Minutes of spin meeting 09/03/08

Leif presented the A15 multi-wire profiles taken in run8. The analysis was done with the added new feature of the multi-wire application. The comparison of multiple-turn and single turn profiles for the injection with dwell field suggests the emittance growth in the vertical (due to mismatch). This is consistent with Woody's findings in the past (presented on April 16, but no good fitting for the multi-turns). There are data points off the Gaussian fits. Leif believed it was due to the gain of some wires and/or beam steering error. Waldo suggested to fit the profiles with two Gaussians due to multiple scattering. But Alfredo pointed out that there are only limited number of data points in the profiles and it would be hard to get a meaningful fit. Then the question is how big an error will be introduced when the one Gaussian is used, which Waldo probably has done such an estimation in his simulation already. Leif also looked the profiles with injection-on-the-fly. The data were taken with same gain for both single turn and multi-turns as the beam intensity was low. But the emittance pictures are less clear, since the horizontal beam size (as the result of beam profile shape changed) fluctuated in the two different shots.

Thomas presented the further estimation of emittance growth in the tune jump case. To make the case simple, he used dipole kicks in the model. Then the emittance growth can be derived as a function of the total number of turns during the kick and the betatron tune. The adiabatic condition is derived as product of number of turns and factional part of the tune much larger than 1: $N\Delta\nu >> 1$. Moving away from integer tune helps to reduce the emittance growth. In addition, the emittance growth is zero for some number of turns due to the cancellation effect. For quadrupole case, the tune will change during the quad "kick" (jump), which makes the whole picture less clear, But the basic structure of the emittance growth should be similar.

Since Fanglei could not come to the meeting, Haixin presented her progress on the simulation of emittance growth. The simulation is trying to confirm one can reduce emittance growth by reducing beta wave in the presence of magnet error. As Thomas pointed out in the meeting, one needs to keep $\Delta\nu_y$ the same for the two quads when fired individually, instead of $\Delta\nu_x$. She will redo the simulation.

Last the discussion is on how well we can control the vertical tune for a long time (days). Thomas suggested to think about possibility of using tune feedback system in the AGS.

Haixin