Polarization Loss Crossing 411-NU Resonance

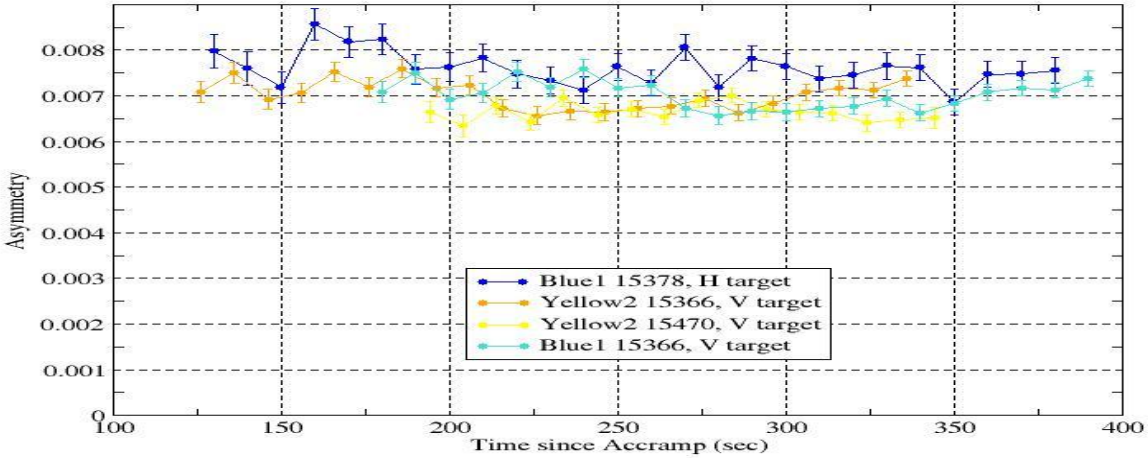
Outline

- Why we should identify location of polarization losses
  - What information we currently have?
- What do our simulations say?

- How to accomplish this?

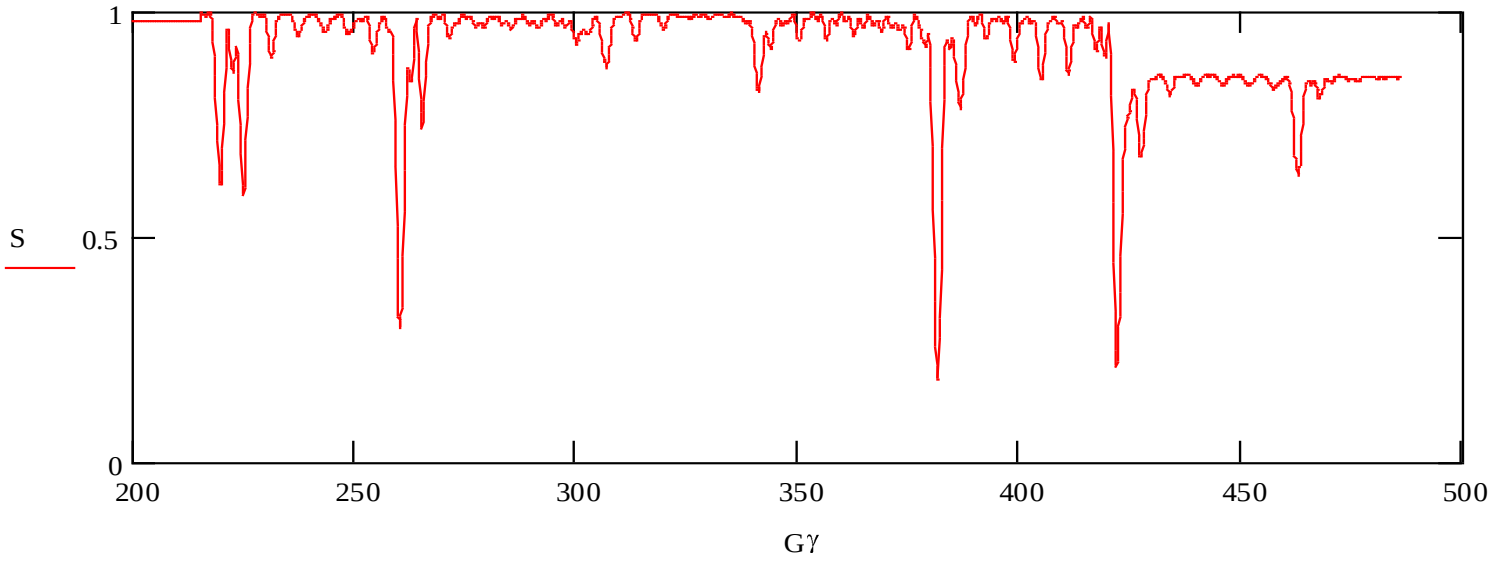
Understanding Where Losses are located on 250 GeV Ramp

