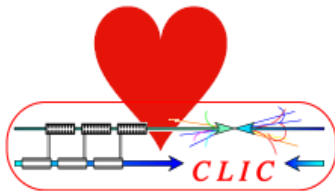


# Introduction to the 4<sup>rd</sup>

## CLIC Advisory Committee meeting (26-28/05/09)

A  
♥

*CLIC Advisory CommitteE (ACE)*

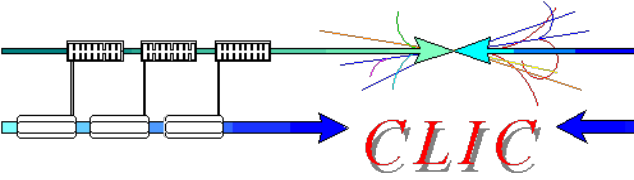


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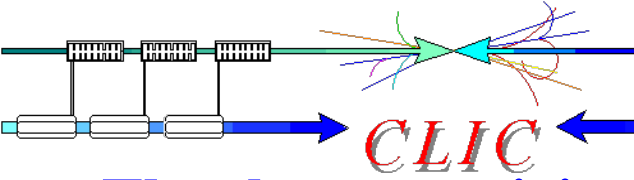
CLIC progress and perspectives  
Follow-up from last ACE meeting

J.P.Delahaye for

The Compact LInear Collider (CLIC) Study Team

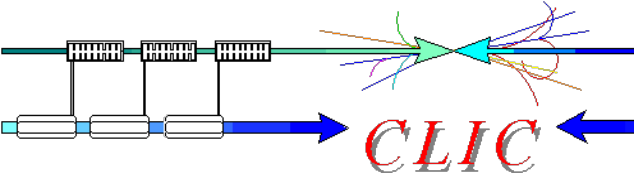


- **Welcome and organisation**
- **Reminder of mandate and previous meetings**
- **Follow-up of ACE's recommendations**
- **Major highlights from last ACE meeting**
- **Resources and plans for the future**
- **Conclusion**



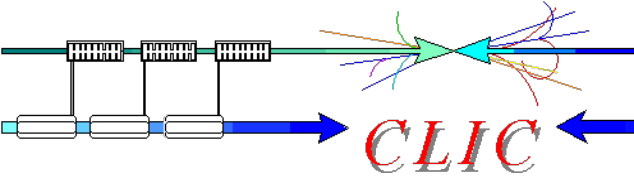
**CLIC**

- Thanks to participants of previous meetings:
  - M.Huening/DESY
  - A.Mosnier/CEA
  - P.Raimondi/ INFN (excused for this meeting)
  - T.Raubenheimer/SLAC (Chair)
  - V.Shiltsev/FNAL
  - N.Toge/KEK
- Welcome the one who could not participate to previous meetings:
  - L.Evans/CERN
  - T.Shintake/Riken (again excused at last moment for this meeting!)
- Welcome to new member:
  - T.Roser/BNL
- Any organisational or administrative issues: **Alexia (161220)**<sub>3</sub>



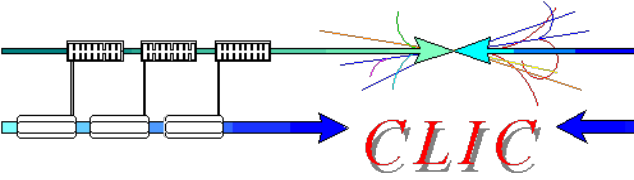
## *Specific to this ACE meeting*

- Focused on progress and plans for critical R&D supporting the CDR and beyond
- **Specific mandate:** The CLIC project is aiming to demonstrate the feasibility of the Two Beam Accelerator concept on the 2010-timescale so that a complete evaluation of technical options for a future linear collider can be made once data from the LHC is available. To this end, the CLIC project is planning to document the status of the TBA technology and the CLIC design in a Conceptual Design Report to be written by the end of 2010. The Committee is invited to review, assess and comment on these plans. In specific, the committee is asked to evaluate:
  - a prioritized list of the most relevant CLIC technical issues and their classification by feasibility, performance and cost impact.
  - the R&D status and plans to address the critical issues in terms of objectives and schedule
  - the R&D program and the schedule to complete a CLIC Feasibility Demonstration as well as a Conceptual Design Report by the end of 2010
  - A first proposal of technical objectives and planning for the Technical Design Phase in the years 2011 - 2015



# Organisation

- This room reserved for the Committee up to Thursday night
- Coffee breaks here (Committee and Speakers)
- Lunches in CERN Main Cafeteria (tickets provided to Committee)
- Dinner to-morrow in Glass Box (Main Cafeteria): (Committee and Speakers)
- Report on ACE's findings and recommendations by ACE chairman to:
  - CLIC team on May 28 pm
  - CLIC/CTF3 collaboration Board on May 29 am



# *ACE4 agenda*

*(organised by H.Schmickler)*

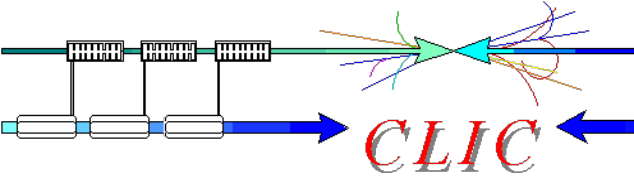
<http://indico.cern.ch/conferenceDisplay.py?confId=58072>

- Introduction to Critical Issues and Specifications driving them (D.Schulte: next presentation)
- Addressing CLIC Technical Issues and reporting in CDR (major part of the meeting)
- Preparation of Technical Design phase (R.Corsini: to morrow)
- Other issues raised by Committee at ACE3 as well as overall progress of CLIC study :
  - Subject of this presentation



- **Specific Mandate: Beam dynamics issues**
  - Review and assess the CLIC Beam Physics studies and the corresponding Beam Physics driven specification of the technical components
  - Comment on the R&D program to assess their feasibility
- **ACE report: Report not (yet?) available**

Recommendations to CLIC team:  
<http://indico.cern.ch/conferenceDisplay.py?confId=30172>
- **Presentation Tor to CLIC/CTF3 collaboration Board:**
  - <http://indico.cern.ch/conferenceDisplay.py?confId=30168>

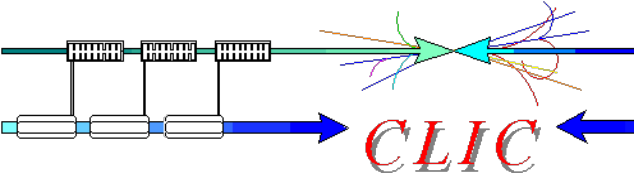


# Recommendations from ACE3

## CLIC

- **Beam Dynamics: (Daniel and Hermann)**
  - Urge focusing on most critical issues
  - Define list of critical issues and technologies for R&D
- **3 TeV with staged approach at 500 GeV and conservative parameters: (Daniel and Hermann)**
  - Make staged approach a coherent story
  - HW Upgrade and how does it fit in CDR?
- **Damping Rings: (Yannis)**
  - Identify key limitations for parameter implications
- **Main linac:**
  - R&D on critical beam instrumentation for emittance preserv. (Daniel)
  - Two Beam Module with integrated components like girder and alignment (Germana)
- **High Gradient Accelerating Structures (Alexej and Walter)**
  - Define criteria of success (fully equipped?)
  - Useful to have many supporting tests - not just a single success
  - Urge completing tests of many VG1 structure to form solid basis for structure design

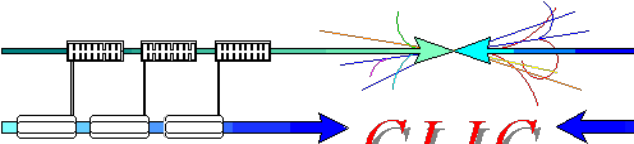




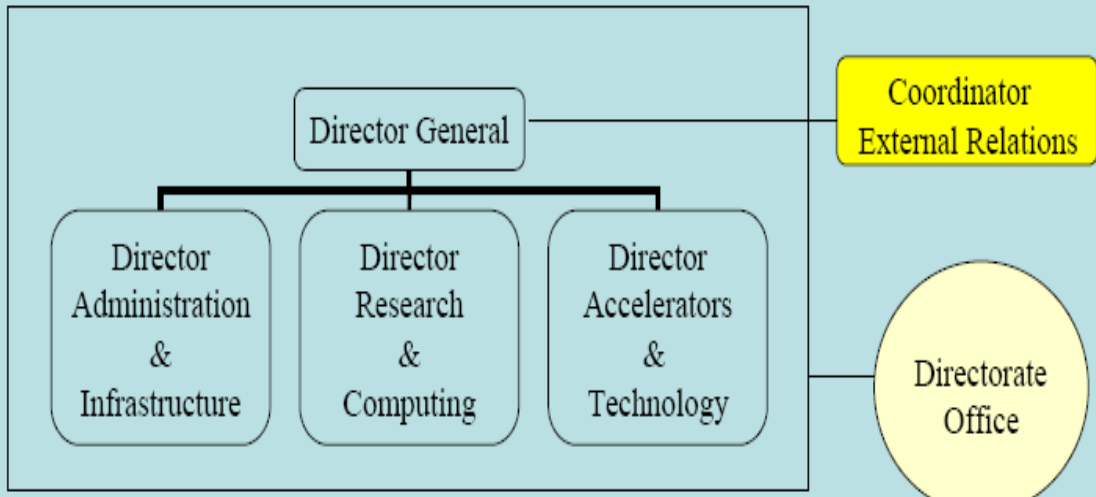
# Recommendations from ACE3

CLIC

- **PETS (Igor)**
  - Increase collaboration support on design and tests
  - What can be measured at CTF3
- **CTF3: (Frank)**
  - More resources for commissioning and operations (Increase collaboration participation)
  - Set expectations of operational performance compared to demonstrations
  - next steps after CTF3?
- **CDR organisation and timescale (Hermann)**
  - Plans and milestones for CDR?
  - Concern about key people highly fractionated
  - Important to plan on supplementing 2010 CDR with greater detail on 2012 timescale for international review
- **Preparation of Technical Design Phase (Roberto)**
  - What test facilities will be necessary to support the next stage?



