CERN – European Organization for Nuclear Research
European Laboratory for Particle Physics

CLIC Note 497

A REPORT OF THE ACTIVITIES OF THE CLIC STUDY TEAM
FOR THE YEAR 2000

Compiled by I. Wilson for the CLIC study team

Geneva, Switzerland
12 July 2001

A report of the activities of the CLIC Study Team for the year 2000

(Compiled by I. Wilson for the CLIC study team)

The progress made during the year 2000 on either the design, the development or the testing of the various sub-systems of the Compact Linear Collider (CLIC) is described as follows.

For the production of positrons, simulations of peak energy densities in the target have shown that the surface and volume energy densities are factors 4 and 1.5 respectively higher than experimental limits found at SLAC. A new tracking code has been developed from the KEK code that was used to design the B-factory positron source. An exact phase space distribution of the final state has been obtained together with a good estimation of the positron yield. At the exit of the capture section (at 200 MeV), the normalised positron yield was found to be 0.3 e^+ per e^- and per GeV (note however that space charge, wake fields and beam loading were not included in this simulation).

A conventional damping ring optics for the 3 TeV parameters was designed using TME (Theoretical Minimum Emittance) arc lattices and established optimisation algorithms. It was shown for this design that the intra-beam scattering growth rate was orders of magnitude higher than the synchrotron radiation damping (the same conclusion holds for the 1 TeV damping rings). In addition two new types of instabilities have been investigated and found to impose severe limitations on the present design. The estimated growth time for the fast beam-ion instability was calculated to be about 0.6 turns at 1 nTorr, the corresponding number for the electron-cloud instability was found to be 14 turns. In the light of the above findings, the design strategy was changed, and a ring with a much larger circumference (LEP-size) is being studied. In such a ring, radiation damping, intrabeam scattering and quantum excitation would occur almost exclusively in the long wiggler sections.

Keeping the rise time of the fast beam-ion instability in the long transfer lines which transport the particles from the damping rings at an acceptable value fixed the vacuum level in these lines at 10^{-9} - 10^{-10} Torr.

In the various sub-systems of the drive-beam-generation complex, the ability to either increase or decrease the bunch length is very desirable. An increased bunch length in the isochronous rings and transfer lines for example reduces coherent-synchrotron-radiation effects, whereas a shorter bunch after the rings maximises RF power production. These bunch length changes can be made using magnetic insertions with R_{56} parameters which can be varied over a given range. This capability increases the operational flexibility of the complex. A design has been developed, starting from the existing isochronous insertion, that can generate either a negative or a positive R_{56} only by changing the strength of the quadrupoles. The main design parameters and conditions such as the focal lengths in the thin lens approximation, the necessary conditions on the minimum and maximum values of R_{56}, and on the lengths of the drift spaces, are described by algebraic expressions.

In the main linac, the control of the bunch-to-bunch energy spread requires a compensation of beam loading effects. A new method has been developed for this, it consists of generating a ramp in the RF output of the Power Extraction and Transfer Structures (PETS) by modifying the time structure of the drive beam. This is done by delaying and irregularly distributing the switching times of the even and odd bunch trains in the drive-beam accelerator. The result is that the final combined bunch train pulse has a modulated distribution of bunches whose density is lower at the head of the pulse and grows towards a constant value in the core. This corresponds to a current ramp which in turn produces a ramp in the PETS power output. Using this technique, a full bunch-to-bunch energy spread of less than 5 10^{-4} is obtained, this is well below the target value of 0.1 %, given by the energy acceptance of the final focus.

Most of the effort on main linac structure development this year has been devoted to identifying and understanding high gradient performance limitations. This effort has been motivated by the discovery of surface damage in prototype 30 GHz accelerating sections previously tested in the CTF, by reports of similar problems encountered at X-band by the NLC study and by recalculation of the pulsed surface heating. The experimental part of this effort has been to try to understand the signatures of breakdown, determine the physical process involved in breakdown, determine the important parameters that affect breakdown level (surface field level, pulse length, vacuum level etc.) and to try to achieve performance records. The theoretical part of the effort has been to develop a full understanding of the options available to optimise the structure based on criteria determined by experiment. The effort has involved extensive use of the program HFSS and has been applied to both the periodic part of the structure and the power couplers. The study of slotted-iris structures has resumed, with the objective of producing a structure that is more favourable than the TDS for pulsed surface heating. Such a structure however has over-voltages on edges of the coupling slots - these have been calculated to be of the order of 20%.