- Reconcile our simulation results with experiment. Measurement of Polarization losses up the ramp last year seems inconclusive.

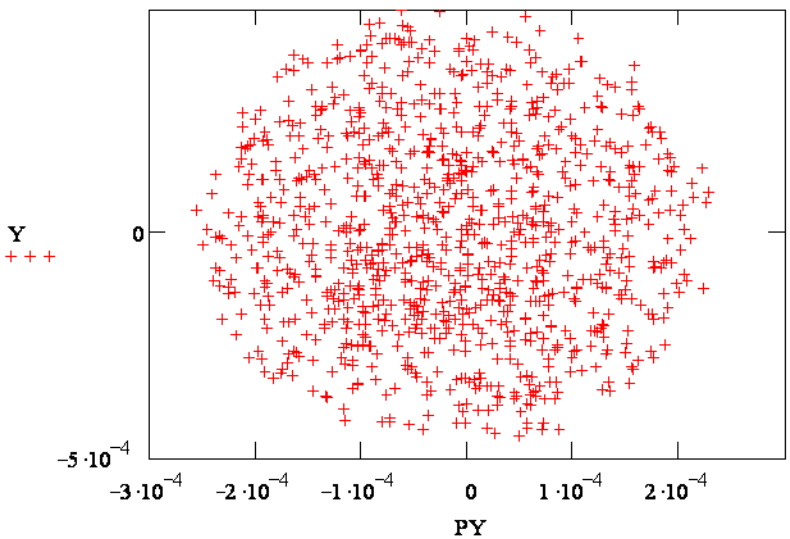


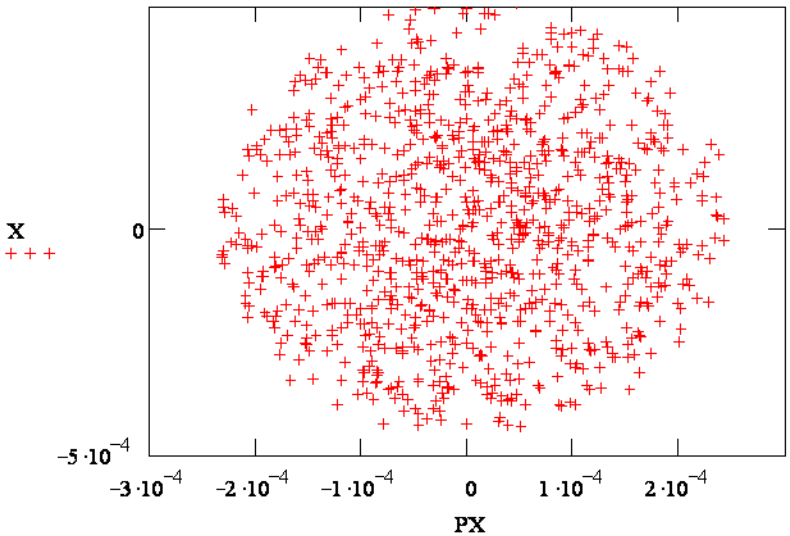
Current Simulations Results

- Show losses should occur mostly at the last resonance crossing. We would like to confirm or refute this.