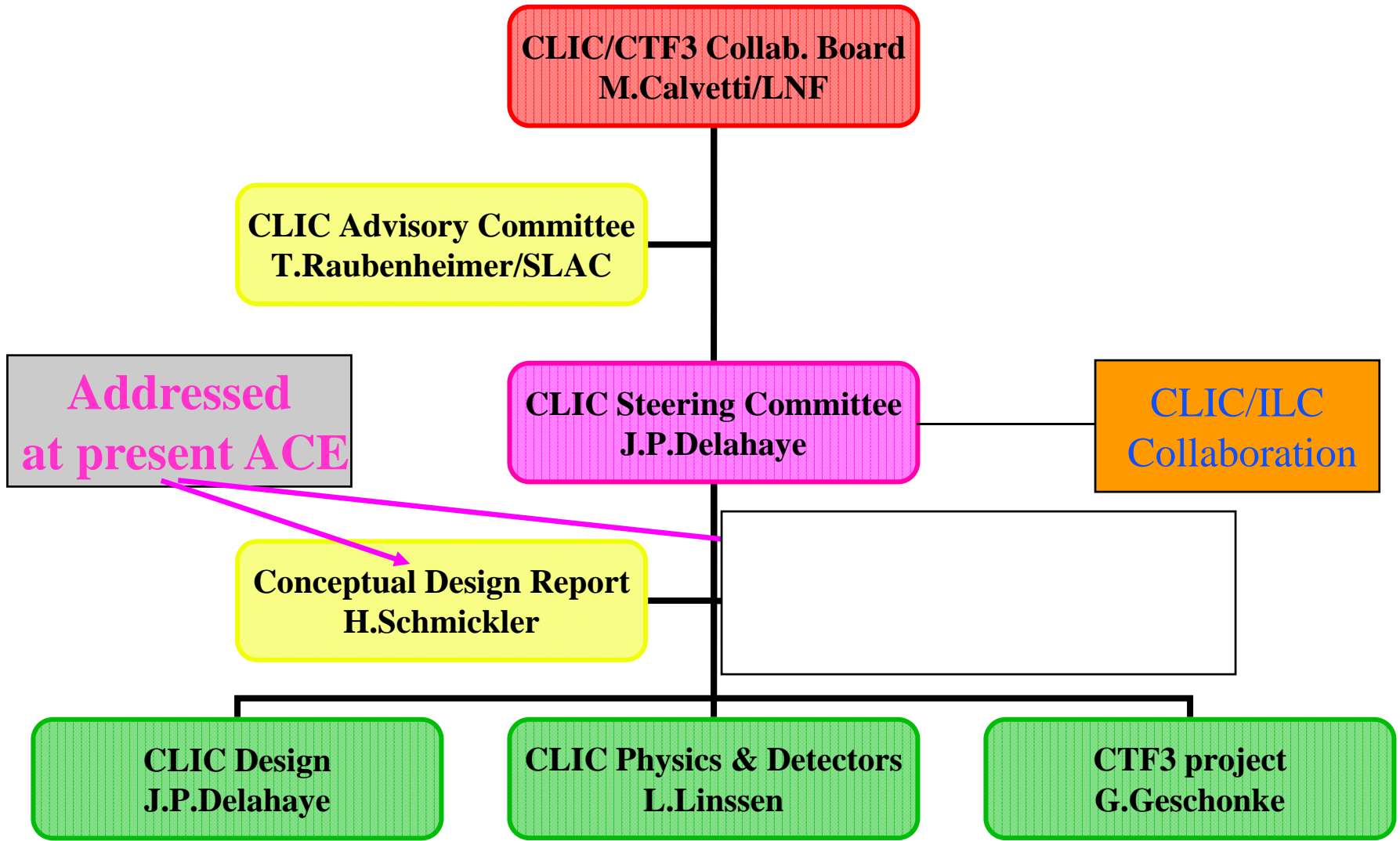
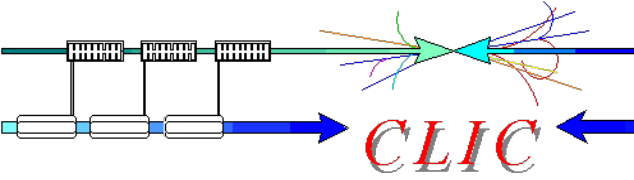
## Core Directorate



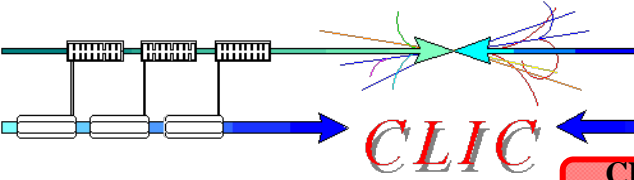
## Projects

Accelerator sector  
sLHC (L. Evans)  
CLIC (J.-P. Delahaye)

Research sector  
Linear Collider Detector (L. Linssen)  
sLHC Detectors (within LHC teams in PH)



# CLIC Chart 09



**CLIC**

**CLIC/CTF3 Collab. Board**  
M.Calvetti/LNF

**CLIC Advisory Committee**  
T.Raubenheimer/SLAC

**CLIC Steering Committee**  
J.P.Delahaye

**Conceptual Design Report**  
Editorial Board: H.Schmickler

**CLIC meeting**  
G.Geschonke

**Replacing H.Braun**

**Technical Design Phase**  
R.Corsini

**CLIC Design & Parameters**  
J.P.Delahaye

**CLIC Physics & Detectors**  
L.Linsen & D.Schlatter

**CTF3 project**  
G.Geschonke/R.Corsini

**Beam Physics**  
D.Schulte

**CTF3 Committee**  
G.Geschonke

**Structure development**  
W.Wuensch

**Addressed at 3<sup>rd</sup> ACE**

**Structure tests**  
S.Doebert

**Technical design**  
H.Schmickler

**Addressed at 2<sup>nd</sup> ACE**

**Cost, Power & Schedule**  
P.Lebrun

**Commissioning & Operation**  
R.Corsini

**Installation & Exploitation**  
L.Rinolfi & G.Geschonke

**CALIFE**  
W.Farabolini/CEA

**Two Beam Test Stand**  
R.Ruber/UU-I.Syratchev

**TBL**  
S.Doebert

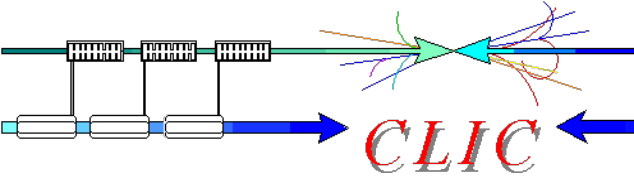
**Photo Injector**  
S.Doebert

**12 GHz Test Stand**  
K.Schirm

**Addressed at present ACE**

J.P.Delahaye

CLIC @ ACE 26-05-09



## *CLIC Web Site and Doc*

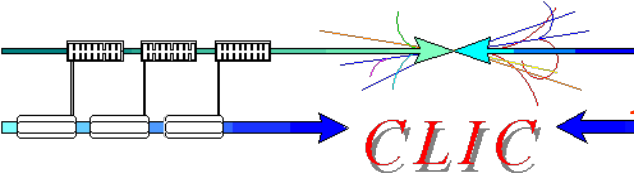
*CLIC*

- **Web site reflecting the CLIC organisation**

[http://clic-study.web.cern.ch/CLIC-Study/Mtgs\\_Wkg\\_Grp.htm](http://clic-study.web.cern.ch/CLIC-Study/Mtgs_Wkg_Grp.htm)

- **Documentation on EDMS:**

<https://edms.cern.ch/nav/CERN-0000060014>

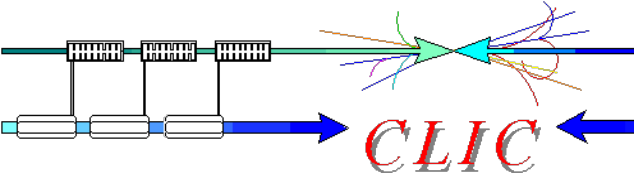


CLIC

## *A necessary and beneficial CLIC /ILC Collaboration*

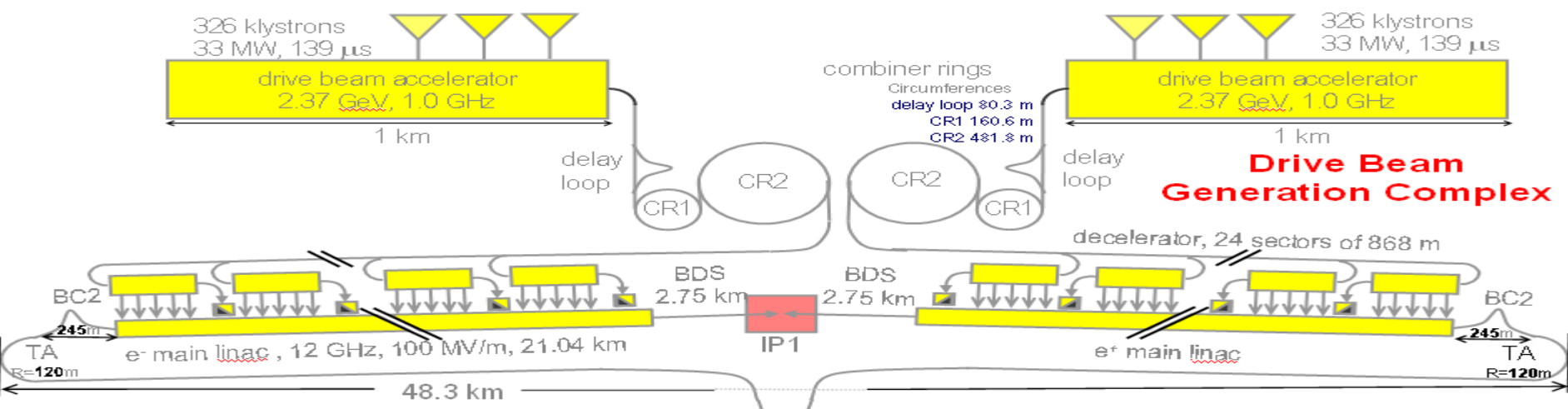
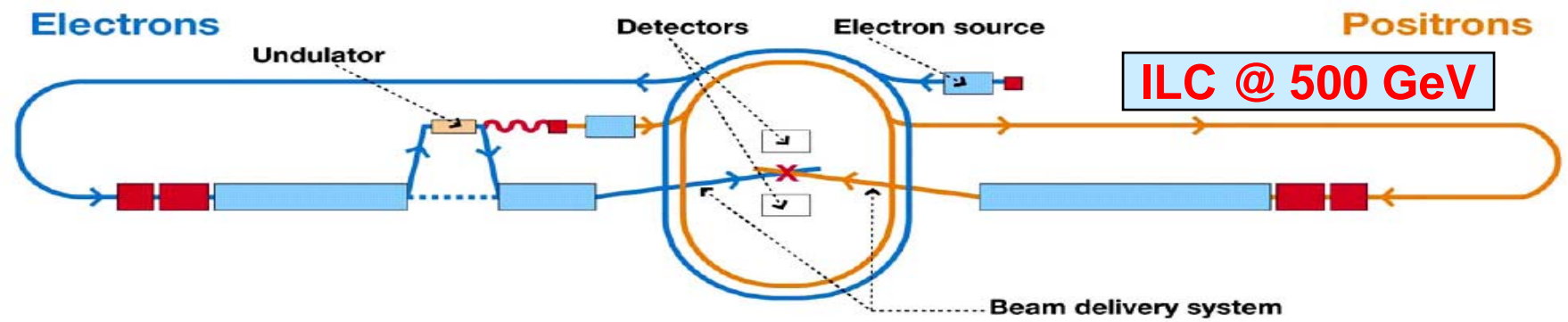
[http://clic-study.web.cern.ch/CLIC-Study/CLIC\\_ILC\\_Collab\\_Mtg/Index.htm](http://clic-study.web.cern.ch/CLIC-Study/CLIC_ILC_Collab_Mtg/Index.htm)