A formal collaboration with the Joint Institute for Nuclear Research in Dubna has been set up to make dedicated pulsed surface-heating experiments. They are able to supply 30.7 GHz, 20 MW, 200 ns long pulses using an induction-linac-driven FEL. This will allow pulsed-surface-heating experiments in single-cell cavities.

CLIC main-linac beam-position-monitor (BPM) work has also resumed, but now with the objective of extracting position signals directly from accelerating structures. The first step has been to recalculate the performance of resonant cavity BPMs, both analytically and using HFSS. Beam position scans have been made in CTF2 on both a cavity BPM and a constant-impedance accelerating structure.

As far as the drive-beam decelerator is concerned, the effect on beam stability of the transverse wake-field of a four-wave-guide Power Extraction and Transfer Structures (PETS) has been further investigated. The frequency dependence of the dipole mode on initial jitter amplification at the end of the drive beam decelerator has been calculated for a four-sigma beam and a one-sigma initial off-set. The results show that a deviation in frequency from the fundamental mode value of 2 % generates an important, not symmetric increase of the amplification factor which on one side of the minimum is 3, and on the other side of the minimum is 10-100. The beam envelope obtained after trajectory correction almost fills the aperture at the low-energy end. One possible remedy for this is to increase the length of the decelerator, with a proportional increase of the initial and final energies. An increase by a factor 2 reduces the 4-sigma envelope of the beam by about 1.6. Another possible remedy is to improve the correction algorithm. Similar simulations with a six wave-guide PETS structure showed the beam to be significantly more stable. The use of the newly-developed computer program GDFDL to make direct time domain computations of full-length PETS has improved the understanding of these structures. The new computations have however uncovered some low-frequency trapped modes.

Fabrication studies have advanced with the initiation of the manufacture of a 1 meter long 4-waveguide diamond-milled PETS (to date all the machining has been completed). Using this structure, power levels above 200 MW for 10 ns long pulses are expected in the CTF.

At the interaction point, the vertical spot-size increase due to synchrotron radiation in the detector solenoid field and its associated fringe field has been shown to be significant. This sets a tight upper bound on the maximum possible beam crossing angle. For a 4-T solenoid field this limit is about 20 mrad (total) - this is, out of interest, the same value that was found for the minimum angle required to avoid other problems such as the kink instability.

A number of short final-focus systems with non-zero dispersion across the final doublet were studied for CLIC at 3 TeV. Unfortunately, all draft optics created so-far fell far short of the desired luminosity. A collaboration has been set up with the University of Valencia to try to improve this performance. Analytical approaches for even shorter final focus systems were explored, and specifications were drawn up for a system based on microwave quadrupoles.

It has been shown that, by evaluating the combined effect of ionisation heating and image currents at three or four locations in the final focus, the spoilers can survive the full impact of an undiluted beam, provided they are made from the proper material (carbon or beryllium). In reality however it is likely that the beam becomes diluted before impacting the spoilers. Simulations have been made assuming well-defined failure modes in the linac to quantify the resulting emittance growth. It was shown that the emittance in some cases blows up by several orders of magnitude. Ultimately this will determine the minimum beta functions required at the collimators. Expressions for collimator wake fields were compiled and programs for studying scattering off residual gas or thermal photons incorporated. A collaboration with DESY Zeuthen, using software tools developed for TESLA, has evaluated the muon generation and propagation in the CLIC beam delivery.

The LHC magnet group has produced first ideas of possible design and layout options for the final focus quadrupoles.

For the gamma-gamma collider option, studies are continuing using ball-park parameters to identify potential problems.

