Project meeting 3.10.2017

Budgets – CERN MTP approved in Council June 2017, no major changes wrt last years MTP

- Personnel estimate reduced for 2019 as we knew would happen (last years estimate was just a flat continuation from 2018) – case by case checked to be ok

Main agreements over the last months:

- Extended agreements with UK groups, tuned one Spanish contract, Helsinki being extended, Oslo being discussed, KEK extended (done year by year)
- Several MoU addenda extended or renewed
- New contracts: Frascati (have submitted CDR for ~1 GeV Xband machine), CEA (support for CLEAR)

Collaborations

Accelerator collaboration with ~50 institutes
Detector collaboration with ~29 institutes

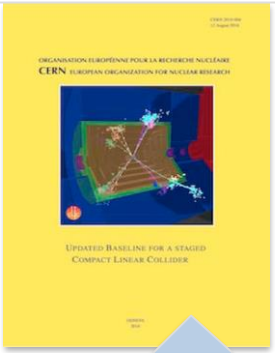
Place	Activity	Xband RF power	Status
CERN	XBox-1 test stand	50 MW	Operational, connection to CLEAR planned
	Xbox-2 test stand	50 MW	Operational
	XBox-3 test stand	4x6 MW	Operational
Trieste	Linearizer for Fermi	50 MW	Operational
PSI	Linearizer for SwissFEL	50 MW	Operational
	Deflector for SwissFEL	50 MW	Design and procurement
DESY	Deflector for FLASHforward	6 MW	Design and procurement
	Deflector for FLASH2	6 MW	Design and procurement
	Deflector for Sinbad	tbd	Planning
Tsinghua	Deflector for Compton source	50 MW	Installation and commissioning
	Linearizer for Compton source	6 MW	Planning
SINAP	Linearizer for soft X-ray FEL	6 MW	Design and procurement
	Deflectors for soft X-ray FEL	3x50 MW	Design and procurement

Australia	Test stand	2x6 MW	Proposal submission
Eindhoven	Compact Compton source, 100 MeV	6 MW	Design and procurement
Valencia	S-band test stand	2x10 MW	Installation and commissioning
KEK	NEXTEF test stand	2x50 MW	Operational
SLAC	NLCTA test stand	2x50 MW	Operational
SLAC/CERN	Design of high-efficiency X-band klystron	30 MW	In progress
Daresbury	Linearizer	6 MW	Design and procurement
	Deflector	tbd	Planning
	Accelerator (CLARA extensions)	tbd	Planning
Frascati	XFEL, plasma accelerator, 1 GeV	4(8)x50 MW	CDR
	Test stand	50 MW	Planning
Gronigen	1.4 GEV XFEL Accelerator, 1.4 GeV	tbd	NL roadmap, CDR

- The use of Xband among the CLIC collaborators increasing very fast, providing key experience now - but even more in the next 5-7 year period.

- Design study for use of X-band technology for compact FELs just approved with 24 institutes (CompactLight) - see later

CLIC – some recent results



CLIC initial stage defined:

Complete re-baselining of a staged implementation starting at 380 GeV for Higgs and top physics, upgradeable to 3 TeV in two further stages, based on an overall power and cost optimisation for the initial stage.

Published report:
Updated Baseline for a Staged Compact Linear Collider (CERN yellow report CERN-2016-004 and arXiv:1608.07537)

CERN Courier summary (link)

CTF3 programme completed:

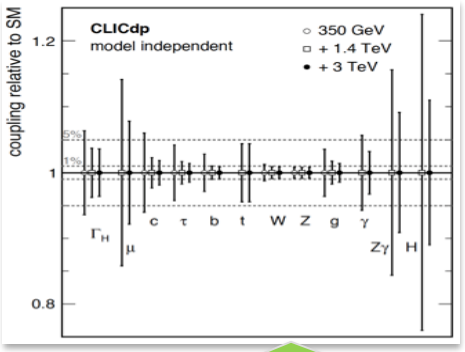
The CTF3 programme has been brought to successful conclusion, proving the CLIC two beam concept and gradient performance, measuring the X-band structure breakdown rate with beam, benchmarking the drive-beam phase stability, verifying instrumentation prototypes and carrying out detailed module performance studies.

