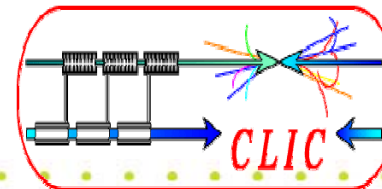


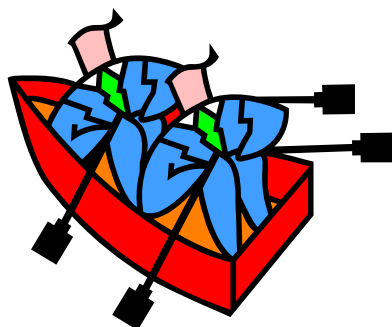


# *CLIC-ILC Collaboration*



**Following constructive visit of Barry @ CERN (Nov 07)**

<http://www.linearcollider.org/newsline/archive/2007/20071213.html>

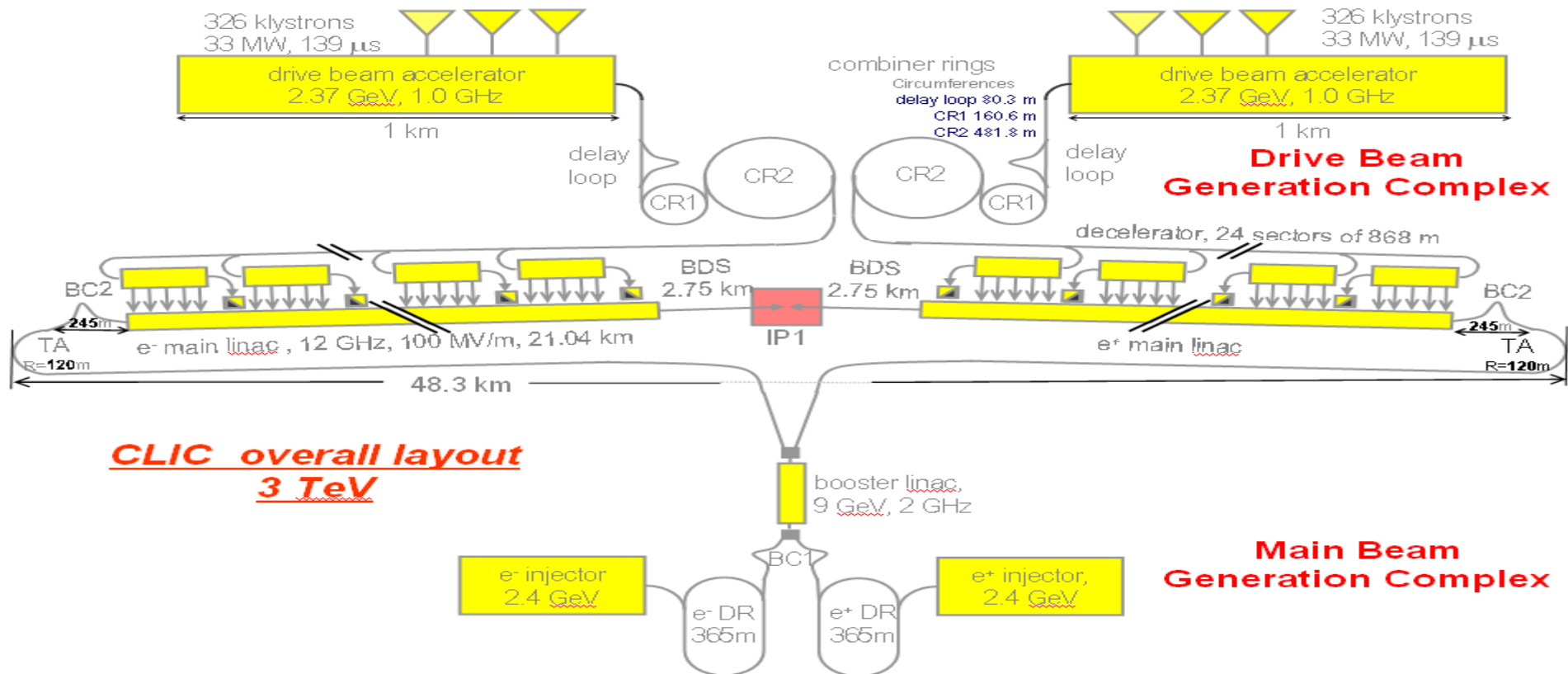
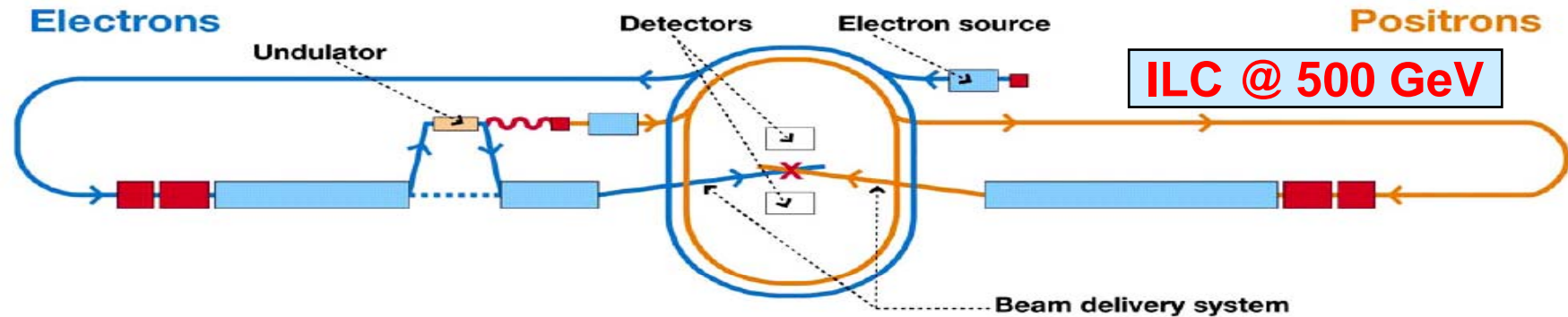
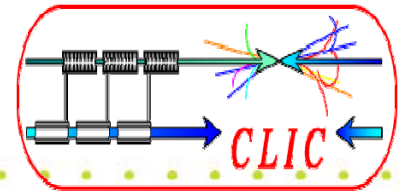