A fast intra-pulse feedback system has been proposed to reduce the luminosity loss due to vertical offsets of the beam centres at the Interaction Point (IP). The position feedback system consists of a deflector and a beam position monitor located very close to each other (~ 1m) on the same side of the IP but in different beam lines. The correction is applied to the incoming bunch train based on a signal produced by the outgoing bunch train beam. Simulations of this system have shown that for small coherent offsets (of about one beam-size sigma) of the bunch trains, the luminosity loss is reduced by a factor 3. For larger offsets (10 nm at E_{cm} = 1 TeV), 50 % of the nominal peak luminosity is recovered.

The vertical position jitter tolerances on the main linac and final-focus quadrupoles are very tight, they are typically 1-2 nm and 0.3 nm respectively for a 2% luminosity loss. A study group has been created to investigate the technical feasibility of stabilising these elements to these levels. This group is working in collaboration with other laboratories including SLAC and a comprehensive R&D program has been launched at CERN.

The scope of CLIC activities has been widened this year to include studies of some of the technical issues relating to services such as civil engineering, electrical power distribution, cooling and ventilation. For this purpose working groups have been created in the ST and EST divisions. The Site working group is studying the geological, hydro-geological and geo-technical constraints of possible sites in the Geneva region. Maps have been prepared that show the molasse/limestone interface, the various underground valleys, the faults and the water-table levels. Two possible sites have been identified with the CLIC-IP located in the one case in the ‘Prévessin’ (CERN North area) and in the other case at ‘Point 6’ (with reference to LEP). In both cases the injection complex is in the North area. The elevation of the tunnels is around 320 to 335 m which implies pit depths of about 110 m. A first look at the electrical power required and its likely distribution confirm that from the power point of view the proposed layout is technically feasible.

The first run of CTF2 in 2000 started with a completely re-arranged laser. This was necessary to increase the margin between the nominal working point and the optical damage threshold, and required a new configuration of the power amplifiers, the pulse compressor and the spatial filtering of the laser beam. The laser can now be operated at the nominal infrared energy without major damage to the most sensitive elements.

Four caesium telluride photo-cathodes were produced for CTF2 running in 2000. One of them was destroyed by accident, the three others together enabled CTF2 to operate for 1000 hours. There are first signs that a gold undercoating gives a better photo-cathode lifetime but this has to be verified because the working conditions in 2000 were less severe than in previous years. The manufacture of the preparation chamber for the production of caesium telluride photo-cathodes in-situ for the CTF2/CTF3 probe beam has continued as foreseen.

During the year 2000 no major modifications were made to the 3GHz part of CTF2. The modulators and klystrons, RF guns and 3 GHz travelling wave structures worked very reliably. This together with modifications of the laser system, an improved laser tune-up procedure, and an increase of the photo-cathode lifetime in the RF gun, resulted in an operation which was much more stable and efficient than in past years. A new, VME based, DAQ system for the streak camera was successfully put into operation – this replaced the obsolete PC-based system.

After the successful test of a string of four 30 GHz accelerating modules in 1999 the RF equipment in modules #2-#4 was dismounted and module #1 was converted into a 30 GHz high-power test-stand. For this conversion the 1m long power extraction structure (CTS-L), which had been first tested in December 1999, was further improved and installed in the drive beam line of the first module. For improved beam focusing a spare solenoid from LIL was mounted around the CTS-L. During the year the CTS-L served as 30 GHz power source for all accelerating structure tests. It reliably delivered up to

150 MW. However, when the focusing field of the solenoid was applied a shortening of the RF output pulse together with an increase of the vacuum level was observed. The most probable explanation for this phenomenon is multipactor in the CTS-L.

The vacuum system and the instrumentation for the 30 GHz accelerating structure tests in module #1 was very much improved. Pumping and vacuum gauges are now installed upstream and downstream of the CLIC accelerating structure (CAS), in the feeding waveguide, and on the pumping chamber of the CAS itself. With the now routinely-applied bake-out at 150^{O} C, static vacuum levels in the 10^{-9} - 10^{-8} mbar range are obtained. Wall current monitors (WCM) installed upstream and downstream of the CAS allow the measurement of dark current and of break-down-related charge bursts. These WCM signals are now the primary guide for the conditioning process. With two WCM's on both sides and by applying time of flight techniques the energy of the electrons constituting these charge bursts is determined. Light emitted by the CAS structures during RF breakdowns into the beam pipe is detected with a fast photo-multiplier and first tests have been performed to measure mechanical vibrations of the CAS with accelerometers. An attempt to measure X-rays produced by dark current and/or RF breakdowns failed due to the strong X-ray background produced by beam halo losses of the nearby drive beam.