- **Focusing on subjects with strong synergy between CLIC & ILC**
- making the best use of the available resources
- adopting systems as similar as possible
- identifying and understanding the differences due to technology and energy (technical, cost...)
- **developing common knowledge** of both designs and technologies on status, advantages, issues and prospects for the best use of future HEP
- **preparing together by the Linear Collider Community made up of CLIC & ILC experts:**
  - the future evaluation of the two technologies
  - proposal(s) best adapted to the (future) HEP requirements

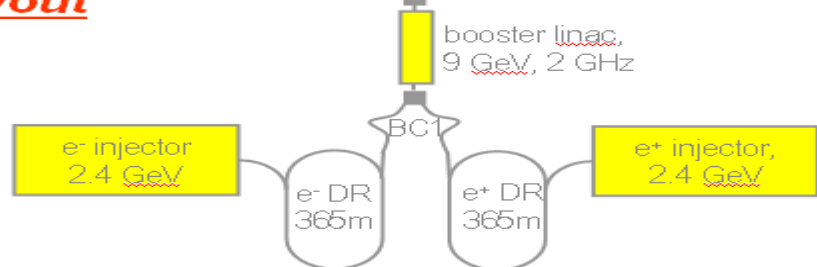


# CLIC and ILC layouts

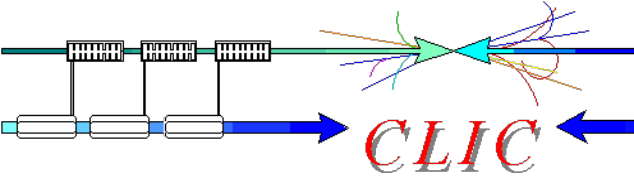
*CLIC*



**CLIC overall layout**  
**3 TeV**



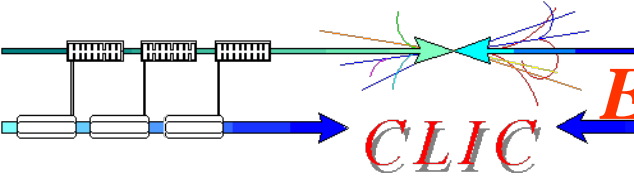
**Main Beam Generation Complex**



*Subjects with strong synergy*  
*Working Groups & Conveners*

	<b>CLIC</b>	<b>ILC</b>
<b>Physics &amp; Detectors</b>	L.Linssen, D.Schlatter	F.Richard, S.Yamada
<b>Beam Delivery System (BDS) &amp; Machine Detector Interface (MDI)</b>	D.Schulte, R.Tomas Garcia E.Tsesmelis	B.Parker, A.Seriy
<b>Civil Engineering &amp; Conventional Facilities</b>	C.Hauviller, J.Osborne.	J.Osborne, V.Kuchler
<b>Positron Generation (new)</b>	L.Rinolfi	J.Clarke
<b>Damping Rings (new)</b>	Y.Papaphilipou	M.Palmer
<b>Beam Dynamics</b>	D.Schulte	A.Latina, K.Kubo, N.Walker
<b>Cost &amp; Schedule</b>	P.Lebrun, K.Foraz, G.Riddone	J.Carwardine, P.Garbincius, T.Shidara





# *Evolution of CLIC-ILC collaboration*

## Towards Linear Collider management?

- Joint meeting on 12/06 at CERN of:  
CLIC SC + ILC EC + CERN management

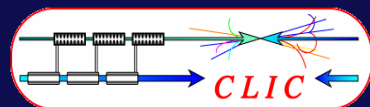
### Agenda:

- evolution of CLIC/ILC collaboration
- future policy about Linear Colliders
- CLIC and ILC (better) synchronisation (workshops, publications, etc...)

# World-wide CLIC / CTF3 collaboration



31 institutes involving 19 funding agencies of 17 countries



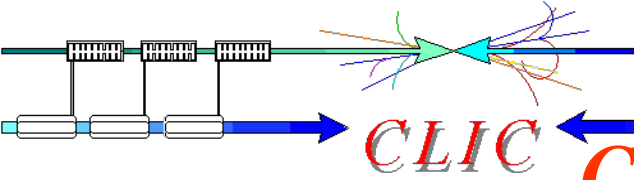
31 collaborating institutes

Ankara University (Turkey)  
 Athens University (Greece)  
 Berlin Tech. Univ. (Germany)  
 BINP (Russia)  
 CERN  
 CIEMAT (Spain)  
 Finnish Industry (Finland)  
 Gazi Universities (Turkey)

IRFU/Saclay (France)  
 Helsinki Institute of Physics (Finland)  
 IAP (Russia)  
 IAP NASU (Ukraine)  
 Instituto de Fisica Corpuscular (Spain)  
 INFN / LNF (Italy)  
 J.Adams Institute, (UK)  
 JASRI (Japan)

JINR (Russia)  
 JLAB (USA)  
 KEK (Japan)  
 Karlsruhe Univ. (Germany)  
 LAL/Orsay (France)  
 LAPP/ESIA (France)  
 LLBL/LBL (USA)  
 NCP (Pakistan)  
 North-West. Univ. Illinois (USA)

Oslo University (Norway)  
 Patras University (Greece)  
 PSI (Switzerland),  
 Polytech. University of Catalonia (Spain)  
 RAL (England)  
 RRCAT-Indore (India)  
 Royal Holloway, Univ. London, (UK)  
 SLAC (USA)  
 Svedberg Laboratory (Sweden)  
 Thrace University (Greece)  
 Uppsala University (Sweden)



# CLIC/CTF3 Multi-Lateral



## Collaboration of Volunteer Institutes

*31 institutes involving 19 funding agencies from 17 countries*

### *Organized as a Physics Detector Collaboration*

*Collab. Board: Chair: M.Calvetti/INFN; Spokesperson: G.Geschonke/CERN*

*MoU with addenda describing specific contribution (& resources)*

*[http://clic-meeting.web.cern.ch/clic-meeting/CTF3\\_Coordination\\_Mtg/Table\\_MoU.htm](http://clic-meeting.web.cern.ch/clic-meeting/CTF3_Coordination_Mtg/Table_MoU.htm)*

*Members (full responsibility of work packages and providing corresponding resources):*

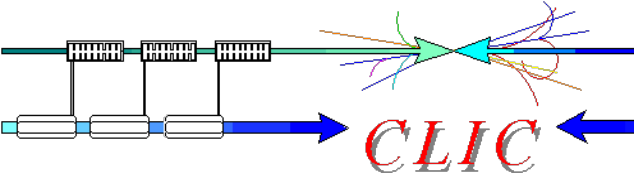
- CERN members with additional voluntary contributions:*

*CERN, Finland (HIP), France (IRFU, LAL, LAPP), Germany (Karlsruhe), Greece (Athens, Patras, Thrace), Italy (LNF), Norway (Oslo U.), Spain (CIEMAT, UPC, IFIC), Sweden (Uppsala), Switzerland (PSI), UK (Cockcroft, JAI, RHUL)*

- CERN non members with voluntary contributions:*

*India (RRCAT), Japan (KEK), Pakistan (NCP), Russia (BINP, IAP, JINR), Turkey (Ankara U., Gazi U.), Ukraine (IAP), USA (NWU, SLAC, JLAB)*

*MoU under discussion: China (HHEP, Tsinghua Univ.), Iran (IPM), USA (ANL)*



# CLIC/CTF3 Collaboration

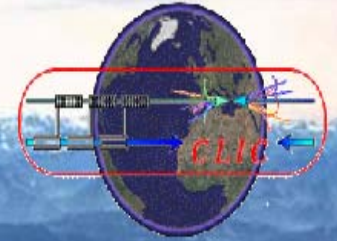
## Recent new members

- **Karlsruhe University: Laboratory for Application of Synchrotron Radiation (LAS)**
  - Development of Superconducting Wigglers for the CLIC Damping Ring
- **Greek Universities:**
  - National Technical University of Athens**
  - University of Patras**
  - The Democritus University of Thrace**
    - Beam Instrumentation
    - High precision mechanical studies and construction
    - Digital electronics
    - Controls systems
    - Machine Detector Interface
- **Important development of collaboration with SLAC and KEK about Structures designs, construction and tests as well as 12 GHz Klystron for stand alone power tests**



# CLIC08 Workshop

CERN, 14-17 October 2008



## CLIC09 Workshop on October 12-16, 2009 ACE participation welcome

[Home](#)

[Venue Details](#)

[Accommodation](#)

[Registration](#)

[General Information](#)

[Draft Program](#)

[Working Groups](#)

[Information for Speakers](#)

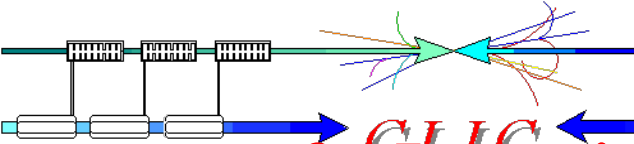
[Program Advisory Committee](#)

[Local Organising Committee](#)

CLIC'08 is an Accelerator and Physics Workshop which follows the very successful 1st Workshop of this kind held at CERN in Oct 2007.

The Aims of CLIC08 are:

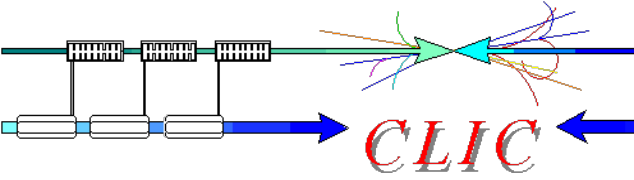
- Review the R&D towards CLIC Feasibility Demonstration and Conceptual Design Report in 2010. This includes Items of ILC-CLIC Common Interest as defined in the recently established ILC-CLIC Collaboration.
- Identify the R&D, Facilities and Engineering Efforts needed in the period after 2010 to progress from a Conceptual Design to a Technical Design.
- Address Particle Physics and Detector Issues of a Multi-TeV Linear Collider.