Recent report (link) IPAC 2017

Gen. rep. about beamtests (CTF3, ATF. FACET ..)

X-band stations at CERN installed and operational:

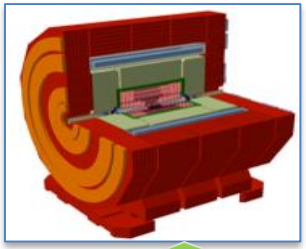
Triple X-band test capacity at CERN for accelerating structure and RF component tests 2016-2019. Define optimized/new acc. structures for 3000GeV/380GeV. Increased statistics for tests. Recent report (link)



CLIC Higgs Overview Publication:

"Higgs Physics at the CLIC Electron-Positron Linear Collider", >25 full simulation studies,

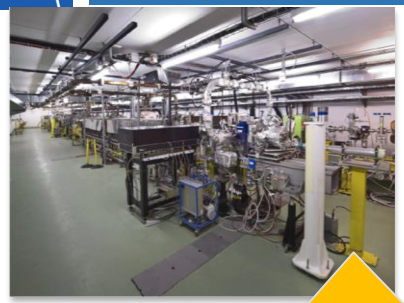
Submitted for journal publication: arXiv:1608.07538



Layout of the new CLIC detector, CLICdet, finalized:

Basis for future detector and physics studies. Write-up in progress, drawings of the new detector: EDMS link CLICdet drawings

CLIC – examples of current studies



CLEAR start up:

A new stand-alone user facility - CLEAR – will be available for users from 2017 onwards.

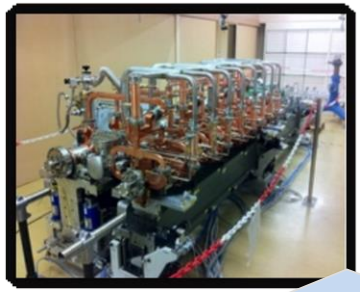
CLEAR: A new open electron beam facility with a wide programme covering various types of accelerator R&D, irradiation and training capabilities. For CLIC and LCs the foreseen programme covers studies of high gradient acceleration methods as X-band studies for linear accelerators and also novel concepts as plasma and THz acceleration.

A key goal for 2017 is to get this facility operational for LC studies and other users.

CLEAR: CERN Linear Electron Accelerator for Research (link for more information)

X-band tests and development

New CLIC 380 GeV and 3TeV baseline with improved features (easy machining and reduce surface heating). Structures with reduced costs.
Submitted European design study for X-band FEL applications with collaborators.
Design of klystron based option at 380 GeV.

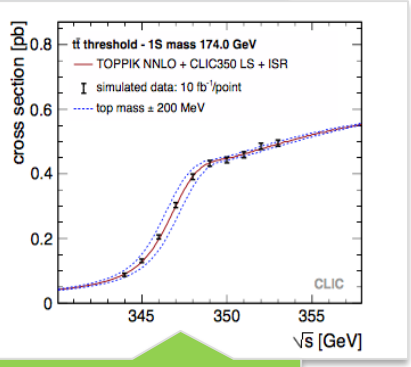


CLIC module development:

Experimental programme to evaluate module in beam and in lab (thermo-mechanical). Optimize module considering the full life-cycle of the module, assembly, conditioning, installation and possibly re-work. Detailed studies of stability and alignment.

Cost and power

Technical developments for accelerator parts as (two key examples):
High efficiency klystron and RF systems.
Permanent magnet systems to reduce power.



