Minutes of WP-meeting 163

Attendance:
DESY: Ralf Diener, Frank Gaede, Philippe Gros, Isa Heinze, Felix Müller, Astrid Münnich, Ron Settles, Klaus Zenker, Ryo Yonamine
Webex: David Attie, Paul Colas, Leif Jönsson, Jochen Kaminski, Martin Killenberg, Akira Sugiyama, Jan Timmermans, Wenxin Wang

PCMAG/LP setup, test beam:
Ralf: PCMAG/test beam area:

- The area has been prepared for the test beam. The cosmic trigger has been mounted on the movable stage and not on the magnet itself.

LP:

- Ralf reported on the HV-problems of the LP. After the last report (WP158) the HV-problems continued. In particular during the DESY test beam, the field cage tripped several times and had to be operated at a cathode voltage of 10 kV only. After the test beam the LP was brought to the FLC-lab and several problems could be identified: The one HV-cable was more prone to discharges than the other one. A video of the cathode showed, that there were discharges at the gas inlet. Two improvised measures were taken to avoid this: The cathode was covered with a Kapton foil and a ceramic plate was mounted over the gas inlet. Finally also the HV-plug showed a carbon bridge. The plug is cast in Stycast and can not be redone. A second HV-plug was cast more carefully in a vacuum environment to avoid air bubbles within the Stycast. It was mounted in the second hole and the first plug was also covered with ceramics.
  After these repairs, the HV of 17 kV was applied to the cathode and no trip was observed for 24 h. Then the test was stopped and the LP prepared for the next test beam.

Test beam schedule:

- The beginning of the Japanese test beam has been delayed by a few days, since the equipment has arrived at the airport and is expected to be delivered to DESY later today. The modules will then be tested in a test box: HV-tests and a Fe-55-spectrum will be recorded. Then the modules will be mounted on the LP. Data taking is planned to start on the 1st of December.
- At the beginning of next year Roman Poeschel has made a test beam request for T24 with an ECAL from 21.-31. January Paul would like to do a 7-module test beam from 28.1.-8.2. Since the two plans collide, Paul will contact Roman and discuss with him. (The result two days later was, that they will go ahead and make the two test beams in parallel.)
- The DESY group plans its test beam from the 25.2.-24.3.

DBD:
Ron had uploaded a preliminary version of the DBD to the agenda and asked everyone to read it and send him comments via email. This version of the DBD will be sent to the PAC (physics advisory committee) on the 30.11. The safety margin of the occupancy mentioned in the last line of the table (p. 2) was shortly discussed. It was observed, that the occupancies dealt with in ALICE are even higher. Ron also asked everyone to write LCnotes or at least reserve a number and upload it later.

News from the groups:
Takeshi had uploaded some transparencies discussing the observation of the track distortions observed

with the Japanese modules. It seems we need to control the electrical field not only to O(mm) but to O(100 µm). He also listed several other issues like discharges and ion gate. The discharges will have a large impact on the total efficiency of the TPC. The can be prevented by a resistive anode at the price of possibly having pile-up.

Martin reported on some GEAR issues and their influence on the reconstruction of test beam data. In particular the description of the Asian module in GEAR is wrong in several aspects and Martin showed with some simulations, how this can lead to artificial track distortions. The first problem is that the $r\phi$ offsets of the first pad in each row is measured from the bounding box and not from the physical module. If this is not taken into account, some clusters are reconstructed in the gap between modules. The second problem was that the offsets of the lower and upper row were interchanged. Martin showed that these problems could not be detected with simulation, if the same GEAR-file is used for the simulation as for reconstruction. He then showed the effect of changing the module angel, the row height, the pad pitch has on the data. Some of the patterns resemble the patterns seen in the test beam data. Therefore, everyone is asked to check carefully his/her GEAR-file again and compare it to the new instructions Martin uploaded to the Indico-page. There are still some open questions that have to be studied further, but in principle all possible geometries can be described in GEAR. However, the Kalman filter is much less tolerant and works only for some deviations from the foreseen geometry.

Paul reported on the progress at Saclay. At CERN 4 new modules are constructed, so that for the next test beam there will be 7 new modules and 2 spares will be available. The modules are tested on a bench with an Fe-55source. Both event pictures and the spectrum were shown. An energy resolution $\sigma_E/E\sim$ 15% were reached, but this can still be optimized with a refined analysis. The occupancy map showed that there are very few dead pads (5-30). The origin of this can not be identified. It could be either a broken connection or a broken electronic channel (the AFTER-chips were not tested before mounting). Paul also showed the plot of the reconstructed hit centers on the three central modules. Some of the problems pointed out by Martin were already solved and the distortions close to the gaps were reduced by about 50 % to ~1 mm. Also the position of the HV-contact could be seen in one module. There the efficiency and the precision was significantly reduced.

AOB:

The next workpackage meeting will take place on December 6th.