Three different structures have been tested. Two are disk-loaded waveguides of 28.5 cm active length and constant impedance. The main difference between these two CAS structures is the coupler design, in one case it is the standard CTF one-port design, and in the other it is a prototype two-port design. The third structure was a 12.3 cm long planar structure build at the Technische Universität of Berlin/Germany. The single-port disk-loaded structure was breakdown limited at a mean accelerating gradient of 60 MV/m corresponding to a peak surface field of 265 MV/m, the two port structure reached a mean accelerating gradient of 70 MV/m corresponding to a peak surface field of 266 MV/m. Both structures have the maximum surface field on the iris between the coupling cell and the first regular accelerating cell. Post mortem inspection of both structures showed damaged surfaces only at this location. The planar structure reached an accelerating gradient of 50 MV/m. The peak surface field for this structure remains to be calculated. Post mortem inspection showed slight damage in the coupler region for this structure as well. All field values quoted are measured for 15 ns pulse lengths, higher values have been reached for shorter pulses.

Thanks to various refinements in the measurement apparatus and in the calibration techniques an agreement (within 1%) is now routinely achieved between the measured probe beam acceleration and the acceleration predicted by the 30 GHz RF power measurement. A large quantity of data has been collected to characterise the RF break-down process. One important observation is that RF breakdowns in the CTF2 parameter range (5-16 ns) result in little or no reflected power (contrary to what is found in more conventional RF cavities), but they do produce intense electron bursts at both ends of the structure. The intensity of these bursts is strongly correlated with a reduction of the RF power transmitted through the structure. Another particular fascinating feature which has been observed when RF breakdowns occur, is the emission of light pulses with duration times of hundreds of nanoseconds (much longer than the RF pulse itself) - the hypothesis is that the light is emitted by copper vapour.

Testing of a beam powered single cell cavity in the drive beam line gave maximum surface fields without breakdown of 380 MV/m. Remarkably this value remained constant even when the cavity was cooled to 77 °K and heated to 570 °K.

The studies on coherent synchrotron radiation (CSR) effects in magnetic bunch compressors have been continued. The analysis of the 1999 data has been completed and published. New experiments to measure the dependence of the emittance growth on the horizontal beam β-function have been performed and are presently being analysed. The design of a new CSR experiment to measure CSR shielding by the vacuum chamber has been completed and the fabrication of the necessary components is underway. The 4 new dipole magnets needed for this experiment have been designed such that they can be re-used later in the CTF3injector.

The CTF2 active-alignment system has demonstrated that it can hold the components in the two beam lines of the 30 GHz part of the accelerator within a window of a few microns. The performance however was found to be perturbed when the drive beam was on – there was some beam-induced position read-out corruption. This problem was solved by improving the timing and gating of the electronics.

A large part of the CLIC effort this year has been devoted to CTF3. The preliminary phase has been completely defined such that work on the modifications to the LPI complex can start in April 2001 when it becomes available. Considerable progress has also been made with development program for the later phases.

The main goal of the preliminary phase is to demonstrate the scheme of electron pulse compression and bunch frequency multiplication at low bunch charge, using injection by RF deflectors into an isochronous ring. The charge limitation is imposed by the use of the present LIL accelerating structures. Since the LIL thermionic gun is not adapted to CTF3 requirements, a new gun will be installed. This gun is presently being built by the LAL laboratory under a collaboration agreement, and closely resembles the design used for the CLIO machine. The fabrication is well advanced and on schedule for installation in June 2001.

The linac will have new optics and will be shortened to eight accelerating sections. The new optics and the modified design layout are finished. The modifications to the present EPA ring to make the lattice isochronous with a dispersion free injection region have been defined. A solution for the optics of the transfer lines has been developed, and detailed drawings of the new layout have been prepared.

