Spin TuneMeter @ Injection
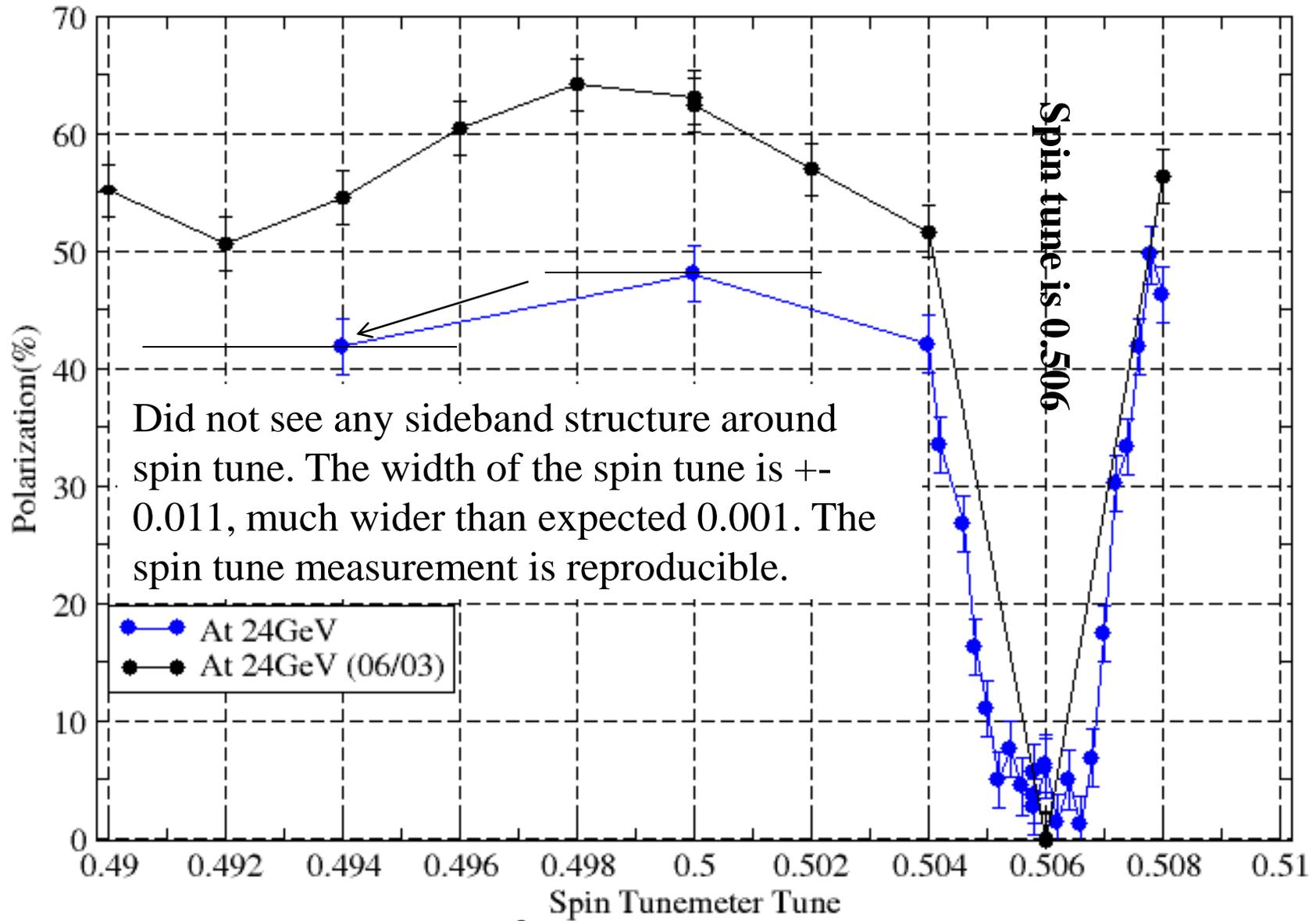
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