

Minutes of WP-meeting 157

Attendance:

DESY: Szymon Bugiel, Ralf Diener, Leif Jönsson, Felix Müller, Klaus Zenker

Webex: Paul Colas, Gilles De Lentdecker, Keisuke Fujii, Philippe Gros, Jochen Kaminski, Takeshi Matsuda, Akira Sugiyama, Ron Settles, Jan Timmermans, Wenxin Wang, Ryo Yonamine

General News:

Jochen reminds everyone of the LCWS2012 at Arlington from 22nd – 26th of October. Abstracts can be sent to one/all of the session chairs, which are for the TPC Alain, Takeshi and Jochen. An official invitation will probably be sent around soon.

PCMAG/LP setup, test beam:

Ralf: PCMAG:

- Small changes in the area and on PCMAG, for example the cosmic trigger was mounted differently, so that PCMAG could be turned again. After modifying PCMAG this was not possible anymore because of the cryo-coolers.

LP:

- The LP was equipped with dummy modules and HV-tests were performed. Voltages up to 15-15.5 kV could be applied to the cathode, before HV breakdowns occurred within 12 h test periods. By disconnecting various components the problem could be traced to one piece of the shielding at the readout endplate. A visual inspection showed some black deposit in the vicinity of a soldering point. On next Monday the endplate will be removed and the soldering point will be cleaned and some insulation will be applied.
- Leif reported that a few FECs were already sent to colleagues of ALICE for their test beam.

Testbeam schedule:

- The DESY group has delayed the beginning of their test beam to the 10th of September.
- Since there are no other test beam users in November Sascha moved to the area T22.

News from the groups:

Felix has finished testing the first DESY-module. Initial HV-problems could be traced to some excessive solder which caused sparks from the HV-contacts on the pad plane to the backframe. This was solved by removing some of the solder and adding some insulation. Now the module stands up to the design voltage of 2250 V. A second module is being tested and it is expected that a third module will be finished until the beginning of the test beam.

Ryo presented a study on calculating the spatial resolution from first principles. He included the ionization process, the diffusion, gas amplification, pad response function and finite pad width. He combined these to a probability distribution function resulting in a general expression for the spatial resolution. The individual terms of the lengthy expression were then compared to the rule of thumb equations found in literature and mathematical expressions for various effects like the hodoscope effect, N_{eff} , \tilde{N}_{eff} and diffusion were given. The behavior of these terms depending on the drift distance and track inclination were discussed and shown for all relevant contributions. Finally, the theoretical expression was compared to data both from the MP-TPC and to LP data and a good agreement was found. An extrapolation to the LCTPC shows, that the requirements ($\sigma < 100 \mu\text{m}$) can be full filled over the full drift length, if the pad response function can be enlarged to $\sigma_{\text{PRF}} > 0.26 \text{ mm}$. This could be achieved in the case of GEMs, for example, by enlarging the induction gap by 2 mm. Paul suggested to

include also the pad-to-pad variations of the electronics preamplifier, which could contribute variations up to 5 %. This effect can, however, be greatly reduced by a thorough calibration of the preamps.

AOB:

The next workpackage meeting will take place on September 13th.