During the year, several LPI machine development sessions have been organised to gather important information for the foreseen modifications, and to plan for the commissioning of the new machine. This included measurements of lattice parameters of LIL, beam emittances, bunch lengths, the EPA circumference, ring isochronicity and testing the modelling of the linac.

Preparations for the later phases of CTF3 are underway. A new front end will be required, consisting of a high-current gun operating at a voltage of 140 kV, prebuncher, sub-harmonic buncher, and a travelling wave buncher. For the gun an existing diode assembly is being modified by SLAC to fit the CTF3 requirements and work has started at LAL on the gun electronics and the high voltage deck. LAL has also started the design work for the prebunchers. SLAC is responsible for the optical layout of the injector. This work is well advanced, and will soon enable the final parameters of the buncher to be fixed. At CERN the RF design of a 20-cell travelling wave buncher has started.

Studies of the feasibility of a laser for an eventual photo-injector for the drive beam of CTF3 (and eventually also for CLIC) have given very encouraging results. These studies, led by the Central Laser Facility at the Rutherford Appleton Laboratory (RAL), have shown that such a laser is feasible with the technology available today. This study will therefore continue with further tests foreseen in collaboration with RAL and the Institute of Photonics at the University of Strathclyde (GB).

The credibility of the photo-injector option for CTF3/CLIC also requires a demonstration that a photo-cathode is able to deliver not only the necessary charge per pulse, but also the mean current. First test results are promising since the specifications of charge and mean current for CTF3 have been largely exceeded. The requirements for CLIC remain to be demonstrated.

The existing LIL drive-beam accelerating structures will be replaced by new structures that are capable of accelerating a high bunch charge. Two types of structure are being considered. The first is a Tapered Damped Structure (TDS) which is based on the design of the CLIC main linac accelerating structure and a full size prototype of this structure has been successfully tested with RF power up to 50 MW. The second is a Slotted-Iris Constant-Aperture (SICA) structure. Computer simulations of this structure predict a very good performance and prototype work has started. The final choice of structure will be decided later. As far as the optics of the new linac is concerned, the design will be based on triplet focussing.

The drive-beam accelerator will be powered by LIL klystrons and will use a pulse compression system. This system has to produce longer RF pulses than the existing LIPS pulse with a flat top in both amplitude and phase. A scheme to achieve this which uses a pre-programmed RF phase variation has been developed and tests with RF power have started. The Barrel Open Cavity (BOC) system which uses only one cavity for storing RF power is being studied as a very promising alternative to the twin-cavity system of LIPS. A prototype model of this system has been built and tested with low power RF.

Full technical responsibility for the delay loop, the combiner ring, the transfer lines and bunch compressors has been given to INFN/Frascati. This responsibility includes the basic design and the associated hardware. The optical layout of the combiner ring is well advanced, the design of the delay loop has started. On the hardware side a model of a strip line kicker has been built, and studies concerning the RF deflectors and magnetic chicanes are progressing.

The use of the CTF3 combiner ring to study coherent synchrotron radiation effects would bring a bonus to the CTF3 test program. This however would require a tunable R_{56} because for normal operation coherent synchrotron radiation effects are reduced as much as possible by having a relatively long bunch. The same variable R_{56} magnetic insertions that were described previously for the CLIC drive-beam generation scheme are foreseen to be installed in CTF3 in the transfer line between the Delay Loop and the Combiner Ring, this will allow the bunch to be a stretched or compressed by about 1.6 mm.

A new timing system for CTF3 is being developed with new functions and the development of prototype equipment is underway.

Some preliminary RF design work on a 30 GHz power generating structure PETS for CTF3 has started.

Some modifications will have to be made to the existing LPI buildings for CTF3. The associated civil engineering work is being planned and studies of the required shielding are going well.

CERN is collaborating with SLAC, INFN/LNF and IN2P3/LAL for the design, construction and commissioning of CTF3. Three collaboration meetings with the main participating institutions have been organised at CERN during the year - two of the meetings with LAL and SLAC focussed on the injector complex, and the third with INFN Frascati covered the delay loop, transfer lines and the combiner ring.