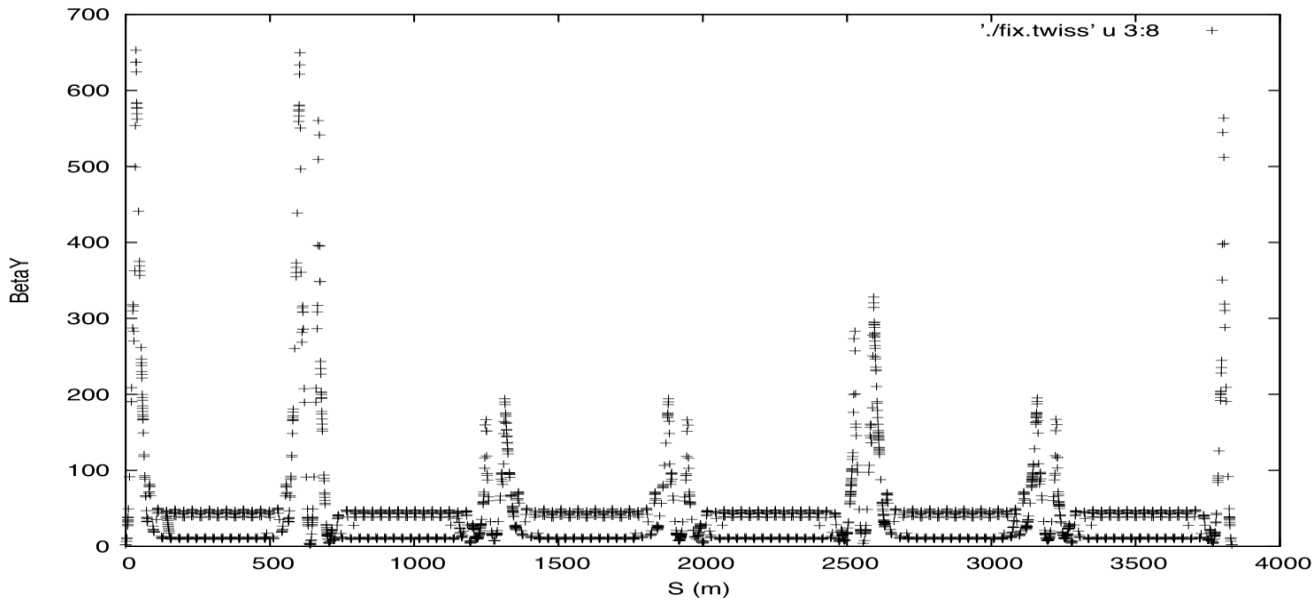
Overview of Simulation Conditions





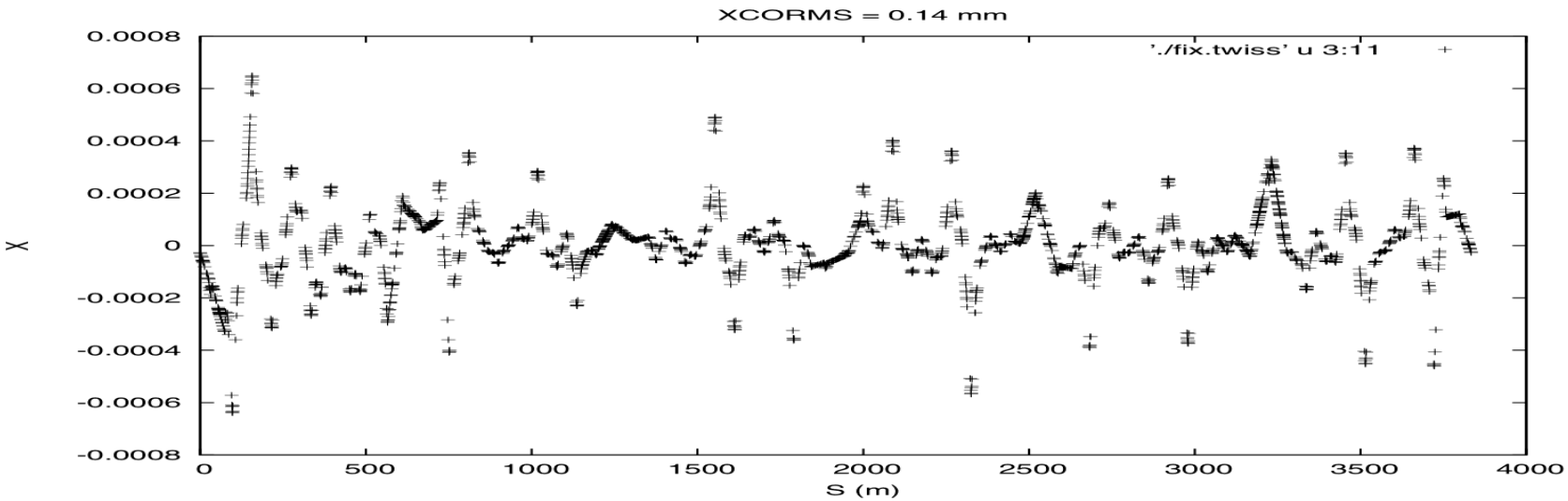
Began with Gaussian random distribution using rms sigma of 3.33 pi mm-mrad cut off
At 2 sigma over both transverse planes (no longitudinal distribution). Used 1024 particle