# Participants to CLIC08

**215 (registered) from 57 Inst. of 18 countries**

- **China:** Tsinghua University
- **Finland:** Helsinki Univ, HIP
- **France:** CEA Saclay, LAL, IPNL-IN2P3, IRFU-SPP, LAPP, LPHNE
- **Germany:** Bonn Univ., DESY, Forschungszentrum Karlsruhe, Greifswald Univ., MaxPlanck Inst.
- **Greece:** Nat Tech Univ., NTU Athens
- **India:** BARC-RRCAT, Ravishankar Shukla Univ
- **Italy:** LNF-INFN
- **Japan:** KEK
- **Norway:** Univ of Oslo
- **Pakistan:** NCP, Air Univ.
- **Poland:** Inst of Nucl Phys
- **Russia:** BINP, JINR, SINP-MSU
- **Spain:** CIEMAT, IFIC, Catalonia Univ., UPC Univ
- **Sweden:** MAX-Lab, Uppsala Univ.
- **Switzerland:** EPFL, ETH, PSI
- **Turkey:** Ankara Univ., TAEA
- **United-Kingdom:** ASTeC, Birmingham Univ., Cockcroft Inst., Euclid TechLab, Manchester Univ., RHUL, JAI, Oxford Univ., RAL, Lancaster Univ., STFC
- **United-States:** ANL, Colorado Univ., Cornell Univ., LBNL, FERMILAB, SLAC, NASA Inspires

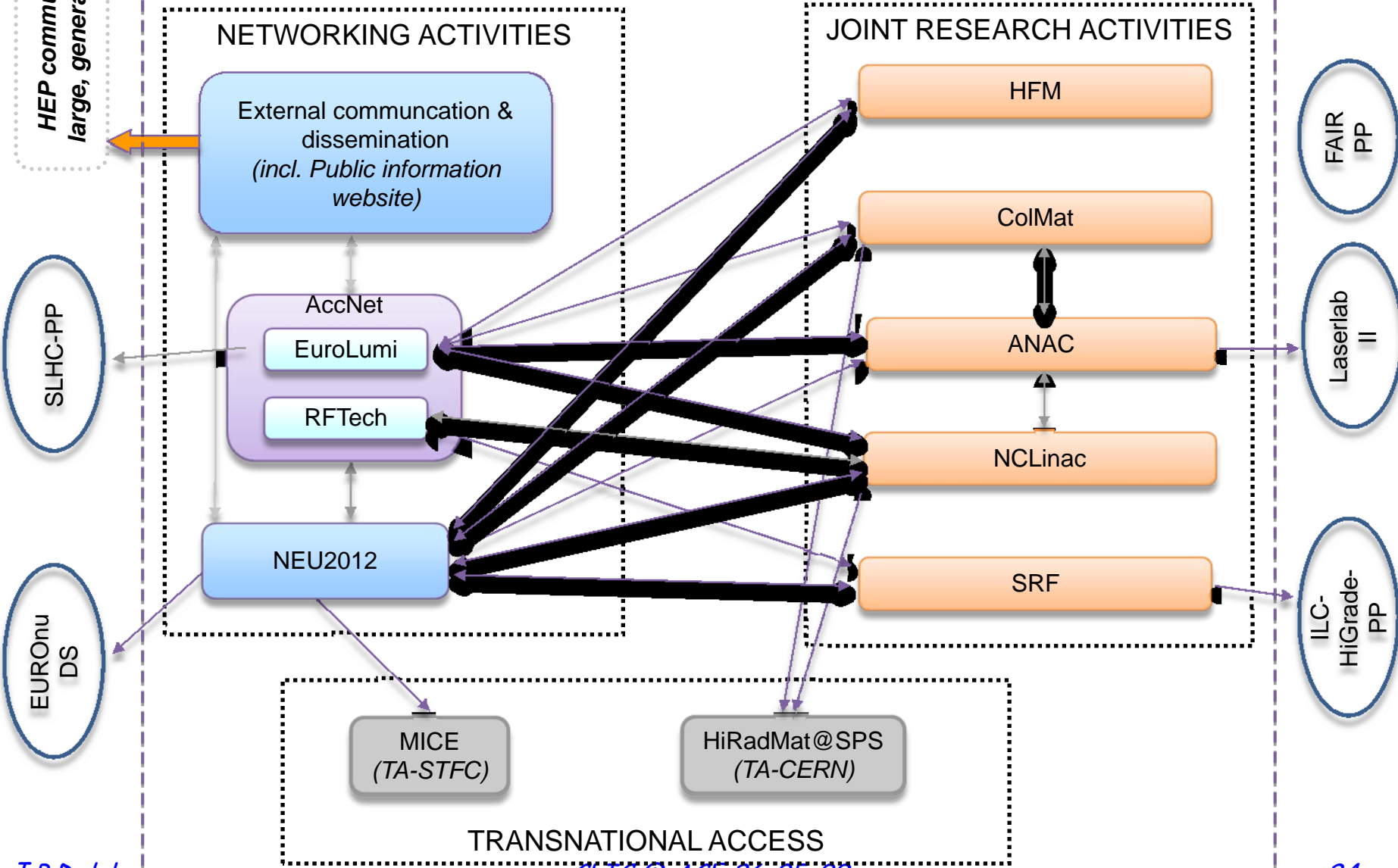


## FP7 - EuCARD

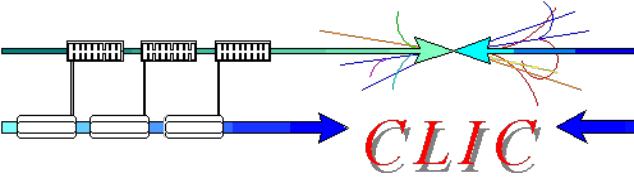
CLIC

- *European Coordination of Accelerator Research and Development*
- EuCARD is an "Integrating Activity" (IA) supported by the European Commission (EC) and coordinated by CERN
- 37 "beneficiaries" (participating labs, universities and companies) from 12 European countries.
- Duration: April 2009 - March 2013
- Overall budget: 33 M€, EC contribution: 10 M€
- Details at: <https://eucard.web.cern.ch/EuCARD/index.html>

# Project management and internal communication







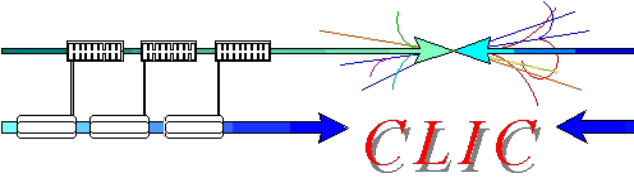
- Full name: *"Technology for normal conducting higher energy linear colliders"*
- 5 tasks:
  - NCLinac Coordination and Communication
  - Normal conducting High Gradient Cavities  
PETS, alignment & HOM's, breakdown simulation, BD diagnostics, precise assembly
  - Linac and Final Focus Stabilisation  
Quadrupole mock-up, FF test-stand
  - Beam Delivery System  
tuning procedures at ATF2, high-precision BPM's, Laser-wire
  - Drive Beam Phase control  
20 fs RF monitor, electro-optical monitor
- Partners: CERN, CIEMAT, CNRS, INFN, PSI, RHUL, STFC, UNIMAN, UOXF-DL, UU
- Resources: 6.5 MEuros, 540 persons-years



# *CLIC major activities and milestones up to 2010*

## *CLIC*

- Demonstrate feasibility of CLIC technology
  - Address all feasibility issues
- Design of a linear Collider based on CLIC technology
  - <http://clic-study.web.cern.ch/CLIC-Study/Design.htm>
- Estimation of its cost (capital investment & operation)
- CLIC Physics study and detector development:
  - [http://clic-meeting.web.cern.ch/clic-meeting/CLIC\\_Phys\\_Study\\_Website/default.html](http://clic-meeting.web.cern.ch/clic-meeting/CLIC_Phys_Study_Website/default.html)
- Conceptual Design Report to be published in 2010 including
  - Physics, Accelerator and Detectors
  - R&D on critical issues and results of feasibility study,
  - Preliminary performance and cost estimation

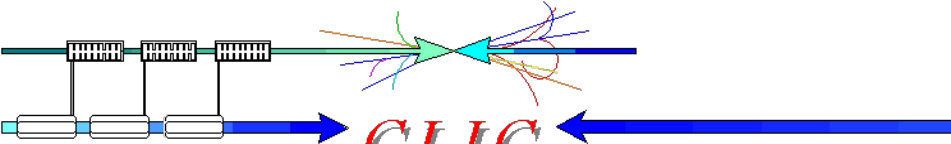


## Beyond 2010

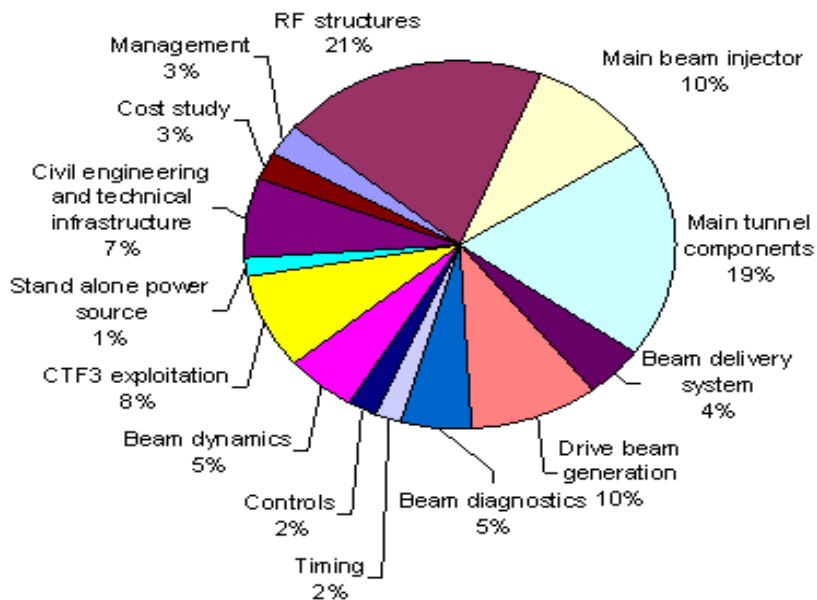
- Work plan (2011-2015) assuming successful feasibility demonstration by 2010 :

201006 CLIC LTP 2006 15.doc

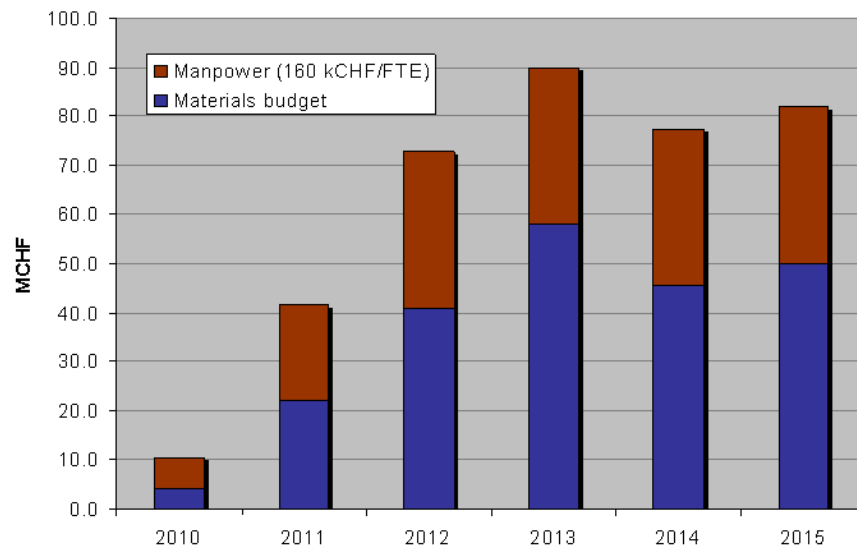
- Preparation of a Technical Design Report
- Task Force (R.Corsini) with preliminary report tomorrow and final report end June in order to define:
  - detailed work program
  - identify possible schedule based on resources (CERN and Collaborators) planned in CERN Medium Term Plan (MTP09)
  - Work distribution by the various teams (CERN and collaborators) and resources allocation in preparation of CERN MTP10.



