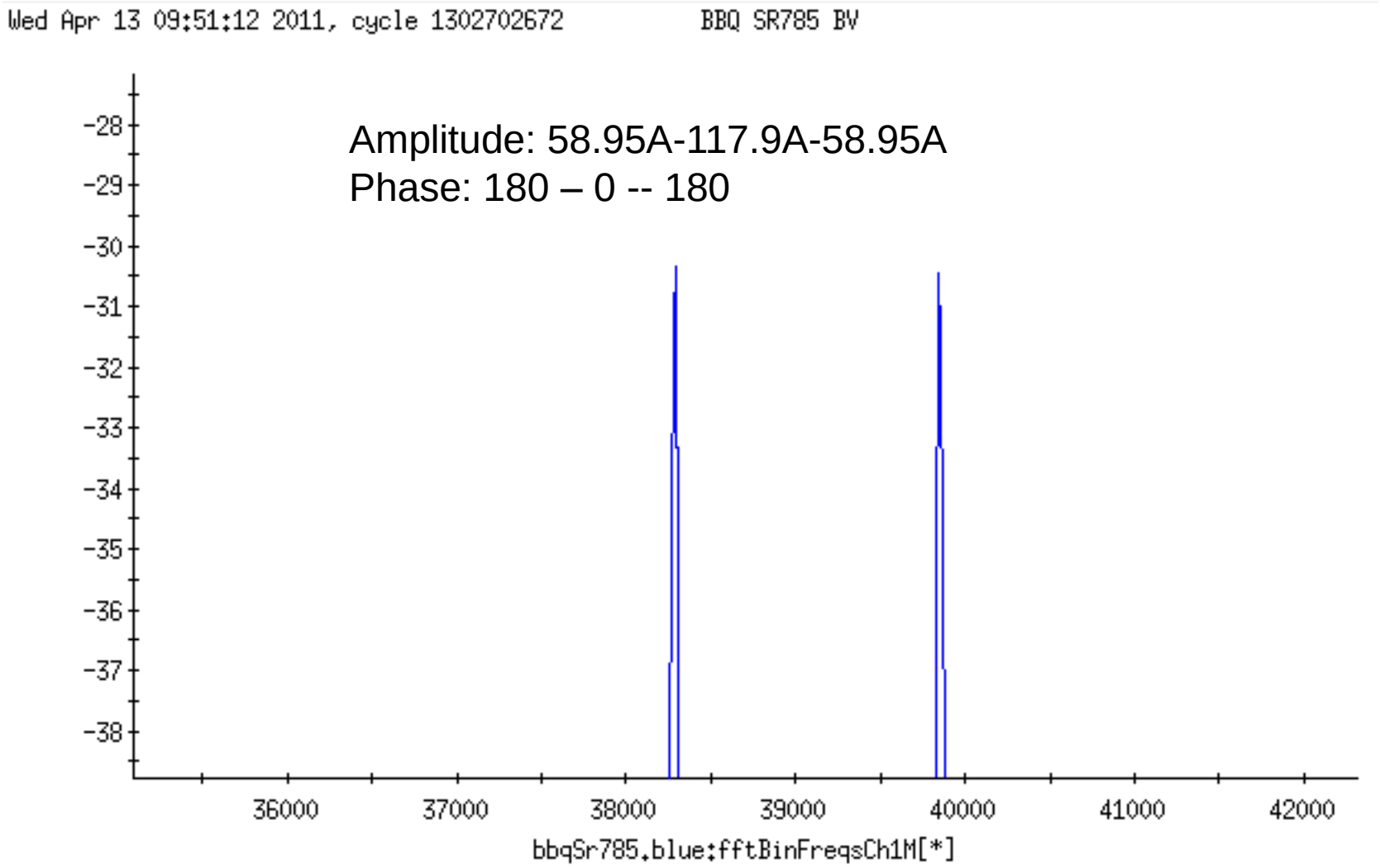


Horizontal DSA



What was done in April 13 APEX Session