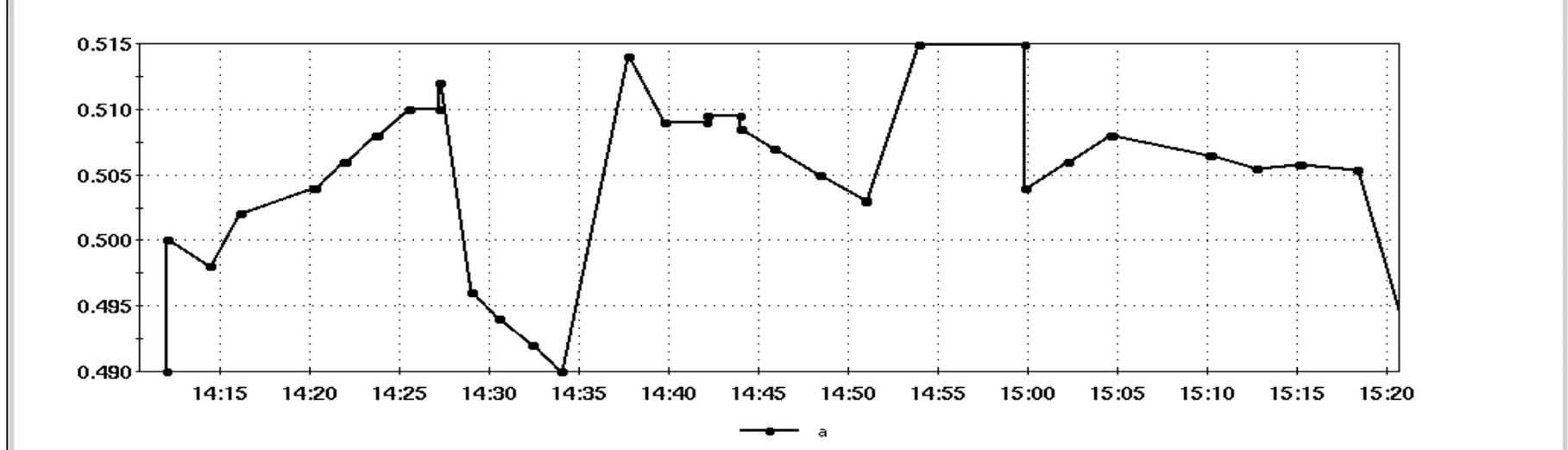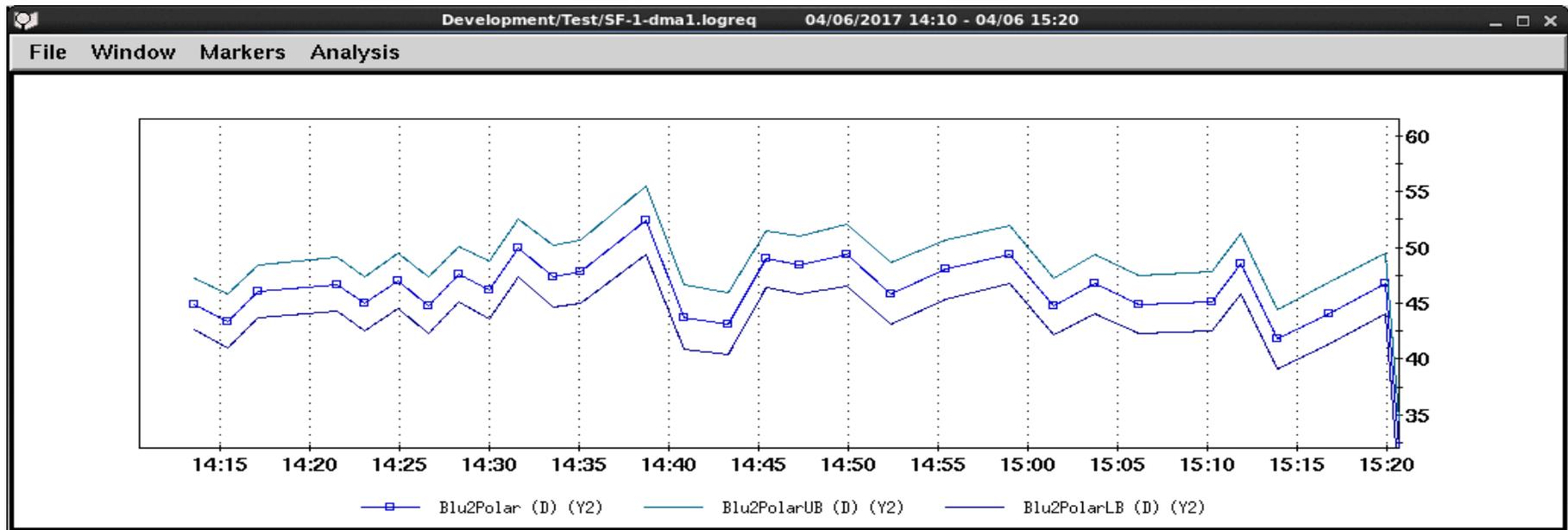
April 7, 2017
APEX Meeting