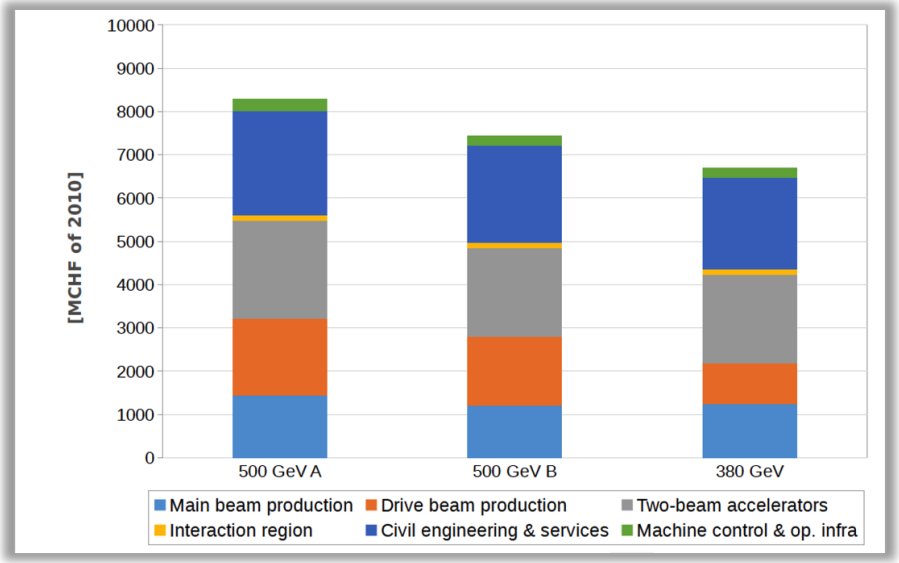
Top and BSMS:

CLIC top quark physics studies (including draft overview publication) and CLIC BSM studies (aim for overview publication in 2018)

Costing – power will follow

Table 11: Value estimate of CLIC at 380 GeV centre-of-mass energy.

	Value [MCHF of December 2010]
Main beam production	1245
Drive beam production	974
Two-beam accelerators	2038
Interaction region	132
Civil engineering & services	2112
Accelerator control & operational infrastructure	216
Total	6690



Status:

- Setting up new WBSs for 380 GeV DB and klystrons, 1.5 TeV and 3 TeV
- Revise cost escalation factors from 2008 to 2017
- Have identified responsible for all parts (~15 people from machine to infrastructure to CE - overlap with FCC/LHC-HE team where possible)
- Aim for internal review mid 2018, external review Sept-October 2018
- Have made some efforts to extract klystron based machine estimates (but did not have WBS for it in 2012)
- Will do power bottom up as well revising all numbers (expect larger changes there)

Cost and power updates foreseen

Action (v = significant impact expected)	Cost	Pow/Energy	Comments
Structure/parameters optimization, minor other changes	v	v	Ok for now, 380 GeV at 1.5 10^34 Defines Civ. Eng. parameters
Further possibility: lower inst. luminosity or initial energy (250 GeV)	v	v	Integrated lum. goal can be maintained, can re-optimize structures
Known corrections needed for injectors and Cooling/Ventilation	v	v	Partly addressed for injectors CV to be re-designed and clear up average and max estimates
Structure manufacturing	v		Optimise, remove steps, halves
High eff. Klystrons/Modulators and RF distribution	v	v	Technical studies where gains can be large Large commercial uncertainty
Magnets	?	v	Technical studies and costing in progress
Running scenario (daily, weekly, yearly)		v (energy, op. cost)	Take advantage of demand/price changes, study foreseen
Commercial studies, currencies and reference costing date	v	v	Examples: klystrons, CHF, CLIC and FCC will use similar convention, learning curves, cost-escalation

Timeline

Goal for next strategy update: Present a CLIC project that is a "credible" option for CERN beyond LHC, a Project Implementation Plan. Guidelines used internally:

- Adapt to physics results – LHC mostly – taking into account LHC at 13-14 TeV as results become available (be flexible)
- Physics no later than 2035, solid luminosities from Higgs/top at 380 GeV to 3 TeV (staging)
- Initial costs compatible with earlier projects (order LHC+50%) (staging)
- Upgradable in 2-3 stages over a 20-30y period, without major (max 3-4 years) operational breaks, and with upgrade costs also in reasonable agreement with current budget level.
- Cover accelerator, detector, physics

2013 - 2019 Development Phase

Development of a Project Plan for a staged CLIC implementation in line with LHC results; technical developments with industry, performance studies for accelerator parts and systems, detector technology demonstrators

