

Spin meeting minutes, 3/14/2007

Itaru presented three horizontal polarization profile measurements done at the end of store in run5. In all three cases, the beam profiles extracted from the good carbon events within the banana cuts are good Gaussian. Judging from the χ^2 of fitting of the two yellow profiles, it seems that Gaussian distribution is the proper profiles instead of a flat one. The blue polarization profile can be either way: a flat profile or a Gaussian one. Gerry and Itaru would like to know if Gaussian profile is expected from accelerator physics point of view. In addition, for the yellow fill 7151, both the beam profile and polarization profile are wider for the colliding bunches than the non-colliding bunches. Not surprisingly, yellow beam was blown up significantly shortly after the two beams were put into collision for this particular fill.

Thomas presented a math-cad model of measured polarization as function of target position in the beam. Since we have a partial warm snake in the AGS for run5, there was some weak effect from horizontal depolarizing resonances, in addition to the coupling resonances, which probably is weak as the helical warm snake does not have much coupling and the two tunes were separated by 0.15. Such a polarization profile is unlikely to change after inject into RHIC and would carry out to the store. This profile is very close to a Gaussian form, though not exactly. It is worth noting that the effect is not only a polarization profile, but also lower vertical component at the peak. When beam is blown up, wider beam profile causes wider polarization profile and lower measured vertical polarization even without polarization loss for the whole beam. In RHIC, there is no known source of horizontal resonances on the ramp, but the spin rotators could be a source after they are turned on at store, as they rotated spin from vertical to longitudinal. The polarization loss from them can not be treated with Froissart-Stora formula since these resonances are not crossed. Their effect should be insignificant in general case. Another possibility is coupling resonances. To separate the profiles carried over from AGS and developed at RHIC store, Mei suggested to look the injection profile measurements (if we had any). We did have profiles measurements from AGS, though. In the future, we should study such effect at store with profile measurement (equal statistics at every target position) at beginning and end of a store, as suggested by Waldo. Itaru will compare polarization of colliding and non-colliding bunches for all measurements. Gerry estimated that it is one-month work.

Haixin