CLIC Notes

A list of all CLIC Notes published in 2000 is attached.

See also http://cern.web.cern.ch/CERN/Divisions/PS/CLIC/Publications/2000.html

Acknowledgement.

In writing this summary, the contributions from the following people are gratefully acknowledged :
H.Braun, R.Corsini, G.Guignard, G.Geschonke, L.Rinolfi, F.Ruggiero G.Suberlucq, L.Thorndahl, W.Wuensch, F.Zimmermann.

EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

12 July 2001

CLIC Notes

CLIC-Note- 427
1999 Activities Report for the CLIC Study
I. Wilson (for the CLIC Study Group)

CLIC-Note- 428
Spectral Response of Cesium Telluride and Rubidium Telluride Photocathodes for the Production of Highly Charged Electron Bunches.
H. Trautner
PhD. Thesis

CLIC-Note- 429 PS/RF Note 2000-006
Simulations of Beam Dynamics in the CTF2 Drive Beam Accelerator and Bunch Compressor
M. Chanudet-Cayla

CLIC-Note- 430
Wake Fields in HCS Accelerator and CTS Power Line of the CLIC Test Facility (CTFII): Simulation with Program Wake
A. Riche

CLIC-Note- 431
Delayed RF Breakdown in a Microwave Cavity
G. Geschonke, W. Schnell

CLIC-Note- 432
Effect of RF-Phase Jitter on the Main-Beam Emittance in CLIC
D. Schulte

CLIC-Note- 433
Proceedings of the Fourth CTF3 Collaboration Meeting held at CERN, 2-3 May 2000
Edited by L. Rinolfi

CLIC-Note- 434
Pulse Shaping and Beam-Loading Compensation with the Delay Loop
D. Schulte

CLIC-Note- 435 CERN-PS-2000-014
A Klystron-Modulator RF Power System for the CLIC Drive-Beam Accelerators
A. Beunas, P. Pearce
24th International Power Modulator Symposium, Norfolk, Virginia, June 26-30, 2000

CLIC-Note- 436 CERN/PS/2000-027 (AE)

Tunable Achromats and Clic Applications

E.T. D'Amico, G. Guignard

7th European Particle Accelerator Conference, 26-30 June 2000, Vienna, Austria

CLIC-Note- 437 CERN/PS 2000-028 (AE)

PLACET: A Program to Simulate Drive Beams

D. Schulte

7th European Particle Accelerator Conference, 26-30 June 2000, Vienna, Austria

CLIC-Note- 438 CERN/PS 2000-034 (AE)

Emittance Growth and Energy Loss due to Coherent Synchrotron Radiation in the Bunch Compressor of the CLIC Test Facility

H.H. Braun, R. Corsini, L. Groening, F. Zhou, CERN, Geneva, Switzerland
A. Kabel, T. Raubenheimer, SLAC, Menlo Park, CA 94025, USA
R. Li, TJNAL, Newport News, VA 23606, USA
T. Limberg, DESY Hamburg, Germany

7th European Particle Accelerator Conference, 26-30 June 2000, Vienna, Austria

CLIC-Note- 439 CERN/PS 2000-037 (LP)

Fundamental Design Principles of Linear Collider Damping Rings with an Application to CLIC

J.P. Potier, T. Risselada

7th European Particle Accelerator Conference, 26-30 June 2000, Vienna, Austria

CLIC-Note- 440 CERN/PS 2000-033 (AE)

Isochronous Optics and Related Measurement in EPA

R. Corsini, J.P. Potier, L. Rinolfi, T. Risselada

7th European Particle Accelerator Conference, 26-30 June 2000, Vienna, Austria

CLIC-Note- 441 CERN/PS 2000-030 (AE)

Experimental Results and Technical Results and Development at CTFII

H.H. Braun

7th European Particle Accelerator Conference, 26-30 June 2000, Vienna, Austria

CLIC-Note- 442 CERN/PS 2000-043 (RF)

Simulations of the Damping of the Power Extraction and Transfer Structure (PETS)