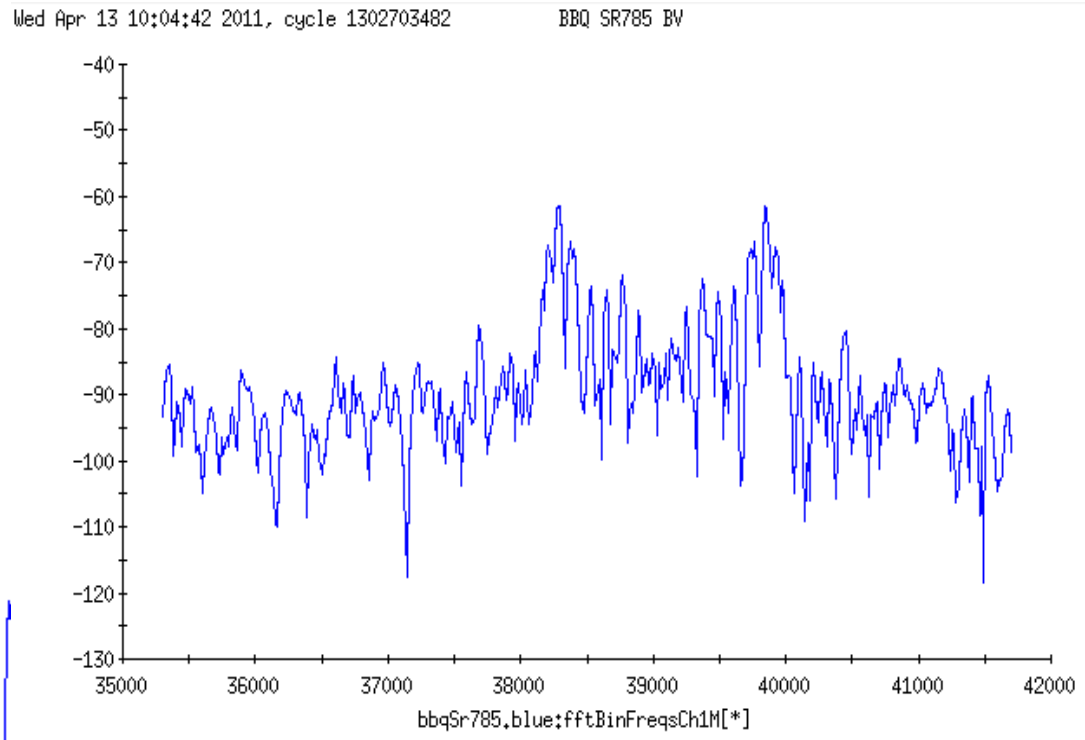
- Close the first AC dipole bumps, #1-#2-#3