2020 - 2025 Preparation Phase

Finalisation of implementation parameters, preparation for industrial procurement, Drive Beam Facility and other system verifications, Technical Proposal of the experiment, site authorisation

2026 - 2034 Construction Phase

Construction of the first CLIC accelerator stage compatible with implementation of further stages; construction of the experiment; hardware commissioning

2019 - 2020 Decisions

Update of the European Strategy for Particle Physics; decision towards a next CERN project at the energy frontier (e.g. CLIC, FCC)

2025 Construction Start

Ready for construction; start of excavations

2035 First Beams

Getting ready for data taking by the time the LHC programme reaches completion

Summary - I

A recent summary for CLICdp can be found given during a CLIC physics workshop (theory plus experimentalists) mid July: https://indico.cern.ch/event/632228/overview.

The activities are going well and the studies are well focused towards the Strategy update, with detector optimisation, physics studies, software development and hardware prototypes.

A CLIC det&phys collaboration meeting took place Aug 29-30: https://indico.cern.ch/event/633975/

For the 380 GeV initial machine the technical status is very solid, most of the work are now related to cost and power optimisation – and has been for the last 2 years. In addition to the 25 or so Work Packages across all technical areas operative since 2012, during the last year four working across project groups are put in place to ensure convergence and coherence for the Project Plan to be presented to the European Strategy Update 2019-20 (the WG can be found at: https://indico.cern.ch/catery/4337/):

- Baseline parameters and design (lead D.Schulte) (Designs and parameters for 380 (DB and klystrons) GeV, 1.5 TeV and 3 TeV) - REPORT in DECEMBER
- Civil Engineering & Infrastructure and Siting WG (CEIS) (lead J.Osborne) (mandate) – REPORT TODAY
- Cost, Power and Schedule (lead S.Stapnes) (Detailed costing of a 380 GeV machine - DB and klystrons - plus additional stages beyond)
- Main Linac Hardware Baselining (lead C.Rossi) (Optimised module technical design and surrounding infrastructure in the tunnel, considering the entire lifetime of a module including commissioning, installation, conditioning, operation, rework, replacements etc.) - REPORT in DECEMBER

Upgrades to 3 TeV using the CLIC drivebeam solution are very well covered in CDR and little extra work is needed, also relying on the working groups above to provide updates where needed. A new WG is looking at extensions with novel technologies and/or higher energies:

- Novel Accelerator methods for future stages of CLIC (lead E.Adli) (mandate) – REPORT TODAY

Summary - II

Documents:

An accelerator technical description (around 150p)

- 380 DB, klystrons, upgrades to 3 TeV and NAT, Technical studies, CE and infra, Performance, Cost and Power
- Describe CLIC as is, background references and EDMS documents for more information, discussion, more technical discussions

A separate document about the collaborations plans for 2020-25 (50p) in the preparation phase including also resource estimates for this period, covering:

- Technical studies and cost/power reduction studies, industrial pre-series were needed
- More detailed site preparation
- Maximising common efforts/collaborative work with outside labs taking Xband in use and other facilities where key components are needed in significant numbers – take full advantage of the fact that light-sources and FELs are abundant and several are now moving to Xband for components or linacs. Related: Looking at the development of and access to test-facilities (at CERN and outside)
- Consider if there are physics measurements that can made before completion of CLIC with test-facilities or use of parts of linacs

A project implementation plan for CLIC in time for the European Strategy update (similar to CDR volume 3 and the Rebaselining document).

Europe/Zurich timezone

The 2017 International Workshop on Future Linear Colliders (LCWS2017) will be hosted in Strasbourg **from Monday, October 23 through Friday, October 27**, at the Strasbourg Convention Center (PMC).

The workshop will be devoted to the study of the physics case for a high energy linear electron-positron collider, taking into account the recent results from LHC, and to review the progress in the detector and accelerator designs for both ILC and CLIC projects. The event will represent an important step before the start of the European Strategy update process.

