

## Minutes of WP-meeting 162

### Attendance:

DESY: Ralf Diener, Isa Heinze, Leif Jönsson, Felix Müller, Astrid Münnich, Volker Prahl, Klaus Zenker

Webex: David Attie, Philippe Gros, Gilles de Lentdecker, Jochen Kaminski, Ron Settles, Akira Sugiyama, Jan Timmermans, Wenxin Wang

### PCMAG/LP setup, test beam:

Ralf: PCMAG/LP:

- Nothing important has changed, only small issues in preparation of the next test beam.
- HV-test with the cathode have advanced: 17-18 kV can be applied: With the cable used sofar in T24-1 a discharge occurs after  $\sim 1$  h, with the other HV-cable it occurred after about 13 h – so the first cable seems to be damaged. With the better cable, the cathode was filmed from the anode side and a discharge could be recorded. It happened at the gas inlet. Further studies will follow.

Test beam schedule:

- The test beam schedule for 2013 is now available at <http://adweb.desy.de/~testbeam>. The test beams will be available until the end of December of 2012, because the Olympus-experiment needs to collect more statistics. Therefore, the maintenance shut down will take place in the first 2 weeks of 2013. The test beam will not be available before the third week, but shortly after a maintenance shut down hick ups are to be expected. Thus, it is recommended to start only in the 4th week of 2013. Paul will probably start then and will take data for about 2 weeks. The DESY team is planning to use the test beam at the end of February. Also, the pixel group (NIKHEF, Saclay and Bonn) want to make a test beam in spring. It is, however, necessary that everyone interested in a test beam contacts Ralf as soon as possible, since CERN will have no test beams in 2013 and, therefore, many requests are expected at DESY. Besides, a complete shut down in the second half of 2013 is also planned at DESY.

### AOB:

The next workpackage meeting will take place on November 22<sup>th</sup>.

Jochen asked for suggestions to discuss during the next workpackage meeting:

- Ron would like to discuss the current version of the TPC section for the DBD which has to be submitted to PAC
- After his presentation on the TPC at the ILC event at the IEEE Takeshi was asked about the overall tracking efficiency of the TPC, when there is a discharge. This led to a discussion on discharge probability of the different technologies. CMS claims a discharge probability of  $10^{-7}$  /track for its GEM-muon trackers, which are being produced for the upgrade. ATLAS reported a probability of  $10^{-4}$ /track for its original Micromegas design, but has now converged on a design with a resistive anode. In this design the probability is hard to measure, since the discharges remain very localized and the voltage drop recorded by the power supply or a meter is only about 1 V. The charge is collected on the resistive anode and the E-field is reduced in this area resulting in a break-off of the discharge and produce an efficiency only in this region. Colleagues in Annecy are working on a simulation of the behavior, which is rather complex, but have already reached a good understanding of the physical process. The aim of the project is to understand the theory of detectors with resistive anodes better and to allow an optimized design

based on this theory. In detectors with resistive anodes, there are also open questions concerning the degradation of the amplification voltage because of charge up and the pile-up at high rate. In general not only the dead time and the correlated drop in efficiency because of a discharge are an issue, but also the distortions because of the ions.

- Ralf was contacted by Frank Gäde. Frank wants to discuss with some expert and compare the implementation of the ion production and ion feedback in the LCTPC simulation software and if there is any difference to the general ILD software (Mocca). In particular also the implementation of the curler from the pair production and microcurlers should be compared in both simulations. From this starting point further refinement of the studies by Keisuke were discussed. In particular, it should be checked whether micro curlers and  $\gamma\gamma \rightarrow$  hadrons have been included in this study and what their impact should be evaluated in case they have not been included yet.

It was decided, that an internal list with open questions should be kept up to date and attached to the WP-pages regularly to keep those issues on the agenda and give everyone the chance to pick one of the topics. Jochen will keep this list and everyone who comes up with a question should send him an email.