**Dedicated web site with specific documentation**

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

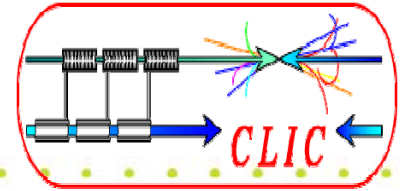


# CLIC and ILC layouts





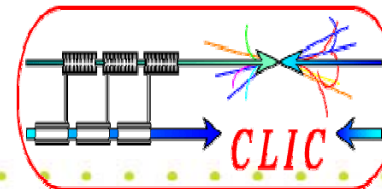
## *A necessary and beneficial CLIC /ILC Collaboration*



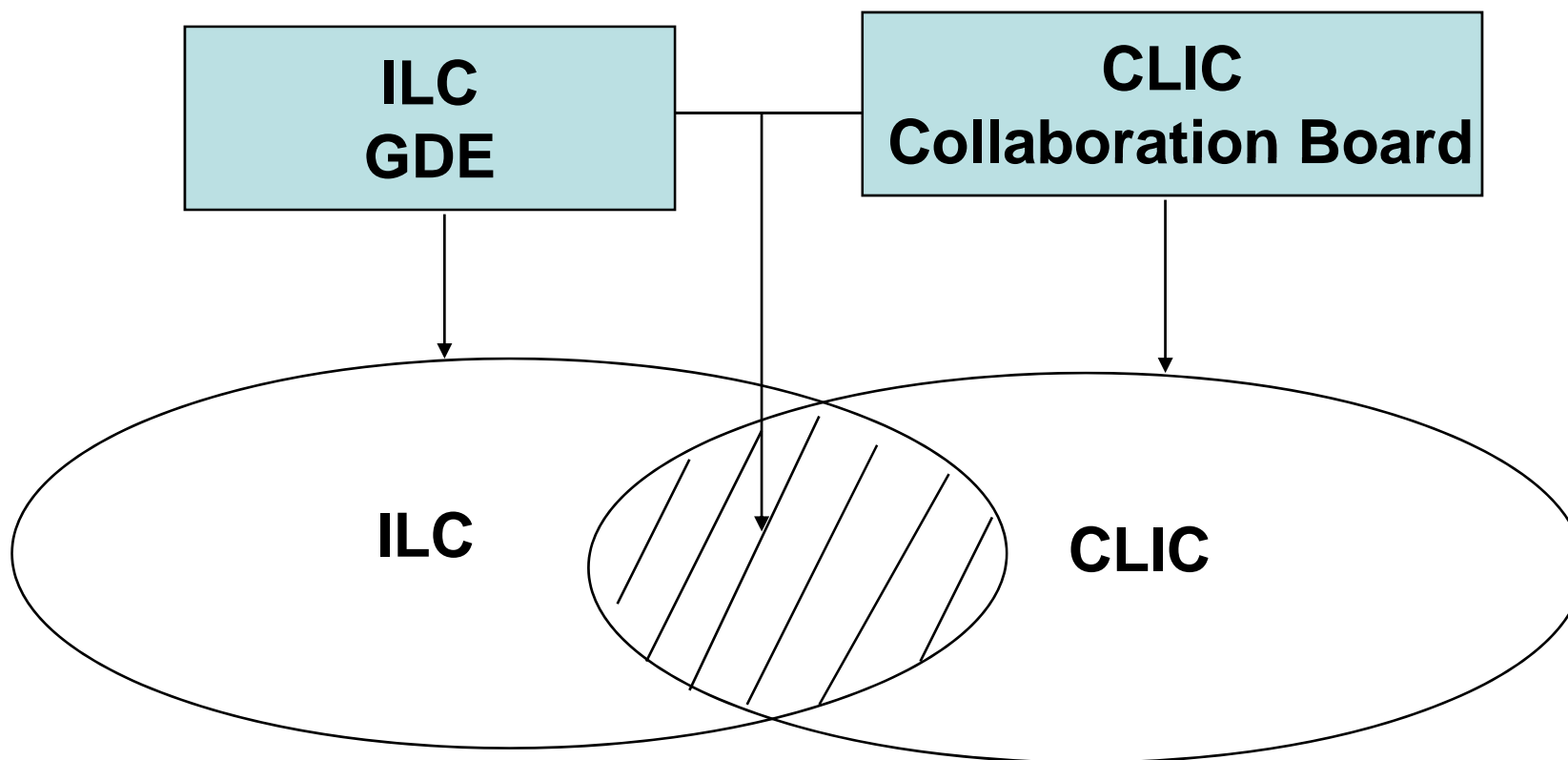
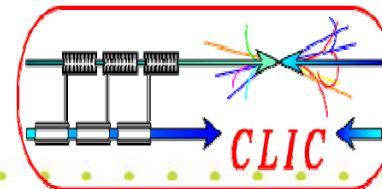
- **Focusing on subjects with strong synergy between CLIC & ILC**
- **making the best use of the available resources**
- **adopting systems as similar as possible**
- **identifying and understanding the differences due to technology and energy (technical, cost....)**
- **developing common knowledge of 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**



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



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



No additional meetings but reinforced participation of CLIC experts to ILC meetings and ILC experts to CLIC workshop

# **CLIC – ILC Collaboration Strategy** **(M.Ross @ CLIC08)**

## **What can ILC bring to CLIC?**

- **Use the same cost basis.**
- **develop a credible comparison**
- **(ILC will help in the costing of CLIC)**

## **And CLIC to ILC:**

- **CERN & CLIC-collaboration experts to work with ILC team on common design issues**

**The credibility of each project within our community  
will be facilitated through communication**







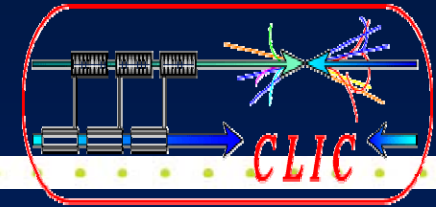
# Collaboration for CFS Works CLIC-ILC

**Conveners:** C.Hauviller/CERN, V.Kuchler/FNAL J.Osborne/CERN

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



# CFS Working Group organisation



The following working groups already exist :

- The Conventional Facilities and Siting 'CFS Team' for ILC
- 'Civil Engineering and Services' CES for CLIC, based at CERN

These groups work independently on the civil engineering and services side of both projects.