Local Organizing Committee:

Jérôme Baudot (IPHC)
Auguste Besson (IPHC)
Vincent Boudry (LLR)
Paul Colas (Irfu)
Caroline Collard (IPHC)
Éric Kajfasz (CPPM)
Imad Laktineh (IPNL)
Alejandro Pérez-Pérez (IPHC)
Maksym Titov (Irfu)
Marc Winter (Chair, IPHC)

Starts 22 Oct 2017 08:00
Ends 27 Oct 2017 22:00
Europe/Zurich

Convention Center (PMC), Strasbourg, France
strasbourg-events.com
Place de Bordeaux, 67082 Strasbourg, France

Materials

Hotels_LCWS_2017.pdf

Plan of rooms available at the Convention Center:
http://www.strasbourg-events.com/en/spaces/all-our-spaces#map=40

Sun 22/10 | Mon 23/10 | **Tue 24/10** | Wed 25/10 | Thu 26/10 | Fri 27/10 | All days

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08:00

Higgs / EW: 1
Graham Wilson, Graham Wilson, Gudrid Moortgat-Pick, Gudrid Moortgat-Pick, Heidi Angelika Rzeh...
Madrid 2 (134 seats)

Top / QCD / Loop Verein: 1
Aleksander Filip Zarnecki, Andre Hoang, Radja Boughezal, Radja Boughezal, Roman P...
Londres 2 (134 seats)

Vertex / Tracking: 1
Akimasa Ishikawa, Akimasa Ishikawa, Alain Bellerive, Bruce Andrew Schumm, Bruce Schumm, Dominik D...
Londres 1 (76 seats)

ATF2 and Damping Rings: 1
Nobuhiro Terunuma, Ph...
Rome (110 seats)

Super Conducting RF: 1
Anna Grassellino Grassellino, D...
Amsterdam (110 seats)

09:00

10:00

Coffee Break
Bar Schweitzer
10:30 - 11:00

11:00

Higgs / EW: 2 (joint session with Top / QCD / Loop Verein)
Madrid 2 (134 seats)

Cal. / Muon: 1
Andrew White, Andy White, Eva Sicking, Katja Krueger, Katja Krueger, Taikan Suehara, ...
Londres 2 (134 seats)

ATF2 and Damping Rings: 2
Nobuhiro Terunuma, P...
Rome (110 seats)

Super Conducting RF: 2
Anna Grassellino Grassellino, D...
Amsterdam (110 seats)

12:00

Lunch
Etoile C
12:30 - 14:00

ATF International Collaboration Board (closed)
Nobuhiro Terunuma...
Stuttgart (37 seats)
12:30 - 14:00

LCCPDeb (closed)
James Brau
Londres 1 (76 seats)
12:30 - 14:00

13:00

14:00

BSM: 1
David Morrissey, Dr. Igor Boyko , Jose Santiago, Jose Santiago, Keisuke Fujii, Keisuke Fujii, ...
Madrid 2 (134 seats)

Vertex / Tracking: 2
Akimasa Ishikawa, Akimasa Ishikawa, Alain Bellerive, Bruce Andrew Schumm, Bruce Schumm, Dominik D...
Londres 1 (76 seats)

Cal. / Muon: 2
Andrew White, Andy White, Eva Sicking, Katja Krueger, Katja Krueger, Taikan Suehara, T...
Londres 2 (134 seats)

ATF2 and Damping Rings: 3
Nobuhiro Terunuma, Ph...
Rome (110 seats)

Beam dynamics and RTML: 1
Andrea Latina, Kaoru ...
Madrid 1 (76 seats)

Super Conducting RF: 3
Anna Grassellino Grassellino, D...
Amsterdam (110 seats)

15:00

16:00

Coffee Break
Bar Schweitzer
16:00 - 16:30

Sim / Reco / Det. Performances: 1
Londres 2 (134 seats)

BSM: 2
Dr. Boyko Igor, David Morrissey, Jose Santiago, Jose Santiago, Keisuke Fujii, Keisuke Fujii, ...
Madrid 2 (134 seats)

Vertex / Tracking: 3
Londres 1 (76 seats)

MDI / Int. / Pol.: 1
Karsten Buesser, Karsten Roland Buesser, Sabine Riemann, Sabine R...
Rome (110 seats)

Beam dynamics and RTML: 2
Andrea Latina, Kaoru ...
Madrid 1 (76 seats)

