

## Minutes of WP-meeting 211

### Attendance:

DESY: Ties Behnke, Ralf Diener, Leif Jönsson, Claus Kleinwort, Felix Müller, Oliver Schäfer, Annika Vauth

Fuzebox: Paul Colas, Jochen Kaminski, Supratik Mukhopadhyay, Amir Shirazi, Ron Settles, Akira Sugiyama, Jan Timmermans, Amir Tosson

### General News:

Ties explained the importance of the ALCW2015: On Wednesday there will be a meeting together with politicians (Japanese and international) and people from MEXT. It is of very high importance to have a good attendance on that day to show the importance of the project. To give more weight to the event, R&D collaborations are asked to make collaboration meetings before the Wednesday event and the design studies ILD/SiD will do it afterwards. We have time from Monday noon to Tuesday afternoon.

### News from the groups:

Bonn: Jochen described the status of the preparations for the test beam on March 26-April 5 with a 96 InGrid module and possibly also additional two modules of 32 InGrids. After a short introduction outlining the setup he summarized the status of the individual components: The InGrids are produced, some more PCB (in particular the Octoboards) have been ordered, but have not been delivered yet, the remaining PCBs are being mounted and tested.

DESY: Ralf listed all the improvements which were done in the test beam area during last years shutdown. He also gave an overview of ongoing projects regarding the Large Prototype and the GEM modules: A new field cage is being designed and a new set of test samples of the wall are being glued. Besides, the space frame endplate is being prepared for upcoming applications and the module mounting tool is upgraded, so it can be used with the new endplate. There are studies ongoing to understand the discharge behavior of the GEMs, to improve the modules design and to include a gating device in the setup. There is also a project regarding the further software improvements. Old data taken with the MediTPC (T2K gas at  $B=4T$ ) have been revisited and simulation studies are ongoing to understand the measured signal width (pads).

Kiev: Oleg could not attend but had written to Jochen that his group has done a CST and Garfield++ based simulation of the field distortion in an Octoboard. They are now preparing to do the same exercise with a larger area.

Kolkatta: Supratik presented the work of Kolkatta. They are studying the 2pCO<sub>2</sub>-cooling of the MM modules by simulations and the field distortions. Kolkatta will also participate in the MM test beam in March.

Lund: Leif discussed the status of the S-ALTRO-readout electronics: For all parts some prototype samples are produced and tests have started last year. The testing of the chip carriers is very difficult, because they have to be pressed into the test socket with a significant force. This requires a flat surface of the glob-topped chips, which is challenging to manufacture, but has now been successfully done and the carrier board fits precisely in the socket. The first three chip carriers showed, however, various problems, some of which regarding the wire bonds and some the layout. The later one did not disappear

in the second tests despite a redesign of the layout. A naked chip carrier will now be examined to understand if there are any production problems.

NIKHEF: Jan is testing the two Octopuce modules (3+4) and is preparing a new test box to make long term tests with the Octopuces. There are also several activities at NIKHEF going on to prepare the Timepix3 and to make InGrids on top of a Timepix3. In the course of these studies a new protection layer has been developed which allows for a better tuned resistivity and thus a reduced charge up of the chip surface. Jan's plan to build an advanced InGrid module has not changed from last year, however, it is currently still difficult to procure the necessary resources at NIKHEF.

MPI: Ron is preparing the addendum of the MoA and is following closely the ILD optimization process, in particular as far as the TPC is concerned.

Rostock: Oliver is still alone and stays at DESY. He is working on his PhD. topic now, which is on high channel automation and he uses the slow control of the S-ALTRO as a case study. He is also maintaining an upgrading the current DOOCS system.

Saclay: Paul reported on the preparations of his next test beam from March 2<sup>nd</sup> to March 16<sup>th</sup>. Two new modules with a different resistive layer have been produced. The material, Japanese Black diamond, is better since it can be produced more uniform and the resistivity can be adjusted more precisely to a required value. Besides, the material is more robust and stable. There have been also some important improvements to the other 9 modules and now the problem of reduced connectivity and lost channels has been avoided. Test are ongoing at CERN, but a good set of 7 modules with close to 100 % efficiency should be available at the next test beam.

Saga/Japan: Akira summarized the Japanese activities: The first project is the GEM gate. Last year two samples have been tested: one with round holes showing an electron transparency of 75% in the open state and one with honeycomb holes showing an electron transparency of about 80 %. A simulation of the transparency was also done and some more details are under study. The next step is to produce a module size GEM gate. The second project is a laser tracking facility, where LP modules can be tested with a laser beam and field distortions between GEM sectors and modules can be studied. In parallel a student is studying the drift field distortions and possible correction for it. The third project is a study regarding the micro discharges observed during the test beam campaigns at DESY. For this, 3 different GEMs (from Scienergy, CERN-GEMs and GEMs of a Japanese company) are being compared with respect to their stability. So far, no differences have been found. The fourth project is a mechanical mockup of a module, where a different stretching and holding mechanism for the Japanese GEMs is tested. The current mechanism has too many parts and is too complicated. Finally also cooling is studied. For example the physical properties of TPG are being studied.

Siegen: Amir N. S. is working on the simulation and reconstruction of long tracks of the pixelized readout in MarlinTPC. He succeeded in simulating first muon tracks in a ILD-TPC and is now working on reconstructing them. Amir T. is studying a new type of GEM made of a ceramic material (a glass alumina material) and compares their performance with a standard GEM.

#### AOB:

The next workpackage meeting will take place on January 22<sup>nd</sup>.