

Hall C NMR Probe and PLC Tasks Meeting

Date: October 31, 2018

Time: 10:00 – 11:30 AM

Attendees: Pablo Campero, Brian Eng, Mike Fowler, Amanda Hoebel, Steven Lassister, Tyler Lemon, Eric Sun, and Stephen Wood.

1. Discussed about magnetic field measured with old NMR PT2025 during HMS operations.
 - a. Steve Lassister presented plots and data that showed the measured field versus ideal/expected field for each of the probes connected in the HMS dipole.
 - i. Probes 2, 3, 4, 5 and 6 with different ranges and locations were evaluated.
 - b. Results showed that one of the probes used has a gap (blank spot), in which the probe is not measuring the field into its expected operational range.
2. Status of new NMR PT2026 unit and probe used to measure magnetic field in HMS Dipole.
 - a. Python code being developed on SBC card to handle data transfer between PT2026 and PLC controller.
 - i. NMR probe connected and measuring magnetic field is located in central region of the HMS Dipole. Eric Sun mentioned that proper position of probe should be checked to ensure better response at the time of measuring the magnetic field.
 - ii. Currently magnetic field measured data is read in the DSG PLC test station.
 - iii. Working in code to handle communication errors with the PLC, and other error exceptions needed.
 - b. Brian Eng mentioned current issues with the NMR PT2026 to get a lock when the current is changing.
 - i. PT2026 needs different RF Pulse settings (under advanced) when HMS dipole is at 1.8T compared to when it's at 1.4 T.
 - ii. Problem noticed when magnetic field > 1.4 T when current is changing.
 - iii. PT2026 has lock issues at the lower end of the probe range, so far it has only tracked well from ~1.3 – 1.5 T
 - c. Brian Eng is working in python code written in SBC card to change the RF pulse settings in the PT2026; this will allow getting the lock when the current is changing.
3. New customized probe for SHMS will be ordered / borrowed from GMW Associates vendor.
 - a. Probe will be connected on the NMR PT2026 unit.
 - b. Probe will be tested in different operational ranges required, and based upon this test probe will be purchased.
 - c. Possible acquisition and testing of probe planed by January 2019.
4. Potential testing dates
 - a. NMR PT2026 unit and probe can be tested on 11/26/2018 and 11/27/2018.
 - i. During this test is planned ramp the HMS dipole over its entire range to see how PT2026 handles the lock when current changes, based in Brian's code implemented on SBC card.
 - b. Developed Dipole filed regulation PLC program could be tested in the HMS control system in a period between 12/2018 and 01/2019.
 - c. No magnetic field testing for SHSM until June, 2019.
5. Discussed about additional tasks for DSG
 - a. Implementation of 1756-IF4FXOF2F High-speed I/O modules to the quench detection PLC control systems.
 - i. Mentioned that High-speed I/O modules only have 4 input channels, compared with the current 1756-IF16 input modules that are been used in differential mode with 8 channels available. (Fact to be considered if the plan is replace the

existing 1756-IF16 modules (x9) used for quench detection by these High-speed I/O modules)

- b. PLC code requested to control fast data recording/archiving at the max data transfer allowed by High-speed module if a real quench event is presented on the SHMS and HMS magnets.
 - i. Steve Lassiter suggested data recording at high speed only for the 30 minutes after and previous to the real quench.
 - ii. 1756-IF4FXOF2F module provided by Steve Lassiter to DSG to start testing and PLC programming.
 - iii. Additionally connected another 1756-IF4FXOF2F module at Stand Alone PLC remote chassis; this will allow mimic current configurations in HMS or SHMS PLC control systems during the test.
- c. EPICS GUI to monitor Magnet status for SHMS and HMS was requested.
 - i. PVs for new EPICS GUI screen to be determined.
 - ii. Stephen Woods mentioned that further details for this task will be discussed with Peter Bonneau.