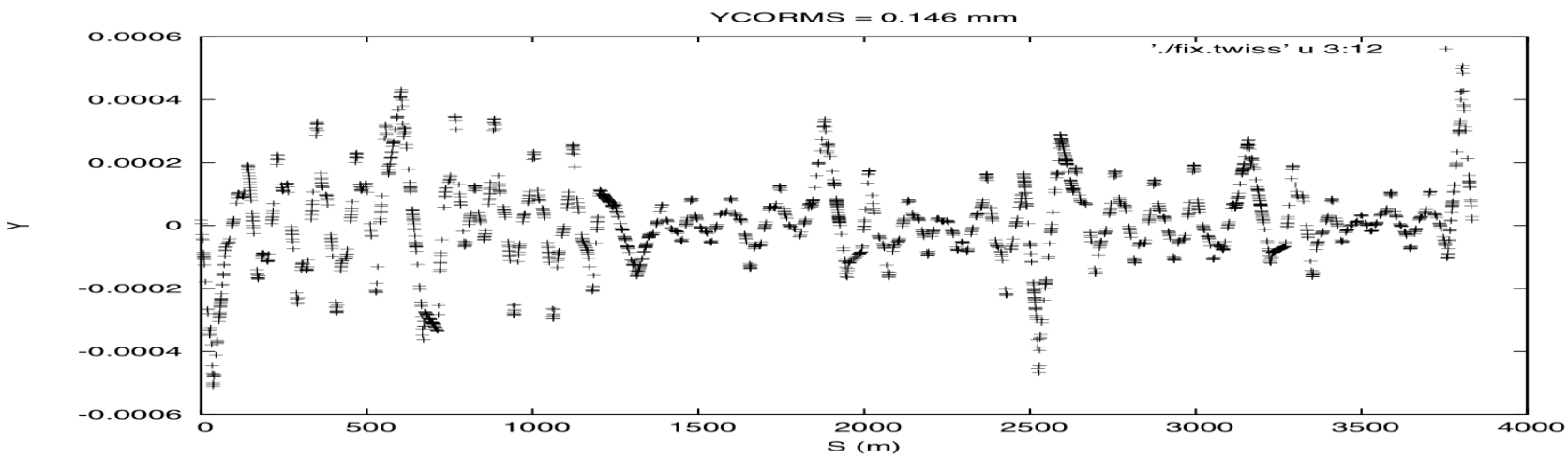
Overview of lattice used



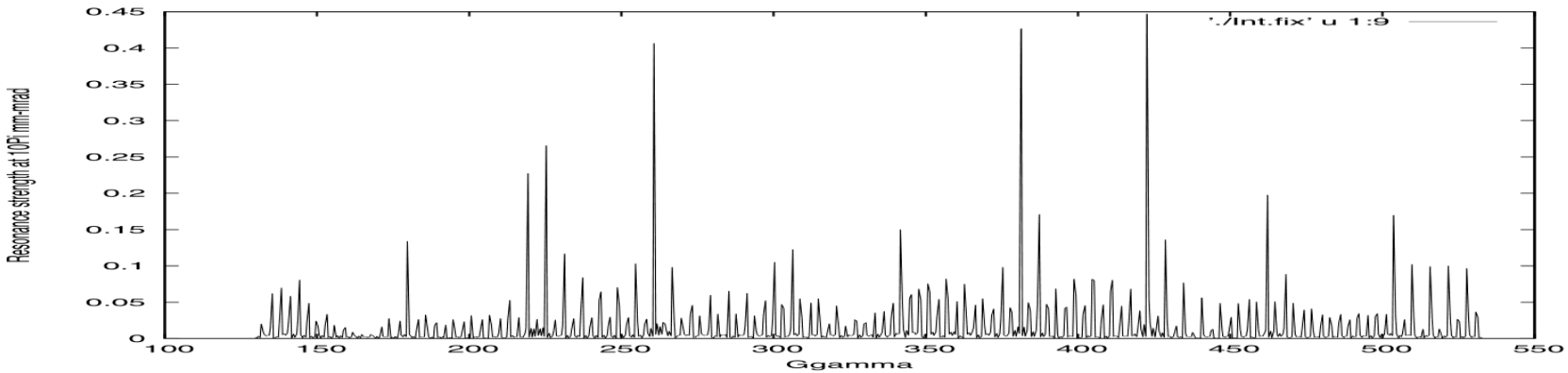
Optics similar to that at stone 422gg static for the whole ramp. Ramp rate 8 times actual. Beta squeezed to 2 m at IP6 and IP8