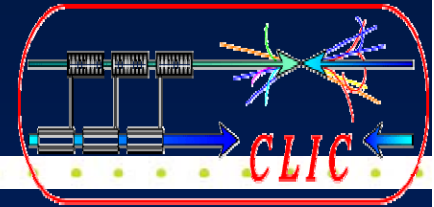
Resources permitting, both groups work together on areas of mutual interest for both projects, with participation from both sides at relevant meetings. Meeting have been held monthly with CLIC & ILC participation

- Optimisation of Tunnel and Shaft diameters, distance between shafts (linked to safety)
- **Overall layout of the machine and interaction region infrastructure**
- Shallow site v Deep Tunnel Option
- Single Tunnel v Double Tunnel
- **Safety issues such as emergency egress**
- Environmental issues
- **Cooling Water**
- Power Distribution
- Air Handling
- **Transport Issues**
- Radiation simulations / shielding ?

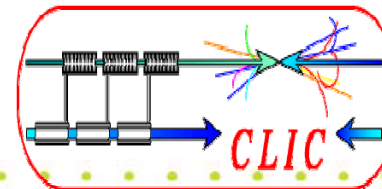




# CFS/CES Objectives for 2009



- Civil engineering :
  - 3d modelling for ILC using CATIA Software (by Spring 09)
  - Assist in studies for possible new ILC sites (Dubna, Desy)
  - Draw up plans for new ILC RF cluster design
  - Assist in shallow site studies v RDR deep tunnel
- Transport – to study ILC installation methods (by summer 09)
- Cooling & Ventilation – CLIC & ILC teams to work together to develop cooling and ventilation design
- Safety – to draw up a common document for underground safety rules that should be applied to CLIC & ILC (by summer 09)



## ***BDS & MDI***

**Conveners:** B.Parker/BNL, A.Seriy/SNAL, D.Schulte/CERN,  
R.Tomas Garcia/CERN, E.Tsesmelis/CERN

**Mandate:** [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)

# Collaboration subjects already started

## 1. ATF2 ultra-low betas and tuning

People S. Bai, P. Bambade, Y. Renier, S. Kuroda,  
G. White and R. Tomás

## 2. FFS design and optimization

People A. Seryi and R. Tomás

## 3. Collimation, survival and efficiency studies

People D. Angal-Kalinin, J. Resta, L. Fernandez,  
F. Jackson and R. Tomás

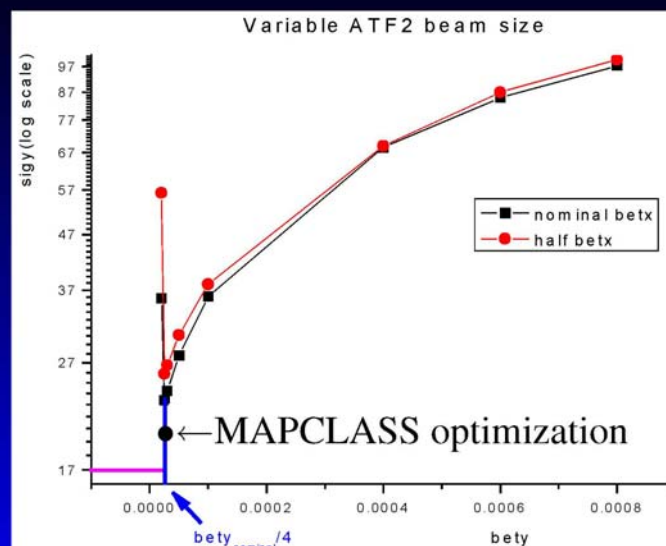
## 4. Polarization measurement

People K. Moffeit, P. Schuler, D. Schulte, A. Seryi  
and R. Tomás

# ATF2 ultra-low betas: plans

- Establish new optics considering magnetic multipolar errors (2009)
- Continue collaborating on finding best tuning strategy (2009)
- CERN PhD to start on February 2009
- Operate ATF2 at ultra-low betas (2010-2011)