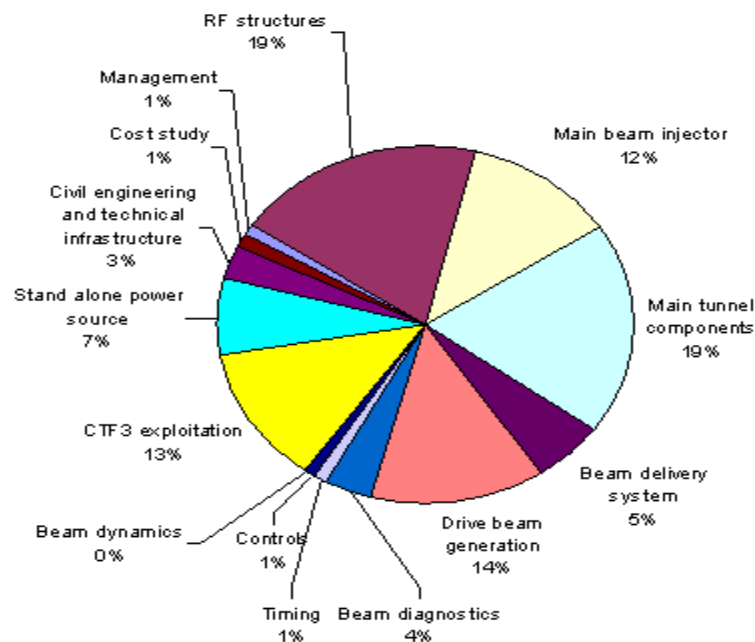
**CLIC Manpower distribution 2010-2015**



**CLIC M&P 2010-15 (CERN part only), Total 374 MCHF**



**CLIC Material budget distribution 2010-2015**



*Estimation of M&P resources distribution*

As planned in the CERN Medium Term Plan (MTP) adopted by the CERN Council in June 2008

ORGANISATION EUROPÉENNE POUR LA RECHERCHE NUCLÉAIRE  
**CERN** EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

**To be approved at CERN Council in June 2009**

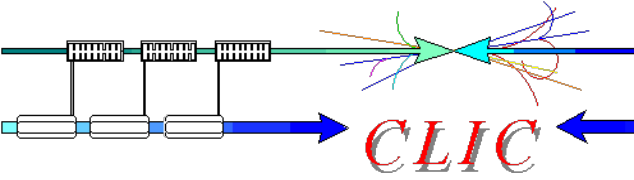
*Action to be taken*

*Voting procedure*

For discussion	SCIENTIFIC POLICY COMMITTEE 259 <sup>th</sup> Meeting 4 May 2009	—
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**WHITE PAPER**

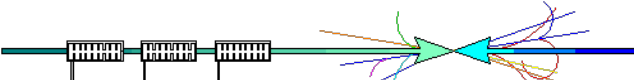
**Medium-Term Plan for the period 2010-2014 and Draft Budget  
of the Organization for the fifty-sixth financial year 2010**



# *CLIC resources in MTP09 Medium Term Plan (2009-2014)*

Table 5: Projects

Fact Sheet	(in MCHF, 2009 prices, rounded off)	2009 Revised budget	2010	2011	2012	2013	2014	2010-2014 Total
	<b>Projects</b>	<b>147.6</b>	<b>151.7</b>	<b>206.2</b>	<b>244.6</b>	<b>228.4</b>	<b>336.9</b>	<b>1 167.8</b>
16.a	CLIC	22.3	22.2	30.0	50.0	50.0	60.0	212.2
	Personnel	12.2	12.2	15.0	24.0	24.0	28.8	104.0
	Materials	10.1	10.0	15.0	26.0	26.0	31.2	108.3
16.b	Linear collider detector	0.1	2.1	3.5	4.1	4.1	4.1	17.9
	Personnel	0.1	1.5	2.6	3.0	3.0	3.0	13.0
	Materials	0.0	0.6	0.9	1.1	1.1	1.1	4.9



## Explanations to Table 5:

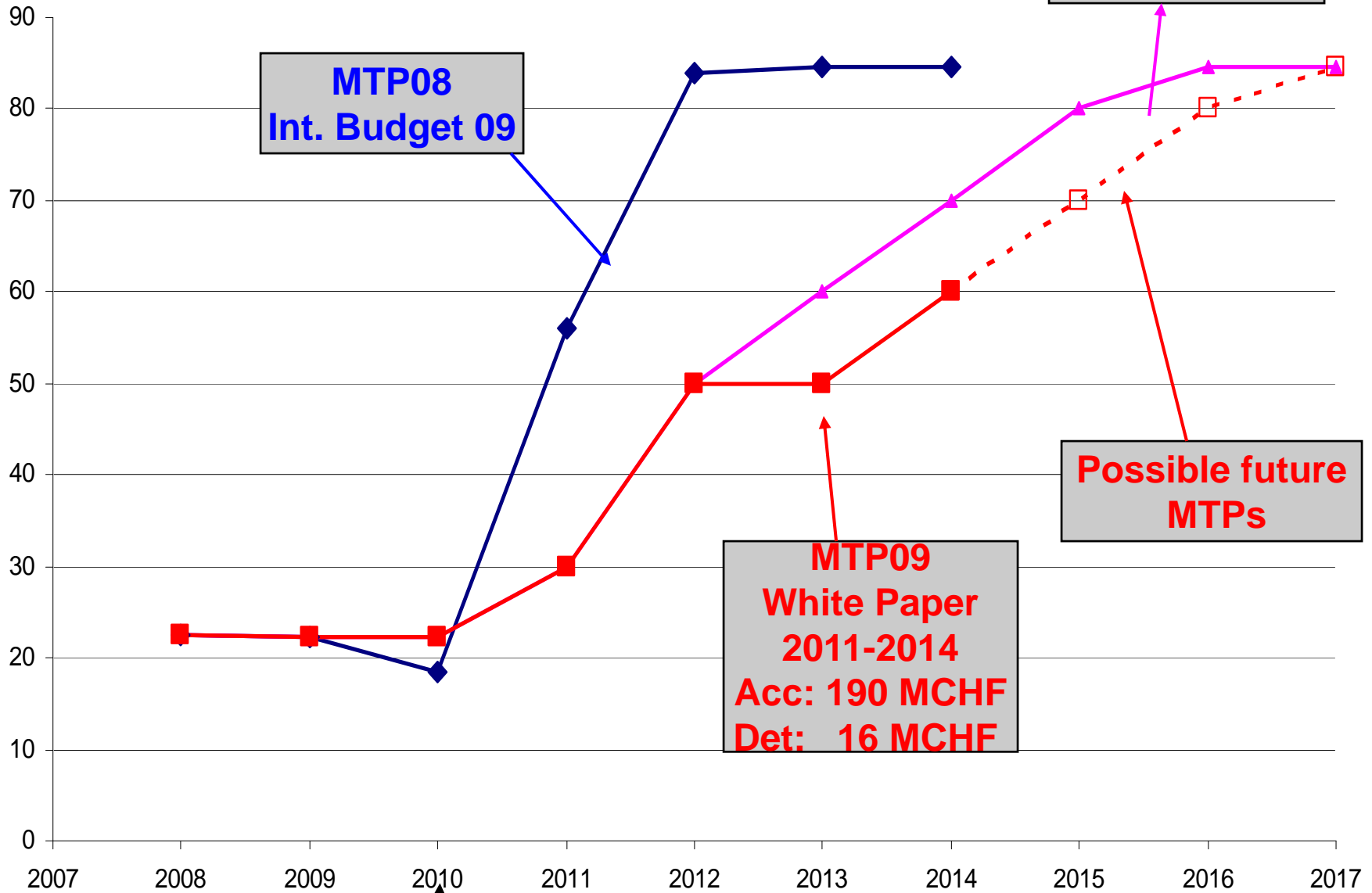
**CLIC:** This heading includes total funding for CTF3, the CLIC study and the CLIC/ILC collaboration. The changes with respect to last year's MTP are an anticipated delay in the outcome of the feasibility studies and a revised Technical Design Report schedule, which substantially reduce the allocation.

Pending the positive outcome of the feasibility study, the increased allocation of resources from 2011 onwards will allow the preparation of a Technical Design Report.

**Linear collider detectors:** This constitutes a new heading for CERN's participation in the detector R&D specific to a future linear collider.

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# CLIC M&P resources (MCHF)



**MTP08**  
**Int. Budget 09**

**CLIC LTP**  
**Proposal**

**MTP09**  
**White Paper**  
**2011-2014**  
**Acc: 190 MCHF**  
**Det: 16 MCHF**

**Possible future**  
**MTPs**

**Conceptual Design Report (CDR)**

**Technical Design (TDR) ?**



# Tentative long-term CLIC scenario

*Short-term Success Oriented, Technically Limited Schedule*

Technology evaluation and Physics assessment based on LHC results for a possible decision on Linear Collider with staged construction starting with the lowest energy required by Physics

Council decision on CLIC TDR

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
R&D on Feasibility Issues	█	█	█	█													
Conceptual Design	█	█	█	█													
R&D on Performance and Cost issues	█	█	█	█	█	█	█	█	█								
Technical design					█	█	█	█	█								
Engineering Optimisation&Industrialisation					█	█	█	█	█	█							
Construction (in stages)											█	█	█	█	█	█	█
Construction Detector													█	█	█	█	█

TDR phase extension to be adapted to detailed work program (Corsini) and resources availability

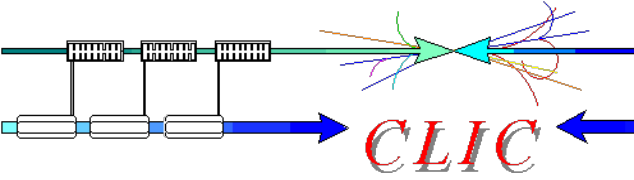
ACE's advice appreciated!

Conceptual Design Report (CDR)

Technical Design Report (TDR)

Project approval ?