Did not see any sideband structure around spin tune. The width of the spin tune is +- 0.011, much wider than expected 0.001. The spin tune measurement is reproducible.

Spin tune is 0.506

Haixin Huang

Scan Spin Tunemeter Driving Tune Results

Scan Spin Tunemeter Driving Tune Results

sddsview - /tmp/LogView_17Apr06-1725.sdds

| File | Options | Data | | Help |
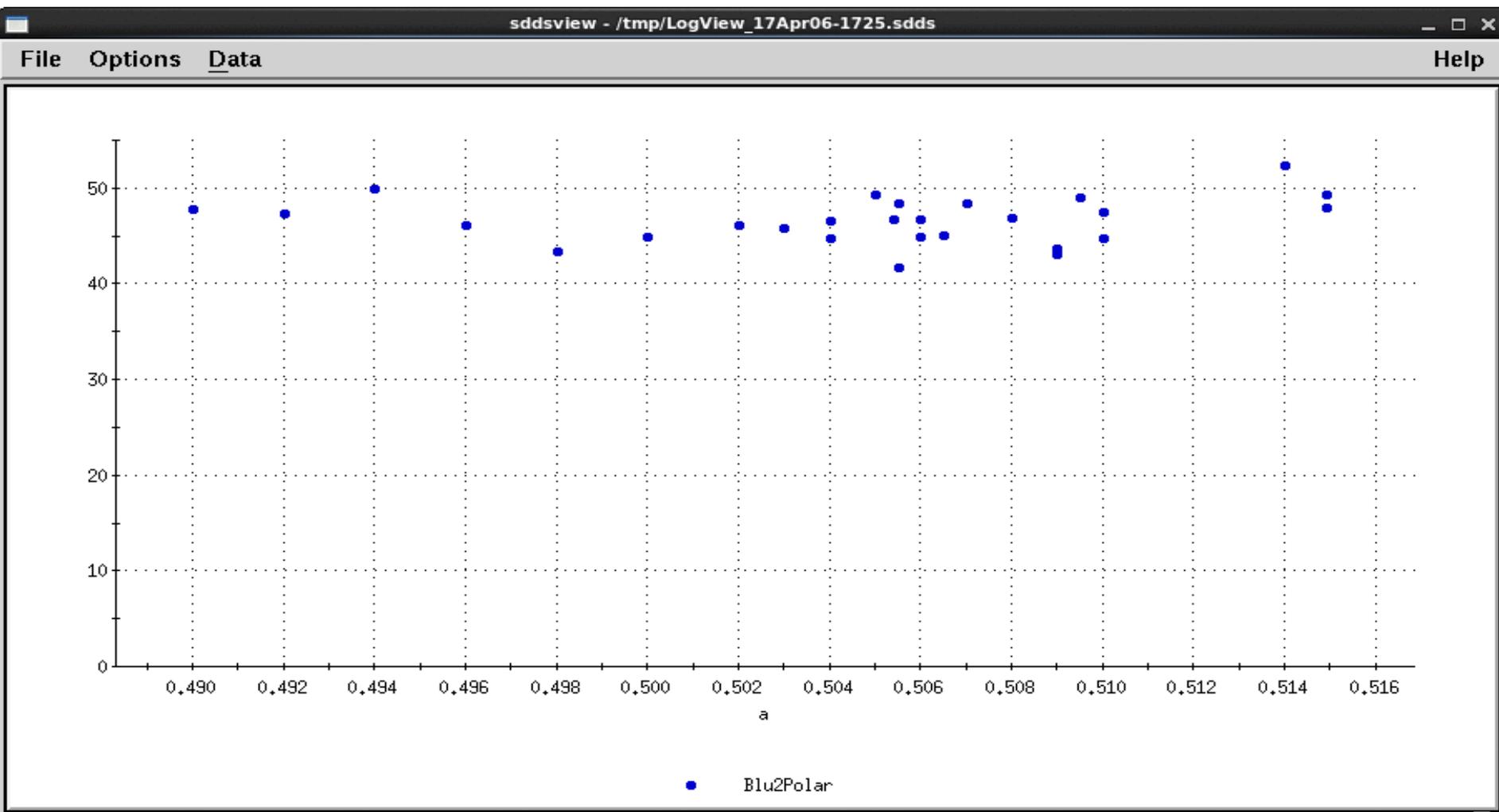
Index	a	Blu2Polar	Blu2PolarUB	Blu2PolarLB
0	0.490002	1e-20	1e-20	1e-20
1	0.500003	1e-20	1e-20	1e-20
2	0.500001	1e-20	1e-20	1e-20