Super Conducting RF: 4
Anna Grassellino Grassellino, D...
Amsterdam (110 seats)

17:00

18:00

Sun 22/10 | Mon 23/10 | Tue 24/10 | **Wed 25/10** | Thu 26/10 | Fri 27/10 | All days

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08:00

Higgs / EW: 3
Graham Wilson, Graham Wilson, Gudrid Moortgat-Pick, Gudrid Moortgat-Pick, Heidi Angelika Rz...
Madrid 2 (134 seats)

Sim / Reco / Det. Performances: (joint session with Cal. / Muon)
Andrew White, Andy White, Eva Sicking, Katja Krueger, Katja Krueger, Taikan Suehara, ...
Londres 2 (134 seats)

Civil Engineering and Siting: 1
Hitoshi Hayano, J...
Londres 1 (76 seats)

Sources: 1
Masao Kuriki, Sabine R...
Rome (110 seats)

09:00

10:00

Coffee Break
Bar Schweitzer
10:30 - 11:00

11:00

Higgs / EW: 4 (joint session with BSM)
Graham Wilson, Graham Wilson, Gudrid Moortgat-Pick, Gudrid Moortgat-Pick, Heidi Angelika Rzehak, Dr....
Madrid 2 (134 seats)

Cal. / Muon: 4
Andrew White, Andy White, Eva Sicking, Katja Krueger, Katja Krueger, Taikan Suehara, ...
Londres 2 (134 seats)

Civil Engineering and Siting: 2
Hitoshi Hayano, J...
Londres 1 (76 seats)

Sources: 2
Masao Kuriki, Sabine R...
Rome (110 seats)

12:00

Lunch
Etoile C
12:30 - 14:00

EJADE
Steinar Stapnes, Thomas Sc...
Rome (110 seats)
12:30 - 14:00

13:00

14:00

ILD Meeting
Ties Behn...
Madrid 2 (134 seats)

SiD Meeting
Andrew White, ...
Londres 1 (76 seats)

Beam delivery system: 3
Eduardo Marin, Glen White, Rogel...
Rome (110 seats)

ILC cost reduction
Shinichiro...
Londres 2 (134 seats)

Industry: 1
Maksym Titov...
Curie A (210 seats)

15:00

16:00

Coffee Break
Bar Schweitzer
16:00 - 16:30

ILD Meeting
Ties Behnke
Madrid 2 (134 seats)

SiD Meeting
Andrew White, ...
Londres 1 (76 seats)

Beam dynamics and RTML: 3
Andrea Latina, Kaoru ...
Rome (110 seats)

Industry: 2
Maksym Titov,...
Curie A (210 seats)

17:00

18:00

Sun 22/10 | Mon 23/10 | Tue 24/10 | Wed 25/10 | **Thu 26/10** | Fri 27/10 | All days

Print | PDF | Full screen | Detailed view | Filter

08:00

Higgs / EW: 5
Graham Wilson, Graham Wilson, Gudrid Moortgat-Pick, Gudrid Moortgat-Pick, Heidi Angelika Rzeh...
Madrid 2 (134 seats)

Top / QCD / Loop Verein: 3
Aleksander Filip Zarnecki, Andre Hoang, Radja Boughezal, Radja Boughezal, Roman Po...
Madrid 1 (76 seats)

Cal. / Muon: 5
Andrew White, Andy White, Eva Sicking, Katja Krueger, Katja Krueger, Taikan Suehara, T...
Londres 2 (134 seats)

MDI / Int. / Pol.: 2
Karsten Buesser, Karsten Roland Buesser, Sabine Riemann, Sabine R...
Rome (110 seats)

LC power: 1
Steinar ...
Amsterdam (110 seats)

Beam delivery system: 1
Eduardo Marin, Glen White, Rogel...
Londres (76 seats)

09:00

10:00

Coffee Break
Bar Schweitzer 10:30 - 11:00

11:00

BSM: 3
David Morrissey, Dr. Igor Boyko, Jose Santiago, Jose Santiago, Keisuke Fujii, Keisuke Fujii, ...
Madrid 2 (134 seats)