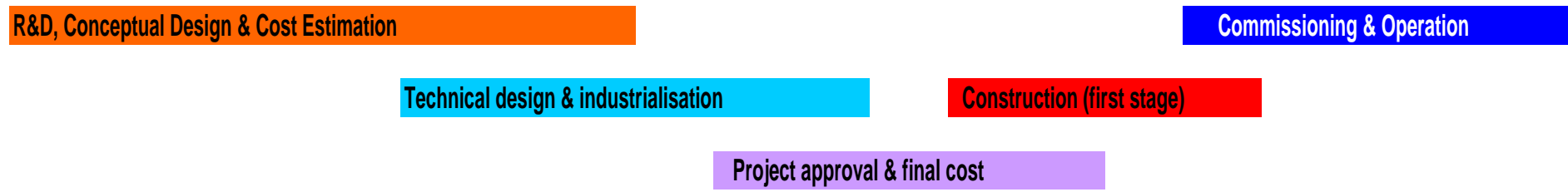
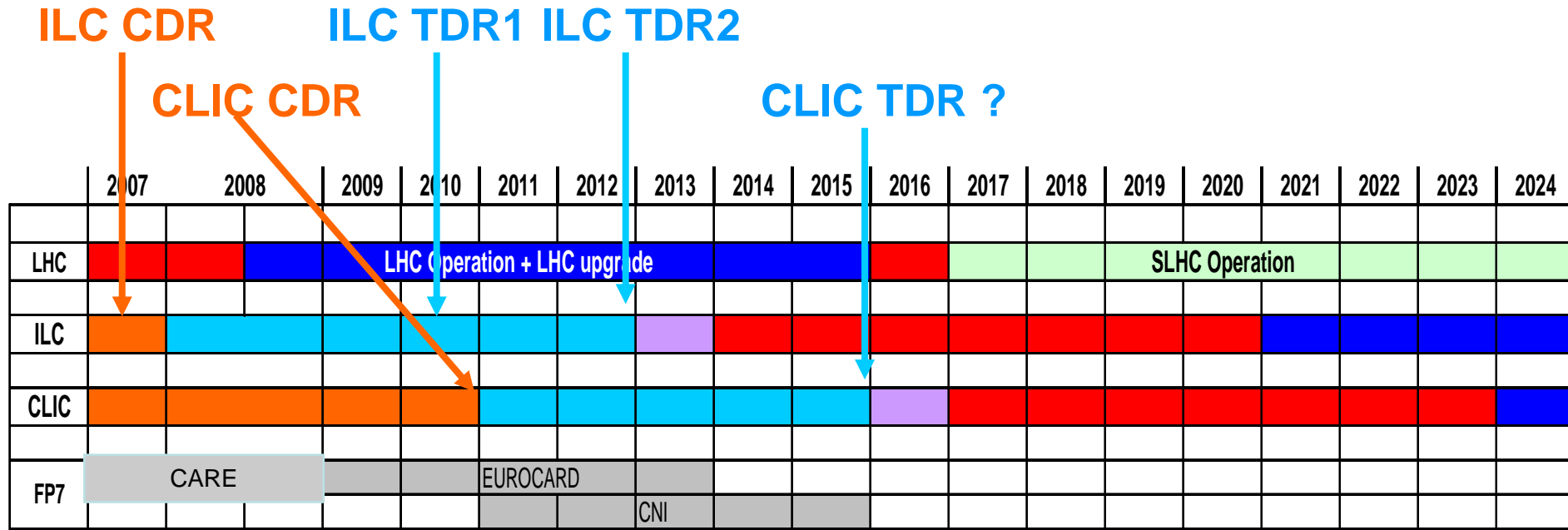
First Beam?

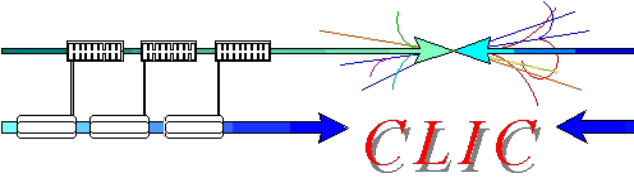


# *CLIC in HEP context*

## *Complementary to LHC*

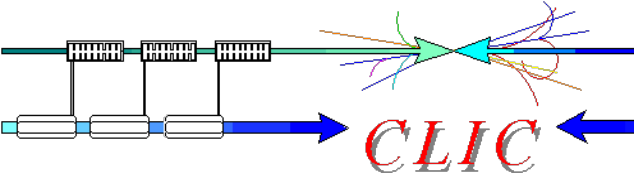
### *Collaborative competition with ILC*



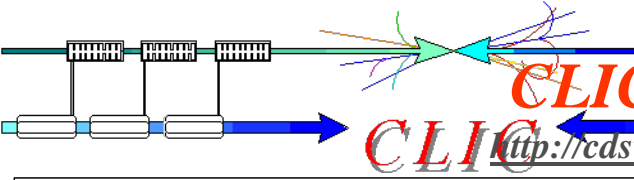


## Conclusion

- CLIC organisation and R&D work program towards feasibility demonstration and CDR edition by end 2010 well defined
- Under schedule but still lot of work to be done!
- 4<sup>th</sup> ACE's recommendations very timely (last moment for any possible adaptation?)
- Definition of program after 2010 towards TDR started:
  - Requested by Collaboration Institutes
  - Reflection on work program (task force)
  - CERN resources planned
- CLIC/CTF3 collaboration very fruitful and expanding
- Excellent spirit of competitive collaboration with ILC
- Support and suggestions by ACE welcome

