Spin meeting minutes, 11/22/2006

Fanglei presented the progress on realistic spin tracking. First part of her presentation is about spin tracking with vertical motion and synchrotron motion for 10% cold snake and 5.9% warm snake. With properly chosen vertical tune at injection, polarization is maintained until $36-\nu$. There are about 4% polarization loss before $36+\nu$ and an additional loss of 7% at 36+ν. The loss is not understood, since spin tune gap is wider at locations of the strong resonances. It is suggested to track with slightly different vertical tunes. Leif suggested to track just around 36+. Mei stated that she and Alfredo found a bug in the acceleration module of SPINK code, but it is not clear if it is in the version Fanglei is using. This will be sorted out soon.

The second part is about spin tracking with horizontal motion and synchrotron motion for 15% cold snake and 5.9% warm snake. Since field map of cold snake would introduce orbit coupling, the tracking with synthetic snake (spin effect only) was done to compare witht the simple MATHCAD model. The motivation is to see if spin tracking can give same gradual polarization loss along ramp. The tracking with 100 particles still shows the spin coherence (as indicated by the polarization bumping up and down) but is agreed with the simple model qualitatively. There was a discussion on the spin coherence vs. synchrotron motion. The polarization loss shown at lower energies may not be real, as at lower energies, the spin precession is slower and spin coherence is more problematic in tracking. Another 1000-particle tracking focus on the early part is ongoing. It is also suggested to try the same tracking with different random seed.

Since both vertical and horizontal resonances are strong near $G\gamma = 45$, Thomas asked if we can lower the extraction energy to $G\gamma = 44.5$. Waldo will check if spin match will be different there for various cold snake strengths (10-15%). Woody pointed out that lattice with 15% cold snake has smaller aperture at injection and is hard to tune. If horizontal tune is still outside the spin tune gap, another idea is to accelerate to $G\gamma = 46.5$ then decelerate down to 45.5. The ramp speed cross $G\gamma = 45$ can be greatly increased to reduce effect from nearby horizontal resonances.

Haixin