Spin meeting minutes, 12/13/2006

Leif first reported the search of $G\gamma(t)$ for the AGS ramp. There are two ways to get the function: one is from the measure B field (Gauss Clock Count), and one is from the measured RF frequency. Ideally the two should agree. Leif separated the ramp into three pieces: early part with Bdot ramping up, middle with constant Bdot and last part with Bdot ramping down. The two methods agreed well in the early and middle part (before $G\gamma = 36$). The early part agreement is within 0.01 $G\gamma$ unit.There is no evidence the GCC conversion to B field is Bdot dependent. The ramp speed glitch showed up in two GCC data sets and it is probably due to the P-bank power supply turning on. Dejan recalled that there were similar power supply switch problems in Fermilab and in RHIC. As Woody and Leif pointed out, we can reduce the effect and move the timing if it turned out this is harmful to polarization. The flattop energy is $G\gamma = 45.4$ from this calculation and raising it to 45.5 requires unrealistic parameters. Since RHIC RF frequency and path length are well known, it is doubtful that there is such a large deviation from half integer. The difference between the two methods is 0.1 $G\gamma$ unit near and along the flattop. In addition, the derived 36+ν resonance timing is later by 2-3ms from the one measured by harmonic scan during the run.

Leif then reported the beta function at the locations of BPMs extracted from ORM data at AGS extraction ($\nu_y = 8.94$). It shows 6-fold symmetry with beta wave of more than a factor 2 (17m-45m), which is contrary to our naive believe that snake effect is negligible at extraction. Kevin added that such a beta wave requires huge current from A17/E17 quads. The only candidate for the effect are the partial helical snakes. Thomas pointed out that there may be a fundamental problem here. The ORM assumes linear lattice (response linear dependent on dipole kick strength). For it to be correct the sextupole component can not be large. In the helical magnets, the field strength is proportional to the quadratic of the orbit offset and not an linear relation. Mei suggested we to vary single quad strength to measure beta function at a few local points, which we can do now with the thin compensation quads for snakes. She also suggest to take tune measurement in the future orbit data taking. If there is no tune variation, then the lattice is reasonable linear. The accurate tune measurement is the key.

Fanglei presented the progress in spin tracking with vertical motion (and synchrotron motion). The first set is to compare the spin tracking with and without synchrotron motion. There is little effect from synchrotron motion except vertical tune at 8.985. The polarization loss for various vertical tune values can be explained by partial snake resonances. She also did spin tracking for three different ramping speed with vertical tune set as 8.985. The results show that there is a few percents difference in polarization and the faster the ramping speed, the better the polarization. Since it was done at 8.985, it is not so convincing. Mei stated that it is contrary to observation in RHIC where there is no correlation between the polarization and vertical tune ramping rate. Thomas pointed out that the $G\gamma$ ramping may be different from tune ramping. Fanglei also did spin tracking around $G\gamma$=5 with smooth ramping speed. It shows that the polarization is very sensitive to the crossing speed. Thomas suggested to check spin tune, crossing speed. Froissart-Stora formula should be able to handle these resonances.

There will be no meeting next week.

Haixin