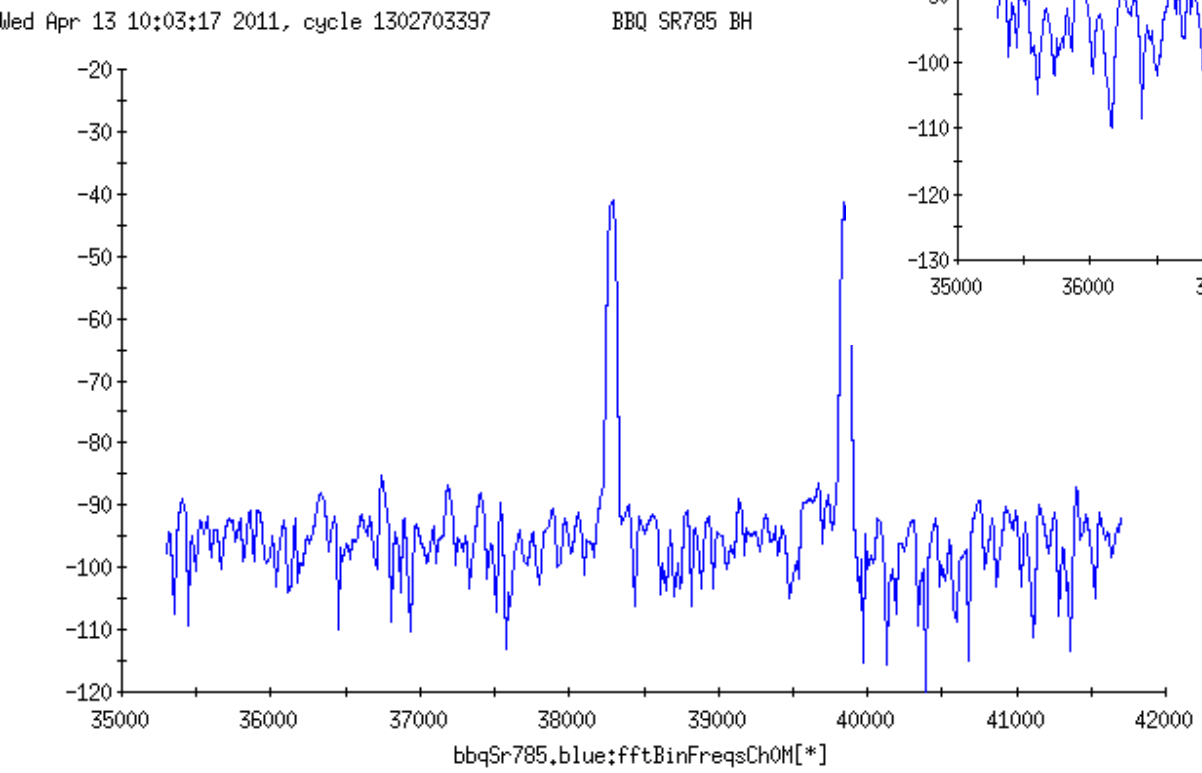


What was done in April 13 APEX Session

- Close the first AC dipole bumps, #1-#2-#3

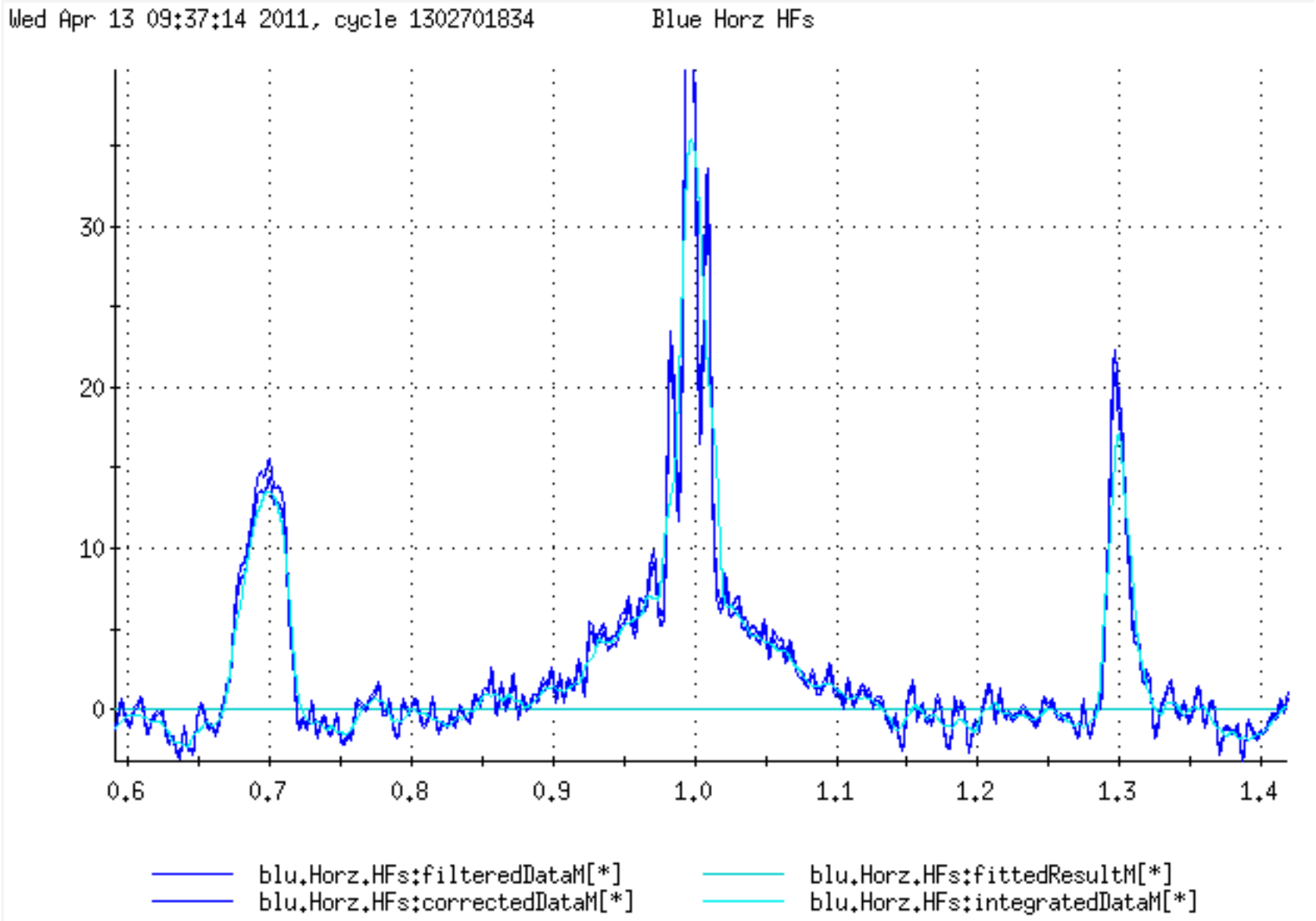
Amplitude: 45A-90A-45A
Phase: 180 – 0 – 179.5





What was done in April 13 APEX Session

- Measured momentum spread with 9MHz



Goal and Plan for coming APEX Session

- Decouple the machine
- Restore the settings in previous session
  - DC dipoles current 1000A
  - First ac dipole bump (closed)
- Turn on the second ac dipole bump (#3-#4-#5). Adjusting phase to close the bump
- Study the horizontal DSA response due to the ac dipole bumps
  - With DC dipole bump off