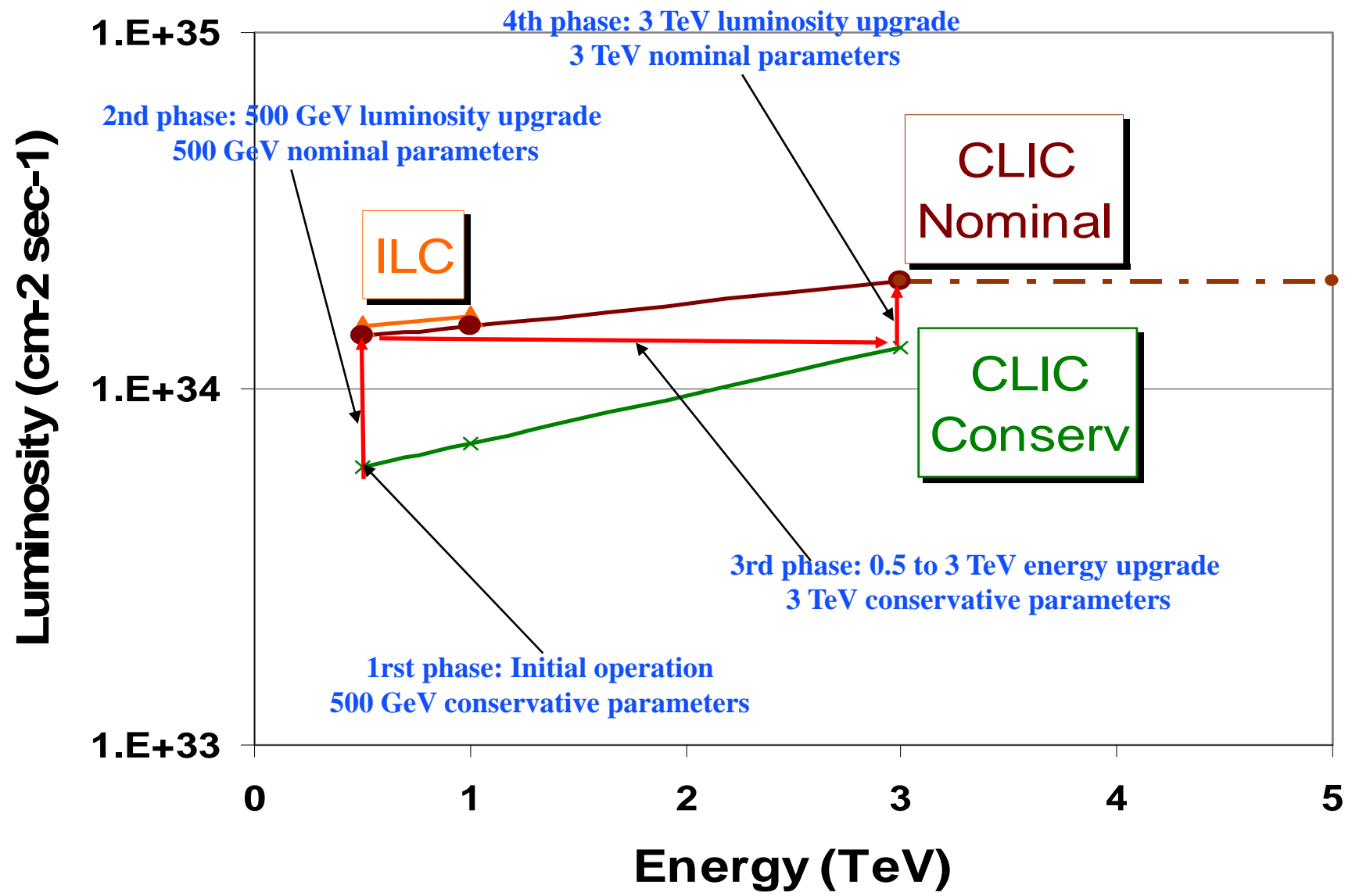


*Spare*

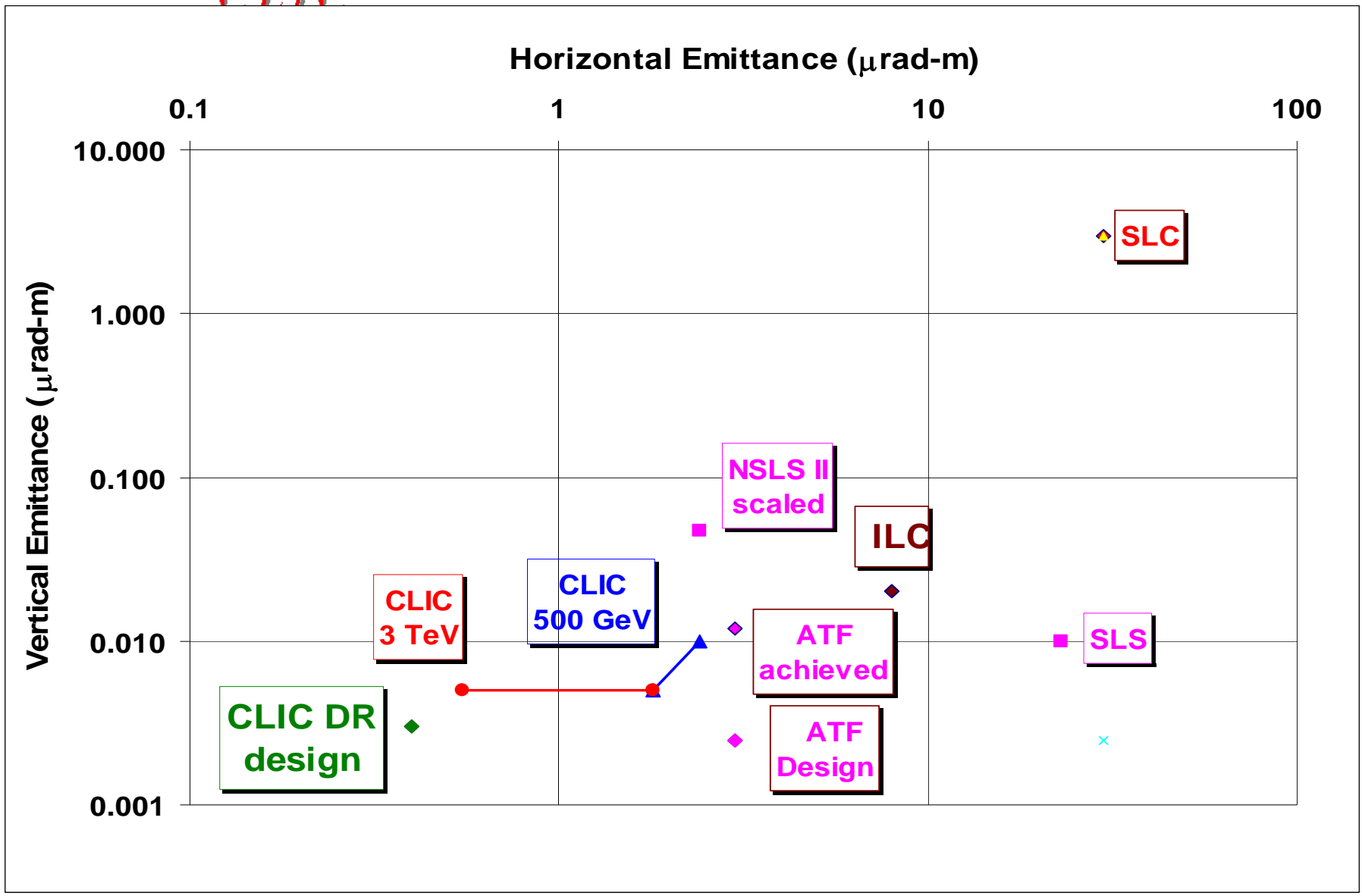


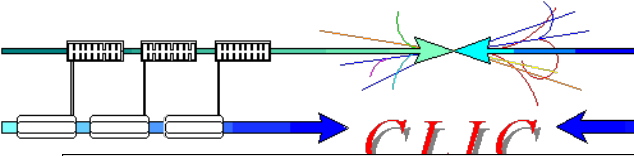
# CLIC Parameters and upgrade scenario

<http://cdsweb.cern.ch/record/1132079/files/CERN-OPEN-2008-021.pdf>



# Beam emittances at Damping Rings

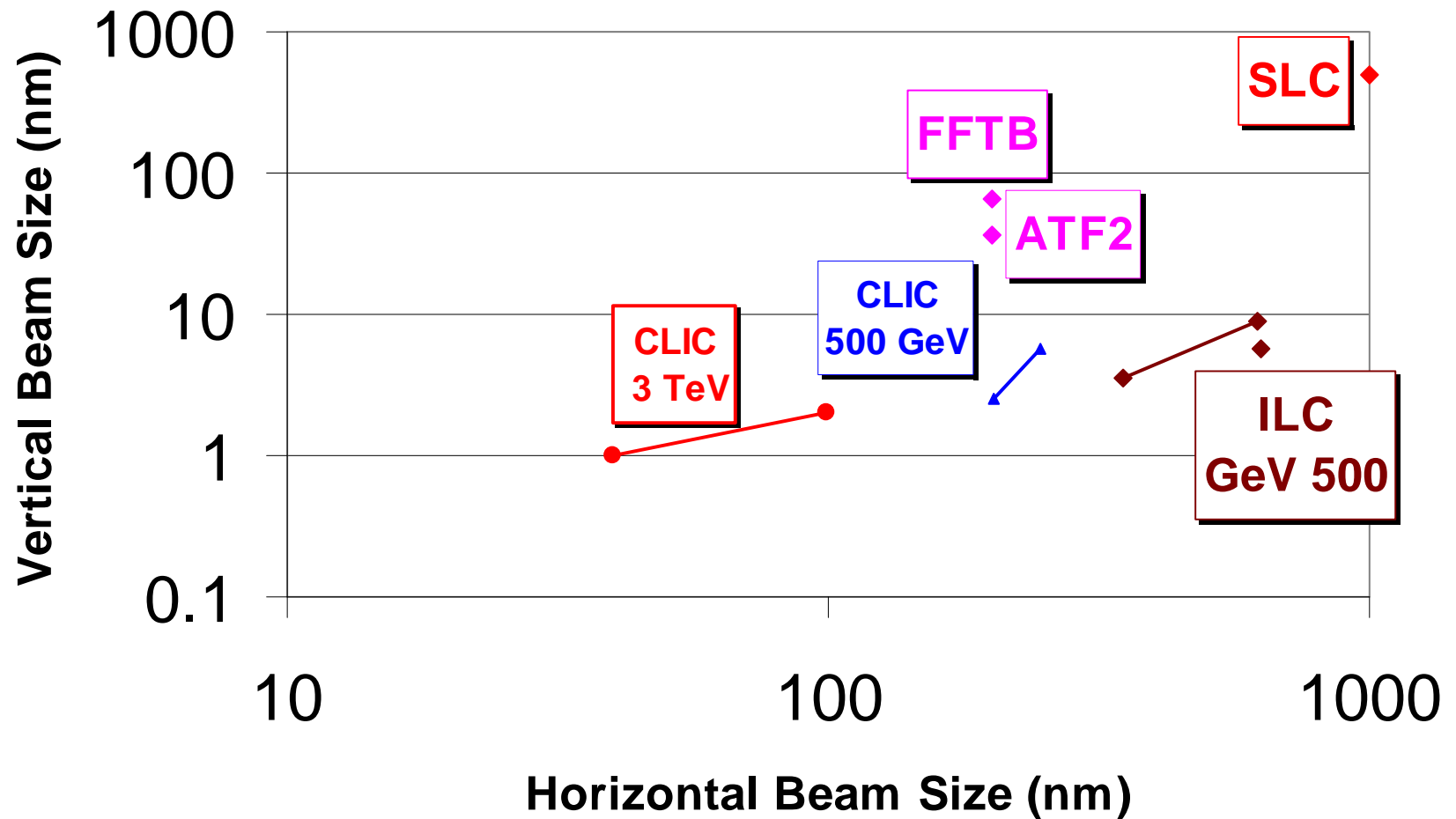




# *Beam sizes at Collisions*



## R.M.S. Beam Sizes at Collision in Linear Colliders



# CLIC main parameters



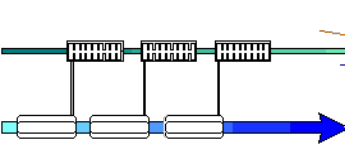
<http://cdsweb.cern.ch/record/1132070?ln=fr> <http://clie-meeting.web.cern.ch/clie-meeting/eliectable2007.html>

Center-of-mass energy	CLIC 500 G		CLIC 3 TeV	
Beam parameters	Conservative	Nominal	Conservative	Nominal
Accelerating structure	502		G	
Total (Peak 1%) luminosity	$0.9(0.6) \cdot 10^3$ 4	$2.3(1.4) \cdot 10$ 34	$1.5(0.73) \cdot 1$ 0 <sup>34</sup>	$5.9(2.0) \cdot 10^{34}$
Repetition rate (Hz)	50			
Loaded accel. gradient MV/m	80		100	
Main linac RF frequency GHz	12			
Bunch charge $10^9$	6.8		3.72	
Bunch separation (ns)	0.5			
Beam pulse duration (ns)	177		156	
Beam power/beam (MWatts)	4.9		14	
Hor./vert. norm. emitt ( $10^{-6}/10^{-9}$ )	3/40	2.4/25	2.4/20	0.66/20
Hor/Vert FF focusing (mm)	10/0.4	8 / 0.1	8 / 0.3	4 / 0.07
Hor./vert. IP beam size (nm)	248 / 5.7	202 / 2.3	83 / 2.0	40 / 1.0
Hadronic events/crossing at IP	0.07	0.19	0.57	2.7
Coherent pairs at IP	10	100	$5 \cdot 10^7$	$3.8 \cdot 10^8$ 40
BDS length (km)	1.87		2.75	

J.P. Delahaye

CLIC @ ACE 26-05-09



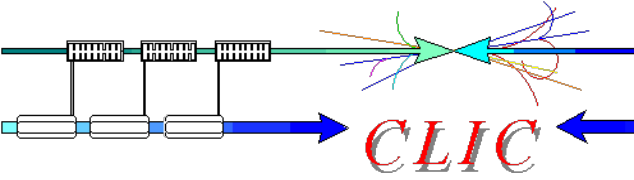


# LC 500 GeV Main parameters



<http://clic-meeting.web.cern.ch/clic-meeting/ComparisonTable.html>

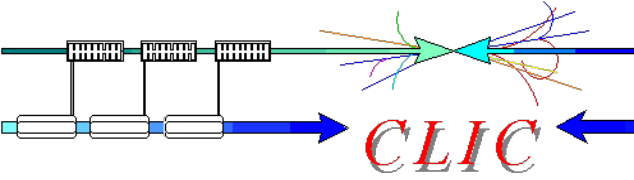
Center-of-mass energy	NLC 500 GeV	ILC 500 GeV	CLIC 500 G Conservativ	CLIC 500 G Nominal
Total (Peak 1%) luminosity	2.0(1.3)-10 <sub>34</sub>	2.0(1.5)-10 <sub>34</sub>	0.9(0.6)-10 <sub>34</sub>	2.3(1.4)-10 <sub>34</sub>
Repetition rate (Hz)	120	5	50	
Loaded accel. gradient MV/m	50	33.5	80	
Main linac RF frequency GHz	11.4	1.3 (SC)	12	
Bunch charge 10 <sup>9</sup>	7.5	20	6.8	
Bunch separation ns	1.4	176	0.5	
Beam pulse duration (ns)	400	1000	177	
Beam power/linac (MWatts)	6.9	10.2	4.9	
Hor./vert. norm. emitt (10 <sup>-6</sup> /10 <sup>-9</sup> )	3.6/40	10/40	3 / 40	2.4 / 25
Hor/Vert FF focusing (mm)	8/0.11	20/0.4	10/0.4	8/0.1
Hor./vert. IP beam size (nm)	243/3	640/5.7	248 / 5.7	202/ 2.3
Soft Hadronic event at IP	0.10	0.12	0.07	0.19
Coherent pairs/crossing at IP	10?	10?	10	100
BDS length (km)	3.5 (1 TeV)	2.23 (1 TeV)	1.87	
J.P.Delahaye	CLIC @ ACE 26-05-09			41
Total site length (km)	18	31	13.0	



