

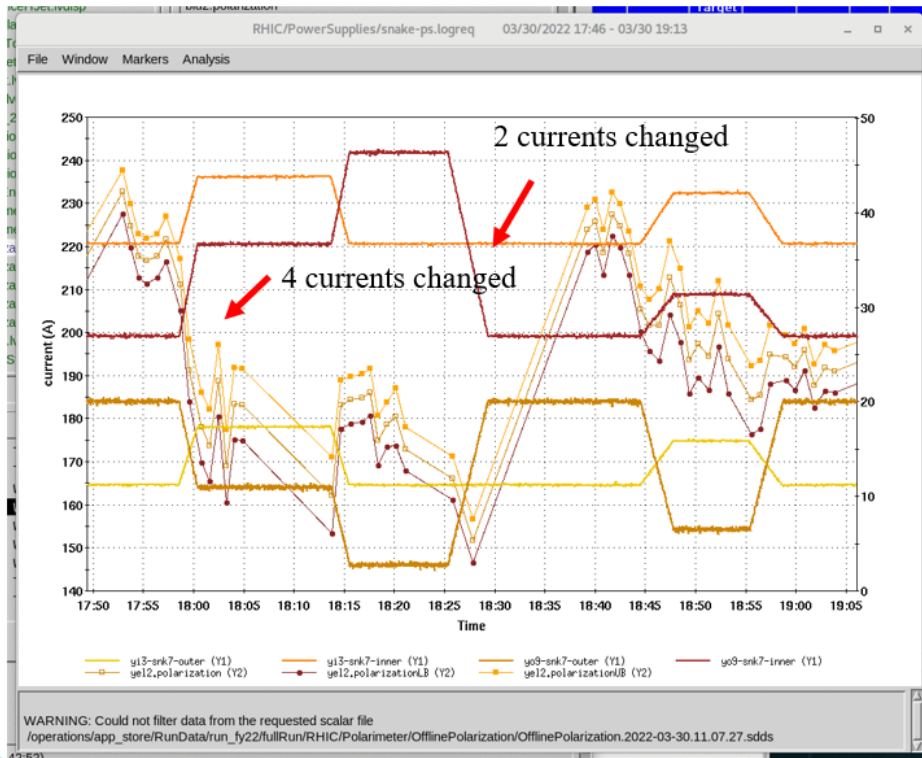
APEX Report

Time meeting, April 12, 2022

Results: Transparency Mode Study (March 30) led by Haixin

The Last Two Ramps from Initial to Final States

Summary and Plan



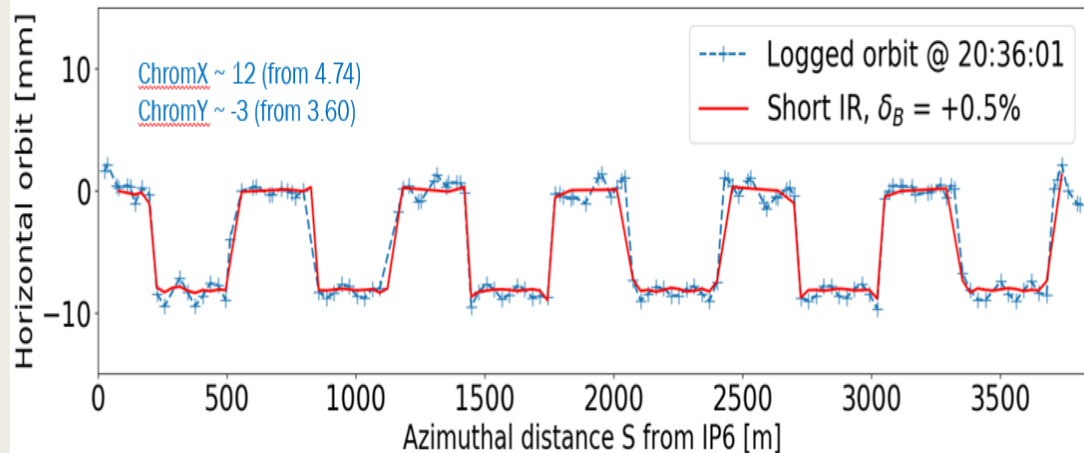
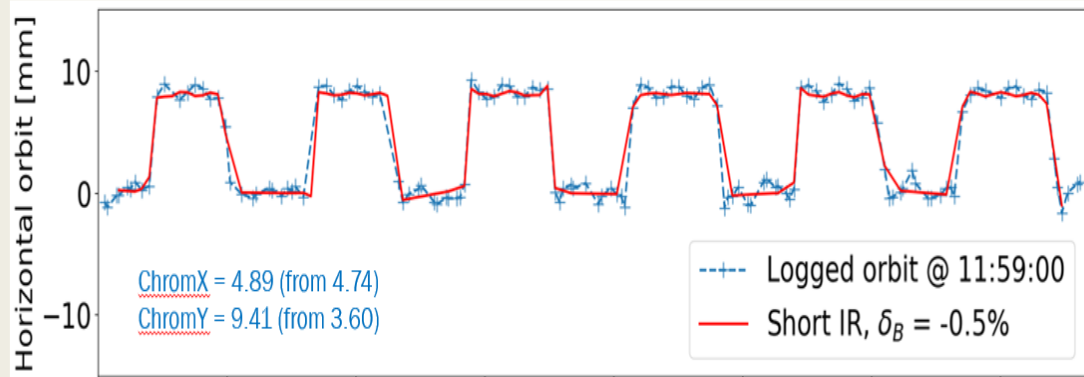
Left: Spin Flip; Right: rotate to radial

- Tune feedback seems important. It showed the difference in the first and last radial rotation experiment.
- The spin tune constant is also important. Constant spin tune+ tune feedback showed partial spin flip. Without the spin tune constant, the polarization is just lost. Given this result, we will run the radial rotation also with constant spin tune next time.
- We got spin flip and radial rotation done as expected. But there is polarization loss in both cases.
- In next (final) session, we ask for eight hours. If there is more time available, we may want to add energy ramp with additional two hours.
- The spin tune will be kept closer to constant for the vertical->radial rotation next time.
- We will first work at injection. Probably quick (one step) on both radial and flip ramp. Then move on to the ten steps ramps.
- If there is time left, we will attempt to ramp energy to 100GeV.

Results: Radial shift orbit, led by Guillaume

I - Context II - Setting up for APEX III - Preliminary results

■ Comparing model and measurement:



I - Context II - Setting up for APEX III - Preliminary results IV - Outlook

- Successfully established circulating beam with large circumference change (about ± 30 mm) for 254 GeV polarized protons, with no change in beam lifetime and no significant polarization loss.
- Limited in the amplitude of excursion available for testing given the present RHIC pp configuration: this emphasizes once again the need for drastic changes for future HSR design and operations.
- With current set of tools, controlling/correcting the vertical orbit is not straightforward; it can be done but it requires significant changes.
- Regarding chromaticity at large orbit excursions, the plot thickens: preliminary results seem to diverge from the observations from Run21 => we clearly need to look deeper into this particular issue.
- Remainder of Run22 APEX: still looking to test more configurations, in particular the Long IR ones. Pressed with time and personnel availability...

APEX Plan for April 13, Wednesday

(8:00pm - 24:00 pm)

08:00am	RHIC Injection Damper Test Tommy, MCR crew	
10:00pm	Spin Transparency Mode Study Haixin, Vincent, Francois, Vasiliy,... MCR crew	
19:00pm	Radial Shift Orbit with Proton Guillaume, Kevin M.,...,MCR crew	
23:00pm	Back to physics MCR crew	
24:00pm		

One uncertainty: if ramp file not ready, radial shift orbit test may not happen.