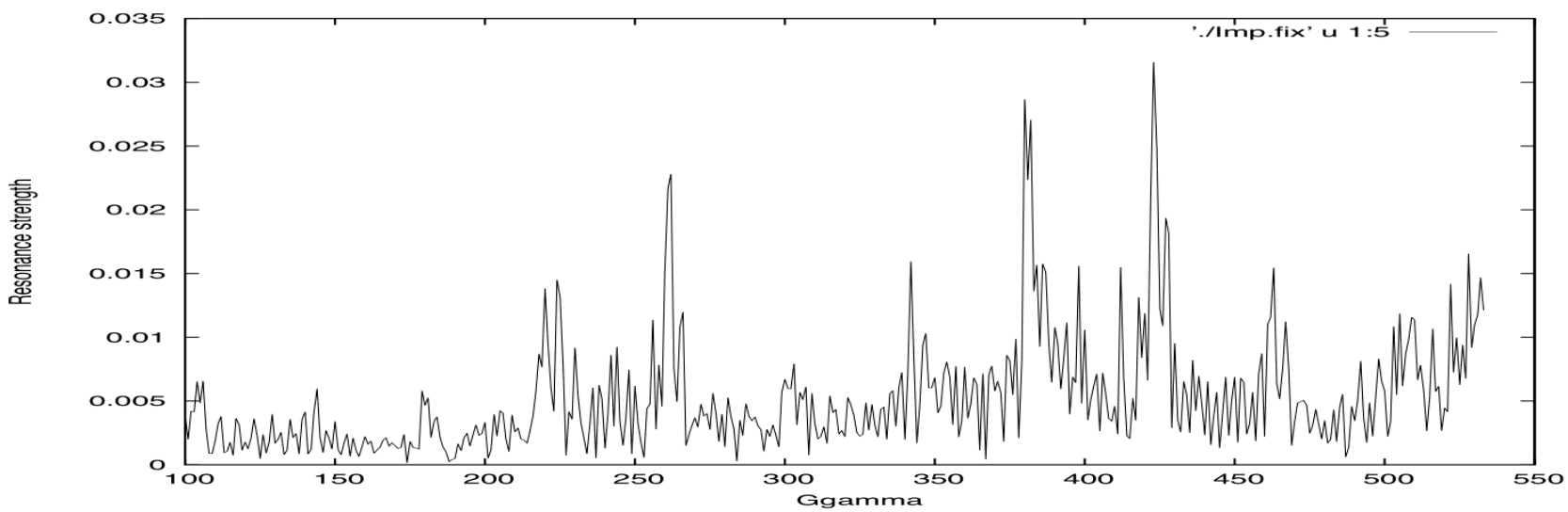
Overview of orbit



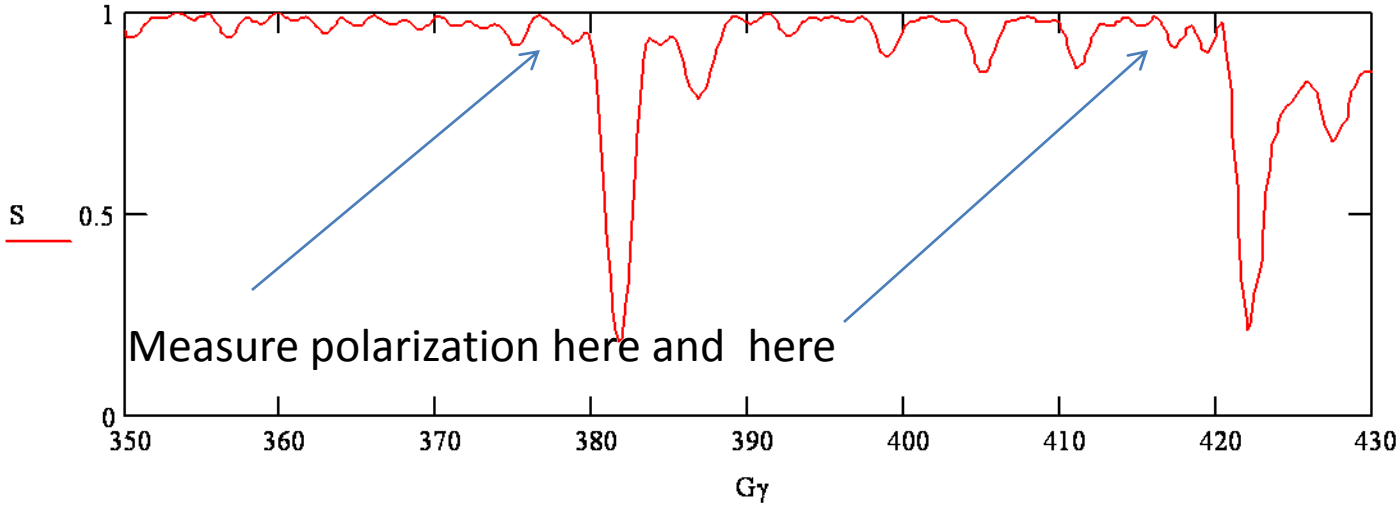


DEPOL Calculated Resonances