Scan Spin Tunemeter Driving Tune Results
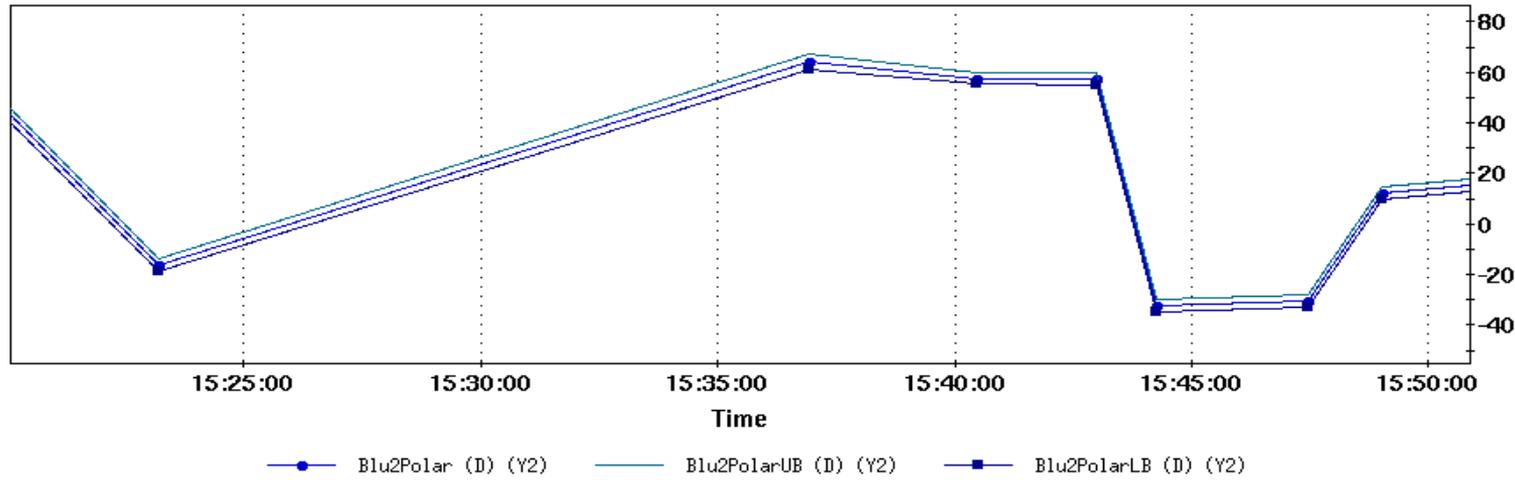