

DRAFT Minutes of the CLIC project meeting of 30.09.2015

The program and slides can be found at: <http://indico.cern.ch/event/379765/>

Phil starts the meeting explaining he is replacing **Steinar** who has had a family emergency. **Frank** has also sent apologies as he is teaching at the CERN Accelerator School.

Minutes of the previous Project Meeting (9 June) are shown. Any comments or modifications can be sent to **Phil** or to **Alexia**.

1- News and Updates

Phil explains that, as expected, resources at CERN have been cut for all projects. For the CLIC study, the reduction has been implemented as a shortening of the study by around one year. In 2018-2019, a choice will have to be made between CLIC and FCC, reason why there is actually only one single line in the CERN budget.

The CERN's management should however take into account many commitments related to Xband structure and testing plus the end of CTF3.

Phil reminds the goals to be achieved in 2018 which is mainly providing the most complete documentation on the CLIC study (a summary project plan and a preparation phase plan documents for the period 2019-2025, a comprehensive documentation on Physics and Detectors, the update of the actual database, etc.)

Phil informs that a review of the CLIC study has been requested by the CERN's Director for Accelerators and Technology. The aim of this review is to assess the current status of the study and in particular provide recommendations on the targets to be achieved that will be instrumental for the next European Strategy Update of 2019. The review will concentrate on the CLIC accelerator programme. It will be lead by Maurizio Vretenar. The agenda is shown on the slides.

Phil also reminds the date of the next Linear Collider School (Whistler, 26 October – 6 November) and of the International Linear Collider Workshop (Whistler, 2-6 November).

The CLIC workshop 2016 had to be moved to **18-22 January 2016**. Registration will open soon.

2- Test-stands and structure programme - Status and plans

Walter presents an overview of the X-band structure development and testing program. The various aspects include: status of the CERN-based XBox test stands, the structures currently under test and objectives for the future program. Highlights include the on-going successful test of a structure built in halves and installation and commissioning progress in XBox-3.

3- Helsinki status and plans

Kenneth presents the status of the experimental activities at Helsinki Institute of Physics. The dynamic vacuum meter (DVM) development aims at measuring the pressure change from copper outgassing inside the CLIC accelerating structures (AS). A dedicated DVM setup has been made in Helsinki and a first calibration for the 10^{-5} – 10^{-4} mbar range has been obtained. An improved calibration using laser ablation is currently being built. The next step is to install the system at one of the DC-spark systems at CERN. A development of a setup to characterize non-destructively the AS internal stack geometry with μm precision using Fourier Domain Short Coherence Interferometry (FDSCI) is also pursued. The precision of the FDSCI method has been verified on high-precision machined Cu disc with steps using a dedicated setup. Using a calibration based on thickness standards and coverslips, a precision better than $3 \mu\text{m}$ has been obtained but the measurement range is limited to $250 \mu\text{m}$. Currently the setup is being modified to have the 10 mm measurement range needed for measuring the AS internal geometry while retaining the same precision.

4- DC system review

Walter presents a summary of the CERN dc pulsed high-voltage system. This system has two main objectives: to complement the high-gradient rf program with simpler, faster and less expensive testing capability and to support the fundamental studies of high-gradient phenomena. The details of the system and results which demonstrate the similarity between rf and dc tests were described. Ongoing theoretical work on high gradients at collaborating institutes were described as well.

5- ATF2 status and plans

Rogelio mentions that ATF2 has achieved record low beam sizes of 40nm in 2014. During 2015 it was difficult to recover the stable operation with 40nm and beam sizes above 50nm were more usual.

ATF2 is planning to operate for longer periods in 2016 with the following priorities:

- recovering 40nm
- solving the beam size dependence on intensity
- 2nm orbit stability

The ATF2 operational budget is ensured until 2018, however lack of spares threatens normal operation. A CERN contribution would be highly appreciated.

Rogelio reminds that CLIC dedicated R&D in ATF2 consists of:

- Ultra-low beta* with 2 new octupoles
- Active Ground Motion feed-forward on orbit
- Wakefield free steering.

CERN is making a large effort to push the ATF2 beam size down to 20nm with the aid of new octupoles to be assembled in the CERN magnet group and shipped to KEK in spring 2016. This experiment will allow demonstrating the feasibility of Final Focus systems with a chromaticity level close to CLIC (larger than ILC)

but also to test considerably smaller beam sizes, closer to the values of future linear colliders.

The active GM feedforward is a critical assumption on the CLIC project baseline which will largely benefit from the experimental demonstration of the feasibility of the concept with current technology. This approach is considerably less expensive than large stabilization devices over long distances. We hope to see first positive results of a very simple set-up in December 2015. More complex set-ups with larger potential in suppressing beam orbit jitter will be tested until 2018.

First tests of DFS and WFS were already done in ATF2 showing that the tools and the algorithms are suitable for ATF2 but excluding the FF section and not regarding the IP beam size. Further studies will continue to push this technique hoping to shed light into the "beam size versus intensity dependence" problem.

6- CALIFES plan update

Phil reminds that CTF3 has been operating since 2006 and has been demonstrating the key elements of the CLIC approach: stable two-beam acceleration via high-gradient (100 MV/m) copper X-band accelerating structures. It is one of the few electron test facilities worldwide available for advanced R&D and would be needed by many collaborators beyond CLIC.

For the moment at CERN, there is no overall CERN strategy for LC and electron-accelerator R&D beyond 2018, however there is a clear need to secure continuity of CERN expertise in this field beyond the timescales mentioned above.

This is the reason why a proposal has been sent to the CERN's management to adapt CALIFES linac to serve as user facility beyond 2017, capitalizing on the existing CTF3 investment and infrastructure. Three primary R&D areas linked to existing and possible future accelerators at CERN are identified (High-gradient energy-frontier R&D: Beam tests of next-generation high-gradient, Beam instrumentation tests and Impedance studies) but the facility can support European accelerator R&D in three other key areas (Plasma wakefield, FEL Linac studies, training).

Phil mentions that resources have been estimated but would remain acceptable as most of the material for a CALIFES facility is available from CTF3

An answer from CERN's management is the next step before going on with a more solid proposal that would be included in the 2016 MTP

7- AOB

Phil reminds that the next Project Meeting will be on **Tuesday 1st December** (morning) and will be followed by a CLIC Christmas drink.