

LEReC 11/24/2015
Cooling Section Solenoid Magnetic Measurement Result Meeting
By Joseph Tuozzolo with input from A. Jain & A. Fedotov

Minutes

A. Fedotov, W. Fischer, A. Jain, J. Kewisch, G. Mahler, W. Meng, P. Wanderer, J. Tuozzolo

Animesh presented the results of the first magnets measured. Overall the magnets looked very good; but, there are variations.

By next week 10 compensating solenoids and 2 matching solenoids should be measured. This is enough for the yellow side beam line. The vacuum group is installing the yellow and blue side sector valves this week and the stands have been surveyed in place and will be bolted down next week. George will arrange for Riggers next week or the following Monday to pick-up the measured solenoids. 6 of the compensating solenoids and the 2 matching solenoids can be placed right on the stands.

Animesh discussed field alignment: the yaw and pitch of the magnetic axis relative to the mechanical axis, as derived from the rotating coil measurements. The Hall probe transverse fields have large errors, but even the rotating coil can have errors due to alignment of the rotating coil axis to the magnet bore. Based on various clearances, this alignment is accurate only at ~ 1 mrad level. Therefore, all results within ± 1 mrad may be treated as consistent with zero. Animesh computed the magnetic yaw and pitch for all magnets measured so far to see if there are any magnets with a misalignment well beyond reasonable measurement errors.

Animesh's presentation from yesterday meeting is attached, with the plots revised to include all available data as of today. Animesh estimated the yaw and pitch from the rotating coil data, assuming a perfect alignment between the rotating coil axis and the magnet's bore tube axis. Most magnets have pitch below 2 mrad, which may very well be within the tolerance of rotating coil axis alignment. On the other hand, there appears to be a systematic yaw of about 3 mrad in most magnets. At least some of this yaw, if not all, should be real. Animesh included the updated values of yaw and pitch in the summary tables at the end of his presentation. Animesh noted the Frank and Matt in survey did very well using the magnet data to locate to the magnetic center during NSLSII.

Because of the uncertainty in the measured results, I would suggest that the magnet pitch should be set based on mechanical survey alone. One may do the same for the yaw as well, or set them with about 3 mrad yaw, except for the first 2 magnets.

It was also noted that we should put the "best" solenoids toward the upstream side of the yellow side. The best magnets are defined as the magnets with the smallest transverse dipole components. The six best magnets will be put on stands next week.

One of the matching solenoids had a higher transverse field than the other. There was some discussion after the meeting and it was determined that the matching solenoid with the higher transverse field will be installed at the downstream end of the yellow cooling line next to the 180° magnet because it runs at lower solenoid field which also gives a lower transverse dipole field.