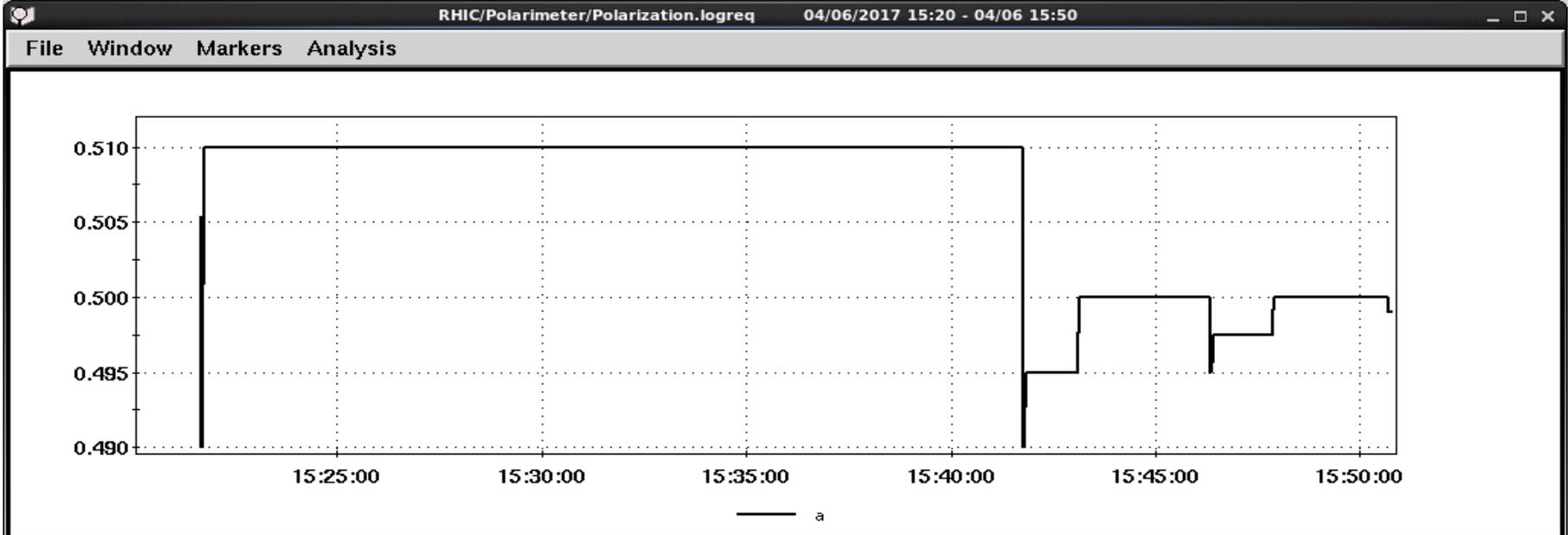
Sweep Spin Tunemeter Driving Tune Results