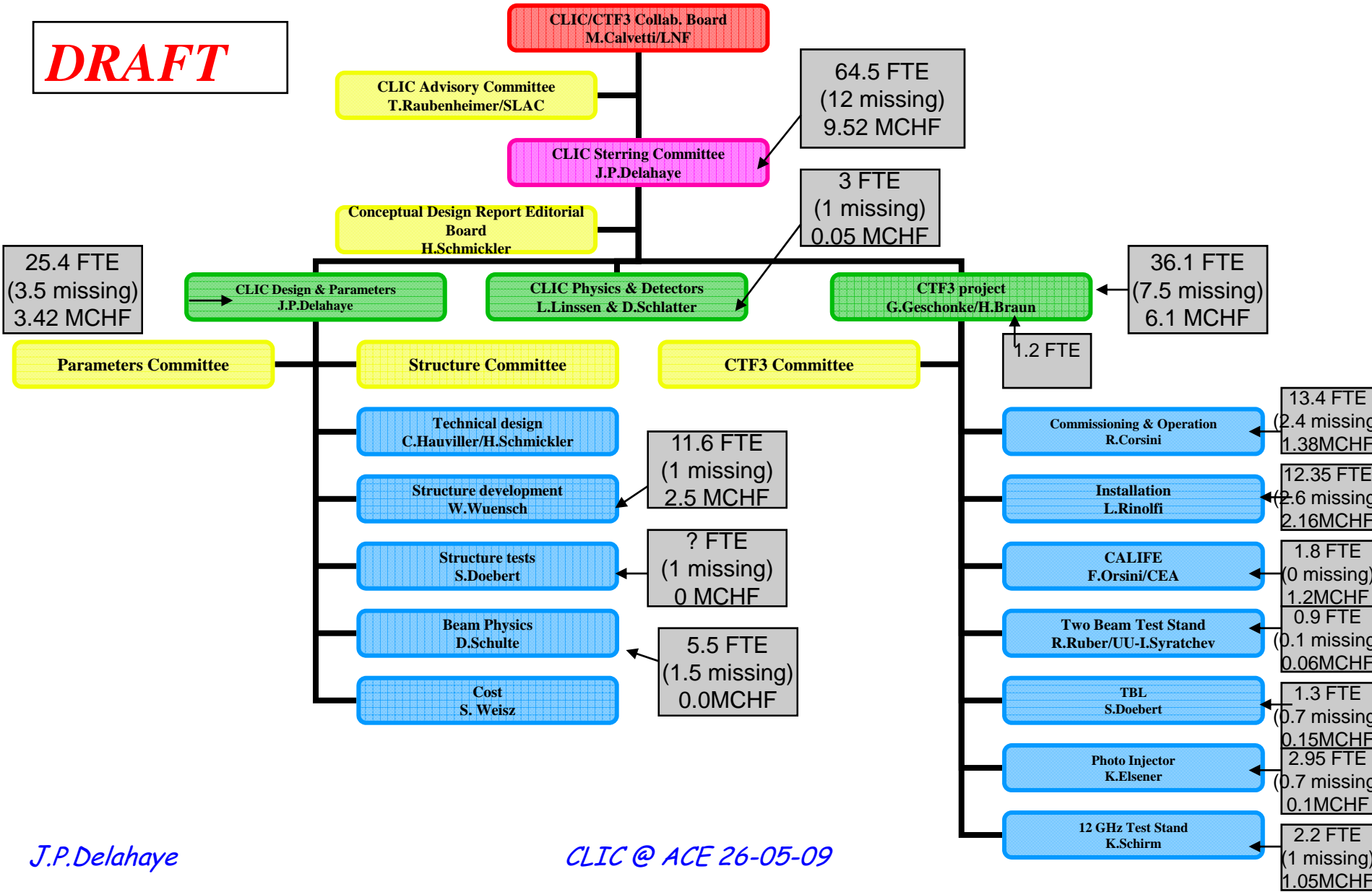
# CLIC missing man-power

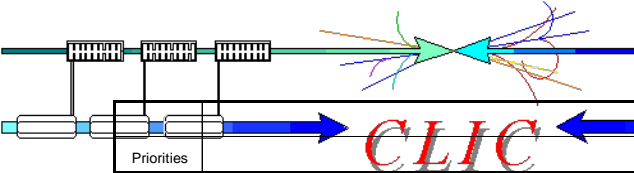
Dep/Group	Job title	Cat.	Comment	# (FTE*Years)	kCHF/y	kCHF
AB/RF	<a href="#">Electronic expert</a>	E		1*2.5	150	375
AB/ABP	<a href="#">CTF3 modelling &amp; commissioning</a>	E		1*2.5	150	375
AB/RF	<a href="#">RF &amp; Electronic</a>	E		1*2.5	150	375
AB/ABP	<a href="#">Beam dynamics: Placet &amp; Drive beam</a>	E		1*2.5	150	375
AB/RF	<a href="#">Klystron &amp; Modulators</a>	D		1*2.5	130	325
AB/RF	<a href="#">RF structure test</a>	E		1*2.5	150	375
AB/BI	<a href="#">CLIC/CTF3 instrumentation</a>	D-E		1*2.5	140	350
AB/RF	<a href="#">CTF3 Inst &amp; Techn. support</a>	B		1*2	100	200
AT/VAC	CTF3 Vacuum	C		1*2	115	230
AB/RF	<a href="#">Klystron &amp; Modulators</a>	D		1*2	130	260
AB/ABP	<a href="#">Beam dynamics</a>	E		1*2	150	300
AB/ATB	<a href="#">Lasers</a>	E		1*2	150	300
AB/BT	<a href="#">CLIC/CTF3 kickers</a>	D-E		1*2	140	280
<b>Total new</b>				<b>29.5</b>		<b>4120</b>

# CLIC Chart



**DRAFT**





# CLIC

Priorities		2010				2011				2012				2013				2014				
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	LHC Operation assumed	O	O	O	O	O	Sh	Sh	O	O	Sh	O	O	O	Sh	O	O	Sh	Sh	Sh	O	O
1	SPS operation and exploitation	O	O	O	O	O	Sh	O	O	O	Sh	O	O	O	Sh	O	O	Sh	Sh	Sh	O	O
1	PS Operation and Exploitation	O	O	O	O	O	Sh	O	O	O	Sh	O	O	O	Sh	O	O	Sh	Sh	Sh	O	O
1	Booster Exploitation and Operation	O	O	O	O	O	Sh	O	O	O	Sh	O	O	O	Sh	O	O	Sh	Sh	Sh	O	O
1	Source/LINAC2 op and exploitation	O	O	O	O	O	Sh	O	O	O	Sh	O	O	O	Sh	O	O	Sh	Sh	Sh	Sh	Sh
1	LHC 3-4 magnet repair for spares		C	C	C	C																
1	Consolidation all accelerators	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	LINAC4 assumed	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	Sh	Sh	Sh	O	O
2	Inner Triplets assumed	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	Sh	Sh	Sh	O	O
1	AD assumed	Sh	Sh	O	O	O	Sh	O	O	O	Sh	O	O	O	Sh	O	O	Sh	Sh	Sh	O	O
1	AEGIS		C?	C?	C?	C?		O?	O?	O?		O?	O?	O?		O?	O?				?	?
1	ELENA						??	??	??	??	??	??	??	??	??	??	??	??	??	??	??	??
1	CNGS	Sh	Sh	O	O	O	Sh	O	O	O	Sh	O	O	O	Sh	O	O	O	Sh	??	??	??
1	East Hall (PS)	Sh	Sh	O	O	O	Sh	O	O	O	Sh	O	O	O	Sh	O	O	O	Sh	??	??	??
1	ISOLDE (REX)	Sh	Sh	O	O	O	Sh	O	O	O	Sh	O	O	O	Sh	O	O	O	Sh	??	??	??
1	nToF	Sh	Sh	O	O	O	Sh	O	O	O	Sh	O	O	O	Sh	O	O	O	Sh	??	??	??
1	North Area (Compass etc)	Sh	Sh	O	O	O	Sh	O	O	O	Sh	O	O	O	Sh	O	O	O	Sh	??	??	??
2	CAST/OSQAR	??	??	??	??	??	??	??	??	??	??	??	??	??	??	??	??	??	??	??	??	??
2	CTF3 Operation	O		O	O	O	O	O	O?	O?	??	O?	O?	O?	??	O?	O?	O?	??	??	O?	O?
2	CLIC/ILC	St	St	St	St	St	St	St	*St?	St?	Td?	Td?	Td?	Td?	Td?	Td?	Td?	Td?	Td?	Td?	Td?	Td?
2	Collimation Phase 2	St	St	St	St	St	St	St	St	St	C?	C?	C?	C?	C?	C?	C?	C?				
2	PS2 Study	St	St	St	St	St	St	St	St	St	St	*										
2	PS2 Construction														C?	C?	C?	C?	C?	C?	C?	C?
2	SPL (LP)	St	St	St	St	St	St	St	St	St	St	*										
2	SPL Construction														C?	C?	C?	C?	C?	C?	C?	C?
3	HIE ISOLDE																		C?	C?	C?	C?
3	High Field Quadrupoles R&D	St	St	St	St	St	St	St	St	St	St	St	St	St	St	St	St	St	St	St	St	St
3	Medical Applications		St	St	St	St	St	St	St	St	St	St	St	St	St	St	St	St	St	St	St	St
3	Radiation Facilities (HiRadMat)						??	??	??	??	??	??	??	??	??	??	??	??	??	??	??	??
			O				C				Sh				St							
			O?																			

scarcity of protons

# Prospects for Scientific Activities over the Period 2012 - 2016

DG to CERN staff  
Jan 08

To be decided in 2010-2011 in light of first physics results from LHC, and designed and R&D results from the previous years. This programme could most probably comprise:

- **An LHC luminosity increase requiring a new injector (SPL and PS).**

The total cost of the investment over 6 years (2011-2016: 1000-1200 MCHF + a staff of 200-300 per year. Total budget: ~200-250 MCHF per year.

- **Preparation of a Technical Design for the CLIC programme, for a possible construction decision in 2016 after the LHC upgrade (depending on the ILC future).**

Total CERN M + P contribution + ~250 MCHF + 1000-1200 FTE over 6 years.

- **Enhanced infrastructure consolidation: 30 MCHF + 40 FTEs from 2011.**

NB: Over the period 2012-2016. Effective participation of CERN in another large programme (ILC or a neutrino factory) will not be possible within the expected resources if positive decisions taken on LHC upgrade and CLIC Technical Design. This situation could totally change *if none of the above programmes is approved* or if a new, more ambitious level of activities and support is envisaged in the European framework.