M. Luong, I. Syratchev

7th European Particle Accelerator Conference, 26-30 June 2000, Vienna, Austria

CLIC-Note- 443 CERN/PS 2000-044 (RF)

An Asset Test of the CLIC Accelerating Structure

C. Adolphsen, C. Archard, M. Dehler, E. Jensen, M. Luong , D. McCormick, M. Ross, T. Slaton, W. Wuensch, I. Wilson

7th European Particle Accelerator Conference, 26-30 June 2000, Vienna, Austria

CLIC-Note- 444 CERN/PS 2000-045 (RF)

A Very High Gradient Test of a 30 GHz Single Cell Resonant Cavity

H. Braun, M. Luong, I. Wilson, W. Wuensch

7th European Particle Accelerator Conference, 26-30 June 2000, Vienna, Austria

CLIC-Note- 445 CERN/PS 2000-042 (PP)

Simulationof the CTF Drive BeamLine and Comparison with the Experiment

R. Bossart, H.H. Braun, M. Chanudet-Cayla, G. Guignard, J.A. Riche, M.Valentini

7th European Particle Accelerator Conference, 26-30 June 2000, Vienna, Austria

CLIC-Note- 446 CERN-SL-2000-057 (AP)

Final-Focus System for CLIC at 3 TeV

R. Assmann, G. Guignard, O. Napoly, D. Schulte, F. Zimmermann,

7th European Particle Accelerator Conference, 26-30 June 2000, Vienna, Austria

CLIC-Note- 447 CERN-SL-2000-058 (AP)

Design Status of the CLIC 3-TeV Beam Delivery System and Damping Rings

R. Assmann, H. Burkhardt, S. Fartoukh, J.B. Jeanneret, J.M. Jowett, A.H. Owen, O. Napoly , F. Ruggiero, D. Schulte, A. Verdier, L. Vos, E. Wildner, F. Zimmermann (CERN),

7th European Particle Accelerator Conference, 26-30 June 2000, Vienna, Austria

CLIC-Note- 448 CERN - SL-2000 - 059 (OP)

Stabilities Considerations for Final Focus Systems of Future Linear Colliders

R. Assmann, B. Jeanneret, A. Verdier, L. Vos, E. Wildner, F. Zimmermann
R. Brinkmann, C. Montag, I. Reyzl, N. Walker - DESY, Germany
C. Adolphsen, J. Frisch, N. Phinney, T. Raubenheimer, A. Seryi, P. Tenenbaum - SLAC, USA

7th European Particle Accelerator Conference, 26-30 June 2000, Vienna, Austria

CLIC-Note- 449 CERN/PS 2000-046 (PP)

Production and Studies of Photocathodes for High Intensity Electron Beams

E. Chevallay, S. Hutchins, P. Legros, G. Suberlucq, H. Trautner

XX International Linac Conference, 21-25 August 2000, Monterey, California, USA

CLIC-Note- 450 CERN/PS 2000-047 (RF)

CLIC - A Two-Beam Multi-TeV e± Linear Collider

J.P. Delahaye and I. Wilson for the CLIC study team: R. Assmann, F. Becker, R. Bossart, H. Braun, H. Burkhardt, G. Carron, W. Coosemans, R. Corsini, E. D'Amico, S. Doebert, S. Fartoukh, A. Ferrari, G. Geschonke, J.C. Godot, L. Groening, G. Guignard, S. Hutchins, B. Jeanneret, E. Jensen, J. Jowett, T. Kamitani, A. Millich, P. Pearce, F. Perriollat, R. Pittin, J.P. Potier, A. Riche, L. Rinolfi, T. Risselada, P. Royer, F. Ruggiero, D. Schulte, G. Suberlucq, I. Syratchev, L. Thorndahl, H. Trautner, A. Verdier, W. Wuensch, F. Zhou, F. Zimmermann, CERN, Geneva, Switzerland, O. Napoly , Saclay, France

XX International Linac Conference, 21-25 August 2000, Monterey, California, USA

CLIC-Note- 451 CERN/PS 2000-048 (RF)

Design of a 3 GHz Accelerator Structure for the CLIC Test Facility (CTF3) Drive Beam