Procedure

- We started with D' reduction lattice. The spin tunemeter current was set at 900A and -26.5mm local bump was applied at 1225m. With this setting, we scanned the spin tunmeter driving tune from 0.49-.514 with step of 0.002 then 0.001 for the part >0.50. We could not see any polarization dip.

- Then we tried sweep driving tune from .49 to.51 and saw partial spin flip. It seems that the spin tune spread is much narrower than what we observed in run15 with regular lattice (full width of 0.004).

- We then swept driving tune in smaller windows: 0.49-0.495, then 0.495-.5. In the 0.495-0.5 window, we saw partial spin flip. The window was further narrowed down. In 0.495-.4975, we did not see partial spin flip. Then another partial flip between .4975 and .5. So the spin tune is between .4975 and .5.

- The first set of TBT spin tune measurement data was taken with driving tune at 0.499. We noticed that the polarization quickly lost: 37%, 25%, 11% then 15%.

- We changed the driving tune to .498 and took additional seven runs with total of 420million events. The last data set is questionable, as the AC dipole gaincontrol has jump right before the measurement.

- We run over for about 0.5hour, but we also started late by about one hour due to Booster vacuum problem and switch water from elens to spin tunemeter.

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BROOKHAVEN
NATIONAL LABORATORY

Spin Flipper Layout

AC dipole #1   AC dipole #2   AC dipole #3   AC dipole #4   AC dipole #5

spin rotator   spin rotator   spin rotator   spin rotator

AC dipole bump #1   AC dipole bump #2
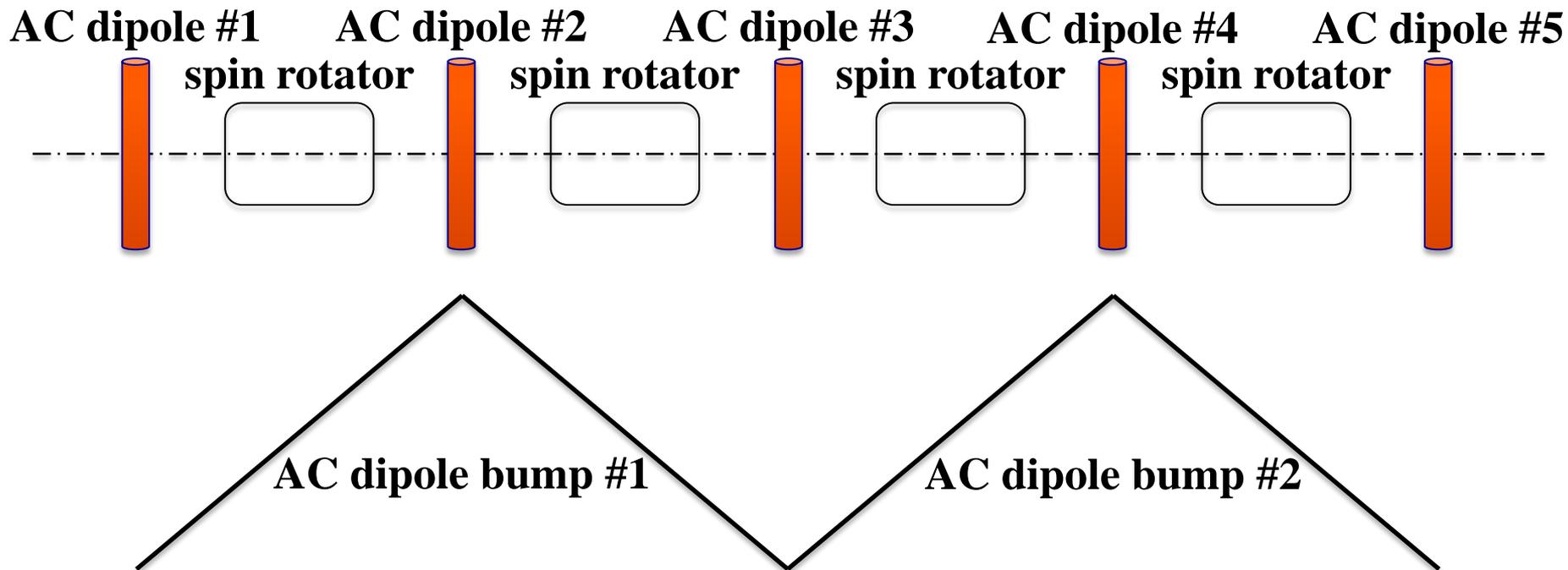
The spin flipper system consists of four DC dipole magnets (spin rotators) and five AC dipole magnets. The aim of this configuration is to produce a rotating field which eliminates the mirror resonance. Multiple AC dipoles are needed to localize the driven coherent betatron oscillation inside the spin flipper.