    - Measure H DSA response as function of one ac dipole bump size. 2nd ac dipole bump off
    - With 1st ac dipole bump at nominal setting, measure H DSA response with both ac dipole bump
  - with DC dipole bump on
    - Measure H DSA response with one ac dipole bump and then both ac dipole bump
    - then vary Qx to see the change of the H DSA

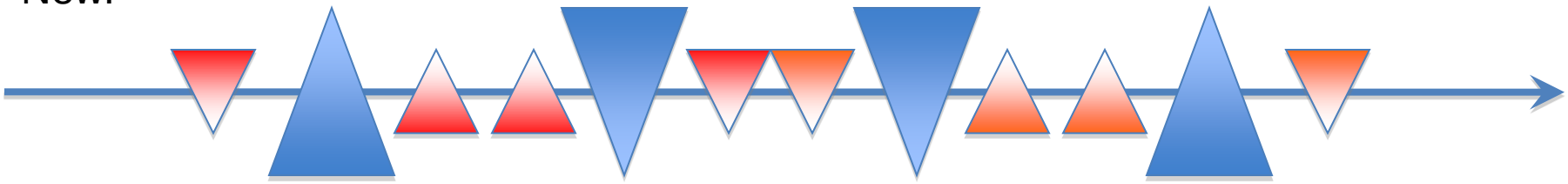
New Spin Flipper Design: Thomas

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: $4\psi_V \sin(\psi_H/2)\sin(\psi_H)$

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

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

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