

Minutes of WP-meeting 367

Attendance:

Zoom: Paul Colas, Ralf Diener, Ulrich Einhaus, Jochen Kaminski, Uwe Krämer, Paul Malek, Shinya Narita, Huirong Qi, Oliver Schäfer, Ron Settles, Jan Timmermans

General News:

Jochen brought up the Russian -Ukrainian war and asked, if LCTPC should also prepare a statement. It was generally felt, that LCTPC is too insignificant to do so and as most of us are part of ILD, this statement would express our opinion sufficiently. Besides, we have no active participation of Russian institutes (that is on the author list), so no immediate actions were deemed necessary.

Ron mentioned that during the ILD strategy discussion on Tuesday (<https://agenda.linearcollider.org/event/9623/>) Manqi Ruan reported on the CEPC and in particular mentioned explicitly, that a pixelTPC would be looked into. Huirong confirmed and added that the director of IHEP is promoting the pixelTPC for the CEPC and sees this as baseline choice. He also has promised funding to study a pixelTPC for an ILD-like detector at CEPC. The main difference here is, that the TPC also has to work in a $B = 2$ T field, when operated at the Z-peak. With a higher magnetic field the high luminosity could not be reached. There is also a 4th concept like detector with drift chambers proposed, where the dE/dx would be done by cluster counting in the time-domain.

There will be the three discussion in the close future to refer

Mar 22 ILD Strategy discussion Part II

<https://agenda.linearcollider.org/event/9624/>

Apr 05 ILD Strategy discussion Part III

<https://agenda.linearcollider.org/event/9625/>

Apr 19 ILD Strategy discussion Part IV (tentative)

<https://agenda.linearcollider.org/event/9626/>

Jochen added, that we should also study, if a TPC could not be used at the FCC-ee.

During the kick-off meeting of the ILD strategy task force on Wednesday it was pointed out, that we should be careful about the message we are inevitably giving, by discussing other Higgs-factories. It might be interpreted that we are moving away from ILC and this could be fatal, even though there are still good hopes to realize it.

There will be an ILD technical board meeting on Friday.

News from the groups:

Jan reported on an observation during the data analysis of the last pixel test beam. It was observed that there is a time jitter of about 7ns corresponding to a drift distance jitter of 400-500 μm when the track position of the external silicon tracker (2x3 Mimosas planes) and the 8 quad detector of Nikhef is compared. It is not clear yet, where this jitter comes from. The most likely candidate is the trigger scintillator itself. Jan had observed already during the test beam, that the efficiency is rather low (report on 7.10.2021). It seems that either the scintillators or the PMTs have degraded. The best two scintillator/PMTs have an efficiency of 50 % each, resulting in an efficiency of 30 % when in coincidence. The low light yield of a few photons might therefore result in a jitter since the passing of the threshold depends on the arrival of individual photons. Besides, the scintillators are 75 cm apart,

which corresponds to a delay of 2.5 ns of the second scintillator. The analog signals are converted into digital signals directly in the NIM crate next to the scintillators. The TTL signal is then taken over a long LEMO cable to both the AIDA TLU and the SPIDR readout system. The long cable might add to the jitter as high frequencies of the signal might be damped. The next steps of studying this were discussed. Uwe will help Jan to find out, if the trigger time is stored in the TLU data stream, so a SPIDR-independent verification can be made. If this also shows a jitter, Oliver will do some tests with the scintillators + e⁻-beam + oscilloscope to check if this is really because of the scintillators.

Paul C. mentioned, that during the data analysis of the T2K data from last year's test beam a shift of the reconstructed detector position with regard to its believed position was observed. Possible origins of the apparent shift were discussed. A likely candidate is the inhomogeneity of the magnetic field. Jan observed that the magnetic field is quite inhomogeneous, for example in the middle plane of the magnet the field varies between 0.9814 T in the center and 0.9960 T close to the coils (at the outside active radius of the LP). This effect is even stronger close to the magnet ends. Since the T2K field cage was 1 m long, the endcap was not completely inside PCMAG. It was recommended to take the magnetic field map into account during the reconstruction and analysis and see, if the effect still is visible. Klaus Zenker had done this before for the GEM analysis and had observed better results with the field map, but at his time the polarity of the current power supply was still opposite. It is not clear, with which polarity the field map was generated (probably the old one) and if this has an effect on the field map.

Paul M. said he is concentrating on preparing the JINST paper for publication. There are only a few questions left to be discussed internally, then the paper will be sent back to the editorial board.

AOB:

The next workpackage meeting will take place on March 17th.