Cal. / Muon: 6
Andrew White, Andy White, Eva Sicking, Katja Krueger, Katja Krueger, Taikan Suehara, T...
Londres 2 (134 seats)

MDI / Int. / Pol.: 3
Karsten Buesser, Karsten Roland Buesser, Sabine Riemann, Sabine R...
Rome (110 seats)

LC power: 2
Steinar St...
Amsterdam (110 seats)

Beam delivery system: 2
Eduardo Marin, Glen White, Rogel...
Londres (76 seats)

12:00

Lunch
Etoile C 12:30 - 14:00

ILC Technical and Change Management Board
Benno List
Londres 2 (134 seats) 12:30 - 14:00

CLIC general
Lucie Linssen, Philip Nicho...
Madrid 2 (134 seats) 12:30 - 14:00

13:00

14:00

Sim / Reco / Det. Performances: 2 (joint session with Vertex / Tracking)
Akimasa Ishikawa, Akimasa Ishikawa, Alain Bellerive, Bruce Andrew Schumm, Bruce Schumm, Dominik D...
Londres 2 (134 seats)

Top / QCD / Loop Verein: 4
Aleksander Filip Zarnecki, Andre Hoang, Radja Boughezal, Radja Boughezal, Roman P...
Amsterdam (110 seats)

BSM: 4
David Morrissey, Dr. Igor Boyko, Jose Santiago, Jose Santiago, Keisuke Fujii, Keisuke Fujii, ...
Madrid 2 (134 seats)

Sources: 3
Masao Kuriki, Sabine R...
Londres 1 (76 seats)

CLIC Main Linac: 1
Carlo Ros...
Stuttgart (37 seats)

15:00

16:00

Coffee Break
Bar Schweitzer 16:00 - 16:30

Sim / Reco / Det. Performances: 4
Aidan Robson, Akiya Miyamoto, André Sailer, Daniel Jeans, F...
Londres 2 (134 seats)

Higgs / EW: 6
Graham Wilson, Graham Wilson, Gudrid Moortgat-Pick, Gudrid Moortgat-Pick, Heidi Angelika Rzeh...
Madrid 2 (134 seats)

Top / QCD / Loop Verein: 5
Aleksander Filip Zarnecki, Andre Hoang, Radja Boughezal, Radja Boughezal, Roman Po...
Amsterdam (110 seats)

Sources: 4
Masao Kuriki, Sabine R...
Londres 1 (76 seats)

LC Central Region Working Group
Kaoru Y...
Madrid 1 (76 seats)

CLIC Main Linac: 2
Carlo Ro...
Stuttgart (37 seats)

17:00

18:00

CLIC Workshop 2018

22-26 January 2018
CERN
Europe/Zurich timezone

CLIC18 administration

clic.project.office@cern.ch

The **CLIC workshop 2018** covers Accelerator as well as the Detector and Physics studies, with their present activities and programme. Special focus of the workshop will go to the preparations for the European Strategy Update, for which the CLIC documentation is due by the end of 2018

For the **Accelerator studies**, the workshop spans over 5 days: **22nd-26th of January.**

For **CLICdp**, the workshop is scheduled from **Tuesday afternoon 23rd to lunchtime on Friday 26th.**

Programme

Common parts:
1- An open plenary session on Wednesday afternoon January 24th, giving an overview of the CLIC project (accelerator, physics/detector), placed in the context of LHC results. This session also addresses the use of CLIC-related developments in other applications.
2- A common plenary accelerator/detector&physics session on Friday morning January 26th.
3- The workshop dinner on Wednesday evening.

Dedicated Accelerator sessions:
1- Parallel sessions on Monday afternoon, Tuesday and Wednesday morning

2- A session on Thursday covering High-Gradient applications outside high energy physics

3- A CLIC Collaboration Board Thursday late afternoon.

Dedicated Detector and Physics sessions:
1- Topical sessions on Tuesday afternoon, Wednesday morning and all of Thursday.
2- The CLICdp Institute Board meeting will take place over lunch on Thursday.

3- A CLICdp dinner is organised for Thursday evening.

We are looking for the widest possible participation and encourage in particular the involvement of young colleagues.