

## Minutes of WP-meeting 326

### Attendance:

Vidyo: Yumi Aoki, Paul Colas, Ralf Diener, Ulrich Einhaus, Keisuke Fujii, Serguei Ganjour, Qi Huirong, Shivam Joshi, Jochen Kaminski, Peter Kluit, Uwe Krämer, Kees Ligtenberg, Paul Malek, Jurina Nakajima, Tomohisa Ogawa, Oliver Schäfer, Ron Settles, Jan Timmermans, Maxim Titov, Keita Yumino

### General News:

Maxim mentioned, that on May 5th there will be an online session where CERN Directorate will outline plans for the coming months, including the slow return to normal operation. The special session of the CERN Council devoted to the European Strategy Update, which was originally planned on May 25th in Budapest, will be video-only. It is possible that the Strategy announcement will follow the CERN Council session in June, but, we might also open the door to a new timeline for the finalization of the Strategy. No big event for the Strategy announcement is currently being foreseen.

Ralf added that the DESY directorate is also discussing the next steps, in particular if new rules for working at DESY can be introduced and more activities can be allowed. Most members of the FLC group are still in home office and only one, in large offices two persons are allowed.

Jochen mentioned, there were no changes in Bonn.

Huirong said, that the government of many cities including Beijing is decreasing the level 1 to level 2. Next week there will be 5 days of holiday (golden week holiday), then senior schools and restaurants will open. Senior schools and universities will reopen May 12th step by step. But Students are not allowed to travel to other cities. So, if they are not in the same city as the university, then they have to stay home to wait the update announcement. Next months it is planned that the situation will recover to normal. The another news is, that the ministry of research will have a fewer discount (15% or more money) in funding for some projects for 2020.

Peter described the intelligent lockdown of Nikhef: There are no absolute restrictions, but everyone is encouraged to stay at home, not to travel and take vacation if possible. However, in case of urgent needs, it is still possible to go on an official trips or to go to Nikhef in person. Schools and universities are all closed in the Netherlands, but primary schools will open on May 8<sup>th</sup>.

Paul mentioned that the last two weeks were mandatory vacations. The lockdown in France will end on May 11th, followed by 3 weeks of gradual return on site. For the first 3 weeks only 20 % of the staff is allowed to return, restricted to critical work. After three weeks 60 % of the staff will be allowed to be on site. Paul plans to return during the 3rd week.

Ron said all MPI members, he knows, are working from home.

Keisuke also mentioned, that next week will be the golden week. It is not clear how this will influence the number of infections, because a lot of people would be traveling in this period to visit their family. In the Iwate prefecture, there have been no infections so far, but possibly after that week this might change. At KEK everything is still in a low operation mode. SuperKEKB is still operating, but the

operation crew is reduced to a minimum. This is in contrast to JPARC and T2K, which are taking measures similar to those taken by the Atomic energy agency, which is following stricter rules. Therefore, JPARC machines are currently not in operation. Keisuke is still working from home.

#### News from the groups:

Peter presented new ideas on the gating. In a first simulation he studied the deformation problem which could be introduced by the gating GEM. Because of intrinsic field inhomogeneities at the border of each hole drifting electrons will be deviated from the original path by less than 20  $\mu\text{m}$  if the potential differences of the two electrodes is chosen within 0.1 V of the nominal potential and the average potential correct to 5-10 V. This can be achieved easily, but larger deviations would cause measurable effects. To improve the alignment, Peter has studied the effect of GridPix with double grid, where a second identical grid is mounted about 250 $\mu\text{m}$  to <1000 $\mu\text{m}$  above the amplification grid. An intermediate electrical field is applied to the gap. First estimates suggest, that the ion backflow can be reduced from 1.3 % of a standard GridPix detector down to  $10^{-4}$ , if the electrical fields are carefully adjusted and the hole diameters are shrunk to 20  $\mu\text{m}$ . The transparency is expected to stay the same. While this idea is interesting, but not essential for the ILC, it would be absolutely necessary for a TPC application at CEPC.

Uli showed his dE/dx-studies of the 250 GeV MC test production. He showed, that the intrinsic dE/dx resolution of all particles worsened and thus also the separation power between the particles. The probable causes for this are some changes in geant++ and they can be corrected for by adapting the fudge factor, which is always used to adapt the MC results to test beam data. However, Uli also showed that all of the particles have a different dE/dx resolution. Since this is not expected, he studied the  $\beta\gamma$ -dependence of the dE/dx resolution. Because of the magnetic field and the resulting curvature particles with momenta < 1 GeV have fewer track points and thus a worse dE/dx resolution. This rise at low momenta consequently happens at different values of  $\beta\gamma$  for each particle type. Above  $\beta\gamma = 10$ , however, the resolution of all heavy particles lie on a common, sloped line, with electrons also following this line above  $\beta\gamma > 2000$ . For this very large  $\beta\gamma$ , the slope converges to a constant value. For the usual measure of dE/dx, the curves were integrated above  $p > 1$  GeV, which corresponds to different parts of the sloped line in  $\beta\gamma$ , leading to different final values for the resolution for each particle type. To reflect test beam conditions, Uli has developed a set of cuts leading to a sample of tracks with sufficiently benign properties. This reduces the statistics significantly and he will ask that in the next test production a dedicated sample of electrons will be produced, so that the smearing factor can be determined more precisely and compared to test beam data. Additional types of particles would be welcome, but are not possible at the moment, as a hadronic test beam is available only at CERN.

Shivam explained the work he did in the last few months. He showed the formula for the charge spreading on a resistive foil, gave the values of the parameters and showed the signals on the individual pads in a resistive MM module. There are still some questions, which are not clear yet. For example only the central pad has a fast negative signal, while all neighbor pads have a fast positive signal and a small negative undershoot comes much later (several  $\mu\text{s}$ ). This seems to contradict the measurements and has to be studied in more detail.

#### AOB:

The next workpackage meeting will take place on May 14<sup>th</sup>.