Spin meeting minutes, 9/20/2006

Ioannis gave two options for the I10 solenoid power supply. First one is to use one of the existing power supplies (150V/5000A) with current cap to limit the current to the needed 1000A. This power supply is under the old DATACOM control interface. In addition, it is voltage controlled instead of current controlled. Another option is to use a g-2 power supply(130V/1250A) sitting in the same room. This requires change of PLC, control software. It is not clear if it can be ready by December. Thomas suggested that we focus on the first option, since we may change the specs after beam test. As the coupling from helical magnets is going down with energy ramping up and is expected to be fully compensated at $G\gamma = 9$ with the cold snake solenoid, the coupling is expected to change sign at $G\gamma = 9$. For the solution with both tune close to integer, the coupling probably is only important at high energy, i.e., $G\gamma = 36 + \nu$. In this case, an unipolar power supply should be enough. In comparison with past ramp rate of this magnet, we need to ramp it faster (between $G\gamma = 9$ to 45) but smaller current. In addition, the resistance is going to be higher as only half cables are used for the single power supply. The voltage should be enough but a calculation should be done to confirm that.

Fanglei reported the progress she and Alfredo have made on spin tracking. She showed two cases with and without the renormalization ("smooth") orbit when updating lattice. Large emittance growth and betatron oscillation are seen for the case without renormalization. Even in the renormalization case, there is still orbit spikes at certain energies. She also compared the cases with vertical tune at 8.96 and 8.98. The case with 8.98 showed complete depolarization. Since MAD only generate twiss parameters instead of transfer matrix for each element, SPINK used the twiss parameters to regenerate the matrices. After the long discussion, people think that there are two potential problems here. First, MAD may not find a stable solution for certain tunes (especially when it is close to an integer). Some of the emittance blowup in the tracking are due to that. Second, the ascii file has limited accuracy and could result some errors. The renormalization probably is correct but the emittance blow up should not happen even without it. Since the emittance blow up did not happen in the early part of the ramp where betatron tunes are ramped and twiss parameter jumps are likely most severe, the twiss parameter jump is unlikely the source of the emittance blow up. Thomas suggested to check those MAD files caused emittance jumps. There is no need to reduce lattice update step size. We may instead fix the lattice file when $G\gamma$ is larger than 20.

Leif briefly reported his coupling analysis from the ORM data. More detail will follow next week. There is clearly strong coupling at injection, but not much at extraction. The ORM data analysis at injection has to be able to handle the case with coupling. Kevin reported the AGS IPM upgrade. He is going to circulate a note on the control, functionality of the AGS IPM soon. He would like to hear people's comment. Vladimir suggested to look the possibility of test the new RHIC BPM electronics in AGS. These electronics give accurate average orbit and are commercially available.

Haixin