G. Carron, E. Jensen, M. Luong, A. Millich, E. Rugo, I. Syratchev, L. Thorndahl

XX International Linac Conference, 21-25 August 2000, Monterey, California, USA

CLIC-Note- 452 CERN/PS 2000-049 (AE)

Beam Dynamics Simulations for the CTF3 Drive Beam Accelerator

D. Schulte

XX International Linac Conference, 21-25 August 2000, Monterey, California, USA

CLIC-Note- 453 CERN/PS 2000-050 (AE)

Beam Loading Compensation in the Main Linac of CLIC

D. Schulte and I . Syratchev

XX International Linac Conference, 21-25 August 2000, Monterey, California, USA

CLIC-Note- 454 CERN/PS 2000-051 (AE)
Simulation of an Intra-Pulse Interaction Point Feedback for Future Linear Colliders
D. Schulte
XX International Linac Conference, 21-25 August 2000, Monterey, California, USA

CLIC-Note- 455 CERN/PS 2000-052 (LP)
An Injector for the CLIC Test Facility (CTF3)
H. Braun, R. Pittin, L. Rinolfi, F. Zhou, CERN, Geneva, Switzerland
B. Mouton, LAL, Orsay, France
R. Miller, D. Yeremian, SLAC, Stanford, CA94309, USA
XX International Linac Conference, 21-25 August 2000, Monterey, California, USA

CLIC-Note- 456 CERN/PS 2000-057 (RF)
The CLIC Main Linac Accelerating Structure
I. Wilson, W. Wuensch, CERN, Geneva, Switzerland
XX International Linac Conference, 21-25 August 2000, Monterey, California, USA

CLIC-Note- 457 CERN/PS 2000-055 (AE)
A Low-Charge Demonstration of Electron Pulse Compression for the CLIC RF Power Source
R. Corsini, A. Ferrari, J.P. Potier, L. Rinolfi, T. Risselada, P. Royer
XX International Linac Conference, 21-25 August 2000, Monterey, California, USA

CLIC-Note- 458 CERN/PS 2000-056 (AE)
Coherent Synchrotron Radiation Measurements in the CLIC Test Facility (CTFII)
H.H. Braun, R. Corsini, L. Groening, F. Zhou, CERN, Geneva, Switzerland
A. Kabel, T. Raubenheimer, SLAC, Menlo Park, CA 94025, USA
R. Li, TJNAF, Newport News, VA 23606, USA
T. Limberg, DESY, Hamburg, Germany
XX International Linac Conference, 21-25 August 2000, Monterey, California

CLIC-Note- 459 CERN/PS/AE Note 2000-010
An Isochronicity-Tunable Achromat Module
E.T. D'Amico

CLIC-Note- 460 CERN/Open-2000-300
User Guide for Code "Wake"
A. Riche

CLIC-Note- 461 CERN/PS 2000-066 (AE) - Revised
Special Lattice Computation for the Compact Linear Collider (CLIC)
E.T. D'Amico, G. Guignard

CLIC-Note- 462
Feasibility Study for the CERN 'CLIC' Photo-Injector Laser System
I.N.Ross, Central Laser Facility, Rutherford Appleton Laboratory

CLIC-Note- 463 CERN/SL 2000-070 (AP)
Multi-TeV CLIC Photon Collider Option
H. Burkhardt
International Workshop on High Energy Photon Colliders, 14-17 June 2000, Hamburg, Germany

CLIC-Note- 464

Proceedings of the Fifth CTF3 Collaboration Meeting held at CERN, 26th - 27th October 2000

L. Rinolfi

CLIC-Note- 465

Beam Dynamics and Beam Parameters for Positron Production at CLIC

T. Kamitani , L. Rinolfi

CLIC-Note- 466 CERN/PS 2000-074 (RF)

New Physics with the Compact Linear Collider

J. Ellis, I. Wilson

Article to be published in "Nature Magazine"

CLIC-Note- 467

Proceedings of the Sixth CTF3 Collaboration Meeting held at CERN, 1st - 2nd November 2000

Edited by R. Corsini