

## Minutes of WP-meeting 154

### Attendance:

DESY: Ties Behnke, Felix Müller, Ralf Diener, Isa Heinze, Klaus Zenker

Webex: Philippe Gros, Leif Jönsson, Jochen Kaminski, Martin Killenberg, Takeshi Matsuda, Astrid Münnich, Dan Peterson, Ron Settles, Jan Timmermans, Wenxin Wang

### PCMAG/LP setup, test beam:

Ralf: PCMAG

- Ralf gave a short summary over the schedule of setting up PCMAG. The work has now finished, the safety checks have been passed and PCMAG is fully functional. Some pictures of the T24 area with the new setup were shown. Only a couple of minor issues remain to be solved: The integration of the compressor status in the slow control and interlock system, additional cooling might be needed for the power rack and a replacement for the data logger has to be found, since it is on loan from KEK until the end of the year. Takeshi mentioned in follow-up emails, that KEK is writing two budget requests for 1) a replacement of the data logger and amplifier for the quench monitor, which is estimated to cost 11 k€ and 2) an automation of the excitation, which will require an additional 5k€. The DESY group also plans to remeasure the magnetic field at a few positions in PCMAG to see, how much the field has changed by the new setup.

test beam area

- Several improvements in the area are planned: A new external position measurement is needed so that the exact position of the LP is known inside PCMAG. Also a new guiding system for the cables is planned so that the movement of the LP becomes easier. The DOOCs slow control system will be extended to include all measurement systems. The safety measures with respect to the magnetic field shall be improved further. The laser system is to be recommissioned. Air condition in the counting hut will be installed.

LP

- A dummy module fell into the field cage while closing the Large Prototype after the test beam campaign. The field cage will be inspected at the next occasion to see whether it was damaged.
- A new mechanical mounting device is planned to standardize and facilitated the insertion of the modules. Sketches of the device were shown.
- Leif has taken 8 FEC to Lund for some inspection.

test beam schedule

- No exact dates for the next campaigns are fixed, but DESY will start mid/end of August. The ECAL (R. Poeschel) would like to make some measurement in PCMAG at some time in September/October, Sascha would like to make test beam measurements at the end of October/beginning of November in T24, the Japanese groups plan to come to DESY end of November and all of December. Also Paul would like to make some more measurements with a complete set of 7 modules. Depending on the precise schedule either before the Japanese or at the beginning of 2013.

### News from the groups:

Felix: All 5 pad planes (4828 pads each) have been delivered and resistors and connectors have already been mounted on three of them. The HV-connection is done via two 4-pin Fischer connectors, which

will be soldered on the board directly. A design to keep the connectors to the ALTRO-electronics in place is being worked upon. To reduce the electric field distortion a 100 $\mu$ m-thick wire was placed around the frame of the top GEM. This was done manually by first fixing the wire with a tape and then apply several dots of Epoxy. Simulations have shown that the best results can be expected, when the wire is connected to the same potential as the top side of the GEM. The complete modules will be assembled now and then tested in a small box.

Wenxin reported on the test beam campaign with 6 Micromegas modules in July. 5 modules were manufactured this year, while the 6<sup>th</sup> was already produced last year. The campaign went smoothly and more than 1,000,000 events were taken within a week. The data taken include a z-scan, drift field scan, gain scan, x-scan (in 2mm steps from +14 mm to -14 mm around the gap between the upper two modules for two drift distances and a similar between  $\pm 12$  mm around the gap between the lower two modules),  $\phi$ -scan, peaking time scan (100-700 ns) and cosmic ray data. Most data were taken at B=1T and with a peaking time of 100 ns. The analysis of the data will be done in MarlinTPC and the complete analysis chain is almost available. Several different display programs are also available and a few events were shown. In some of these events a common noise on several modules could be observed, thus, during the next test beam, a better separation of the grounds has to be found. All modules will be brought to CERN now. There, a setup is available to scan all modules with a <sup>55</sup>Fe-source and study the variations of gas gain and energy resolution across each module. The RMS of the charge spread depends slightly on the peaking time chosen, but is of this resistivity about 2 mm.

Dan gave a short reminder on his double resolution track study from 2002-2007. He simulated ee  $\rightarrow$  HZ events with a different detector, but very similar BR<sup>2</sup>. He assumed a RMS of 0.7 $\times$ pad pitch, a decay time which corresponds to 2 cm drift and salt and pepper noise. He used the CLEO tracking code, where pattern recognition is done first in time then in  $\phi$ . With this he studied the tracking efficiency in dependence on the noise and the pad width. The latter one showed an efficiency of more than 99% for pad widths smaller than 2.5 mm. He pointed out that the RMS depends on a pad and a PRF component and that the quadratic addition of both is important to determine the pad width necessary to separate the tracks. He also showed the efficiency plot with a modified axis, giving the efficiency in dependence on the combined RMS.

AOB:

The next workpackage meeting will take place on August 2<sup>nd</sup>.