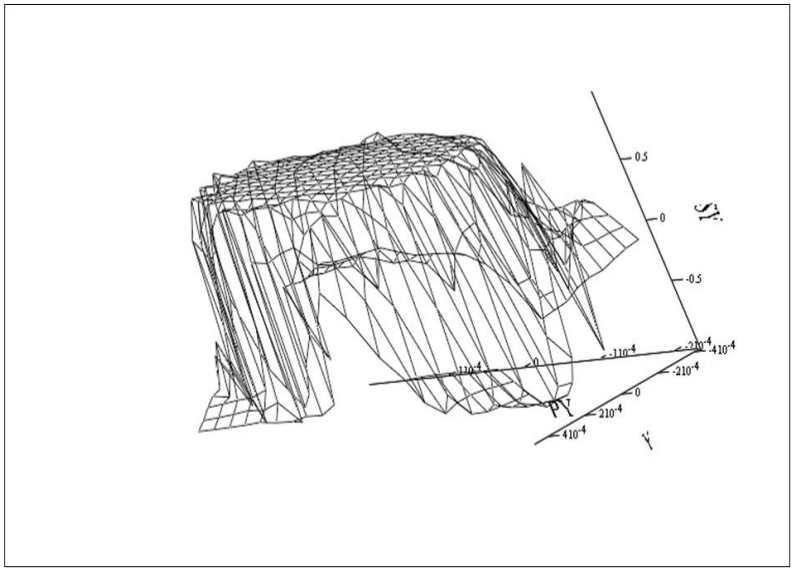


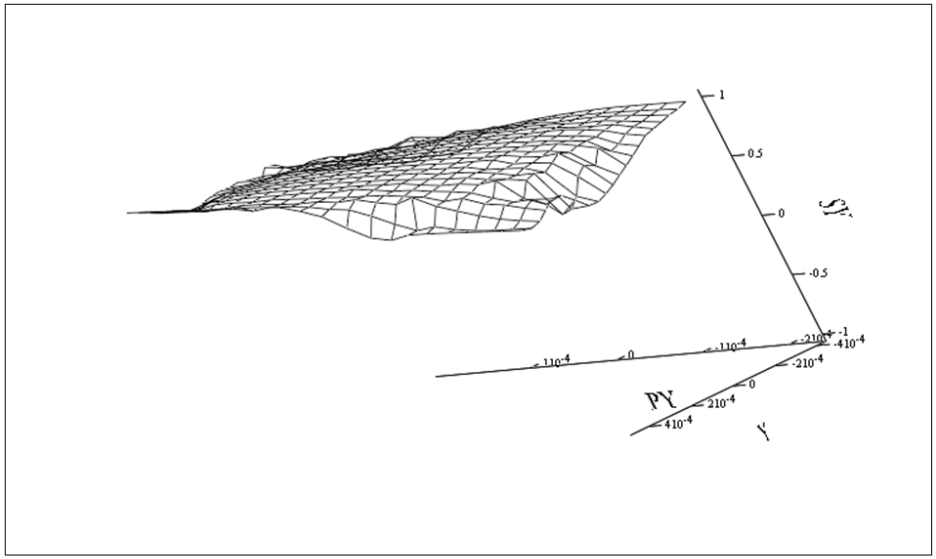
Simulations Point to Last intrinsic Resonance crossing

