Magnet Discussion Meeting

Jagiellonian University, Krakow

Tuesday 24th June 2008

1 Attendance

Present:- Gennady Alexeev (Dubna), Andrea Bersani (Genova), Wojciech Czyzychi (Krakow), Yuri Davydov (Dubna), Valery Dodokhov (Dubna), Mariusz Domageila (Krakow), Evie Downie (Glasgow), Francisco Garcia (Helsinki), Michela Greco (Turin), Paola Gianotti (Frascati), Michat Hawryluk (Krakow), Inti Lehmann (Glasgow), Bernd Lewandowski (GSI), Filip Lisowski (Krakow), Edward Lizowski (Krakow), Jost Lühning (GSI - via EVO), Mario Maggiora (Turin), Johann Marton (Vienna), Herbert Orth (GSI), Lars Schmitt (GSI), Günther Rosner (Glasgow), Victor Varentsov (FAIR), Alexander Vodopianov (Dubna),

2 Minutes

The Magnet Group met on Tuesday 24th June in Krakow, with Jost Lühning participating via EVO. Inti Lehmann opened the meeting and reminded everyone that for email communication within the Magnet Group, the email address PANDA-MAGNET@gsi.de in order to ensure that everyone receives the information. This was followed by a short presentation by Evie Downie on version 0.4.0 of the Draft Interface Document. This document is now available on the Magnet Wiki page and contains the unified solenoid design and updated information on several of the detector interfaces and some details of the target requirements. It was pointed out that much of the required detector input is still lacking and that we need more detail of the target interfaces (which H. Orth has promised to supply in the coming weeks). The Magnet Volumes have increased in radius from 2240 mm to 2300 mm in order to accommodate the increase in Muon Detector gap thickness, but they have remained the same in the forward door region in order to retain space for possible forward door modifications. It was emphasised that we need to clarify and finalise the upstream and downstream door designs and the tolerances for the production and assembly of the magnet, especially with regard to the Muon systems.

Inti Lehman presented the status of the TDR. He indicated the areas that are nearly complete in the "Zeroth Version" and those that are empty or nearly so. It was emphasised out that the TDR has to be read and understood, not only members of the PANDA Collaboration, but also by the FAIR administration and by Funding Agencies, thus the structure of the document should be clear and should have a similar form for both the Target and Forward Spectrometers. After some restructuring of the document, responsibilities were allocated for each of the sections as follows:-

Section	Responsible
Executive Summary	G. Rosner
Introduction	I. Lehmann
Organisation and Management	I. Lehmann
Spectrometer Overview	R. Parodi, A. Vodopianov, G. Rosner, G. Alexeev
Target Spectrometer:-	
Requirements	A. Bersani, Y. Lobanov
Coil and Cryostat	A. Bersani
Instrumented Flux Return	Y. Lobanov
Detector and Target Integration	A. Bersani, Y. Lobanov
Performance	
Forward Spectrometer	I. Lehmann, J. Lühning, E. Lizowski
Infrastructure	B. Lewandowski, D. Prashun
Timelines	I. Lehmann

It was decided that we should aim to have a completed first draft of the TDR by September in order to assist Genova in their grant application to INFN. It was anticipated that the TDR will thereafter be required by several of the other Groups for similar purposes. The final version should be complete by January 2009.

Andrea Bersani made a short presentation on the progress of his coil and magnet optimisation. He showed that, using the yoke designed by Dubna in conjunction with the coil designed by Genova, instead of lengthening the cryostat-coil complex, it was possible to satisfy the field homogeneity requirements in the central tracker by slightly increasing the thickness of the cut away section of the upstream door. This improves field homogeneity and increases the screening of the field from the region outside of the magnet. After increasing the door thickness, at its thinnest point, from 236 to 275 mm, all field requirements are satisfied, but the Barrel DIRC readout has to move a little towards the EMC. As this movement will put some pressure on the region where the EMC planned to route their services and signals, this suggestion will have to be discussed with the Barrel EMC responsibles before final approval. Andrea showed that the unbalanced axial force in this optimised design has been reduced to 13 tonnes in the upstream direction. It is planned that the cryostat will be secured against forces of 30 to 50 tonnes in both upstream and downstream directions in order to allow for any alteration in the unbalanced force during the switching on and off of the solenoid. Having tie rods at both ends of the cryostat also allows more freedom in the final coil alignment once the cryostat-coil complex is in place within the yoke. Andrea has also increased the gaps in the forward door from 25 to 30 mm in response to the Muon Detector Group request. This increases the overall thickness of the door by 20 mm and brings the outside edge to 2885 mm in Z..

Gennady Alexeev then explained that the Muon Detector Group has recognised that a double layer of Muon Detectors is needed immediately on the inside the solenoid return yoke in order to increase the efficiency of Muon detection in this important first layer of detectors. This means that, inside of the forward door, the Muon Group require 50 mm of space, instead of the currently allocated 30 mm. They suggested reducing the thickness of the first layer of iron in the door by 20 mm, but it was decided that this was an unwise procedure, given the fact that there are already some small regions of saturation within this region. It was then proposed that we increase the magnet length by 20 mm in the z direction, beginning the forward door at 2485 mm, instead of the

current 2465 mm, and bringing the external dimension back to the former number of 2905 mm in z.. In order not to reverse the reduction in the unbalanced forces achieved by A. Bersani, it was suggested that the magnet yoke could also be increased by 20 mm in the upstream direction, thereby retaining the symmetry and alleviating the newly acquired spatial difficulties in the upstream region at the same time. As this may result in an unacceptable drop in the magnetic field in the upstream region of the tracking detector systems, it was agreed that A. Bersani would investigate the effect of these changes on the field and would report back to the rest of the Magnet Group as soon as possible on the feasibility of these requests and suggestions. Inti Lehmann will communicate the requests to Yuri Lobanov also in order to allow him to investigate the option in parallel with Andrea Bersani.

Lars Schmitt reported on the simulation Field Mapping plan and explained that, once the final magnet dimensions were fixed, he and Jost Lühning would work with Mohammad Al- Turany in order to produce a field map for the simulation. During the production of the simulation field map, they will document the procedure in order that the Magnet Group can properly cross-check the results against their own calculations.

3 Required Actions

Individual / Group Responsible Agreed responsibility.

Magnet Group Production of TDR according to responsibilities laid out in the above table.

I. Lehmann Communication of 20 mm suggestion to Y. Lobanov.

A. Bersani & Y. Lobanov Investigation of the effect of increasing the magnet length by 20 mm in both directions.

J. Lühninig & L. Schmitt Construction of a magnetic field map for the simulation and documentation of the procedure.