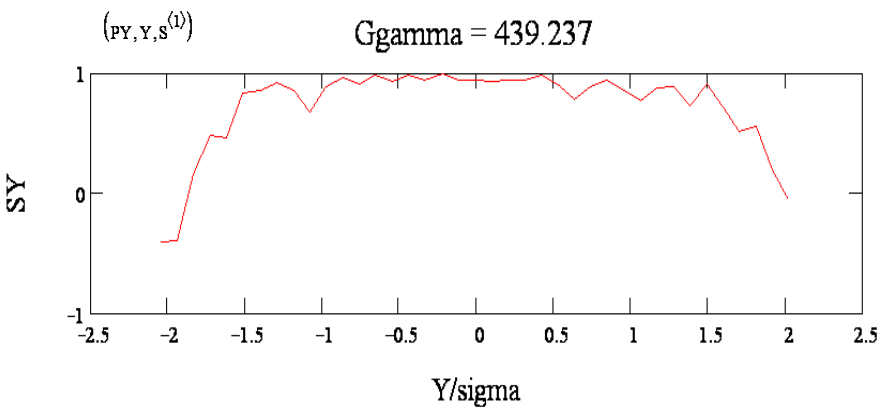


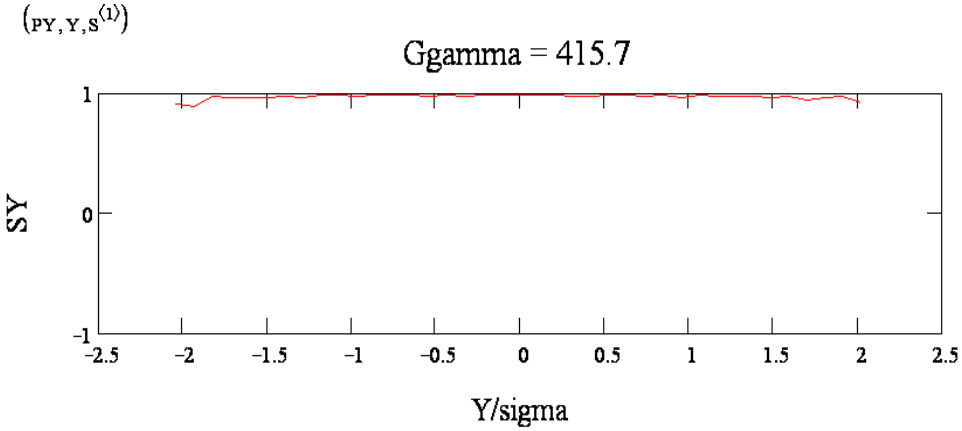
So I would like to verify or disproof this by measuring polarization at two additional Locations on the ramp

Relative change in Polarization Profile We expect

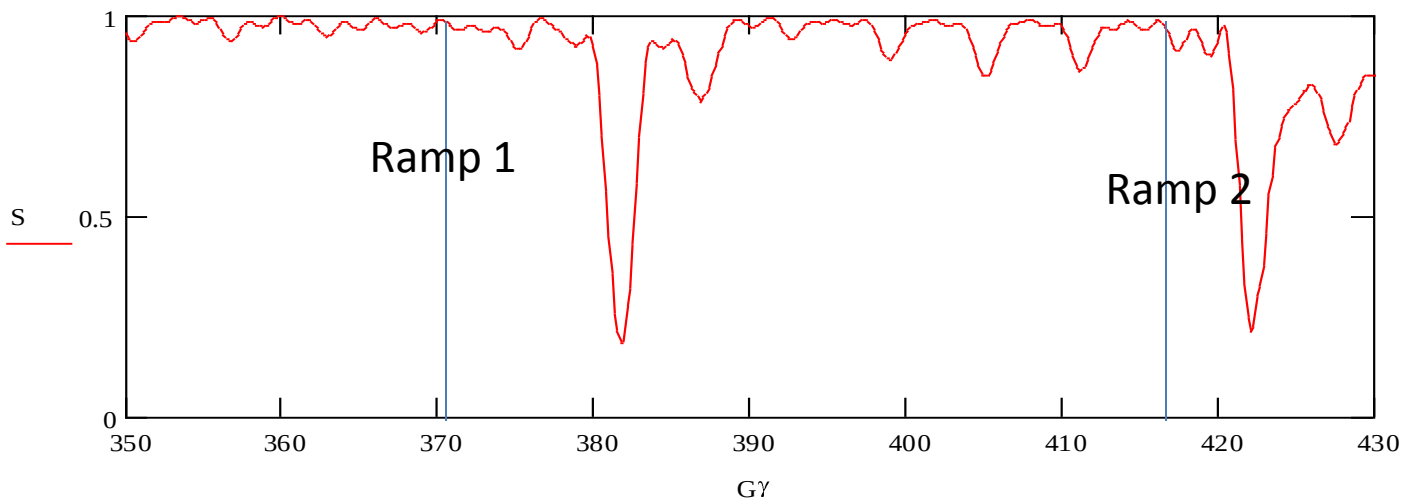








Approach Build two new ramps:

- First one to Ggamma = 370.26 right before 411-nu resonance crossing. This energy ensures two things.
  - First we are at a spin nodal point and our cone opening is minimized.
  - Second that we preserve the acceleration rate during the strong intrinsic resonance crossings. Since it takes about 30 units of Ggamma to stop the magnets ramping this ensures we should have plenty of room between the previous strong intrinsic resonance (~267 Ggamma) and our stopping point (370.26)

- The second ramp should go to 416.26 just before the last strong intrinsic resonance (393+NU). This location is a tighter ‘fit’ since we have only about 40 units of Ggamma between this resonance and the previous one. But we should be able to make it . I estimate the whole thing should consume between 5-8 hours of RHIC machine time.