## ATF2 ultra-low betas

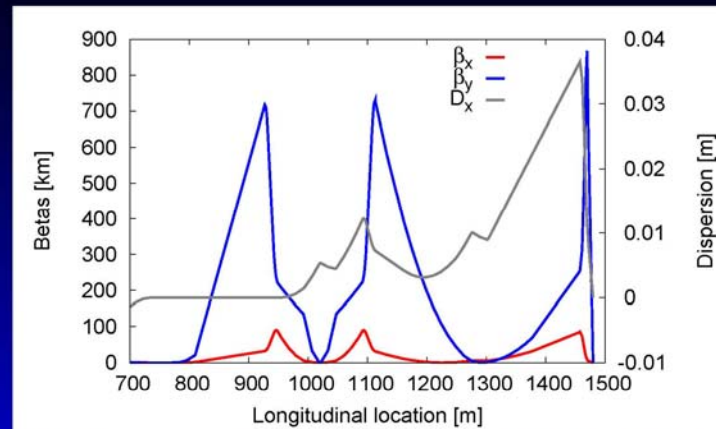




# FFS design and optimization: plans

- Finalize designs for  $L^*=3.5, 4.3$  and 8m
- Evaluate luminosity and tuning performances
- Try to alleviate synchrotron radiation or reduce aberrations via increasing the length of the FFS (P. Raimondi proposal)
- Provide all information towards the CDR in 2010

## FFS design and optimization

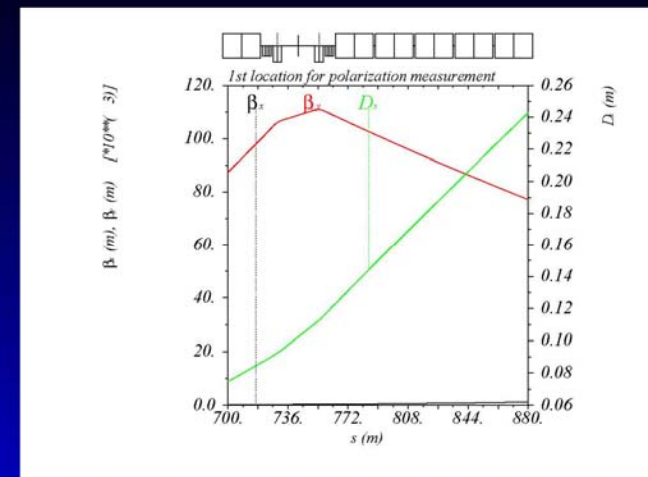


New FFS proposed by A. Seryi for CLIC with  $L^*=8$ m.  
On-going optimizations with MAPCLASS and performance comparison to CLIC FFS with  $L^*=3.5$ m.

# Polarization measurement plans

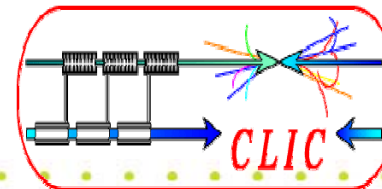
- Update lattice with the polarization measurement
- However depolarization at IP is 4%
- Request a study of another post-IP polarization measurement
- Spent beam conditions very adverse for instrumentation
- Need to involve col post-collision line

## Polarization measurement (before IP)



Conceptual polarization measurement fully devised in a straight section of the collimation section.



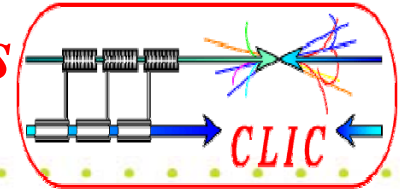


## *Positron generation (Starting at this workshop)*

**Conveners: J.Clarke/STFC Daresbury, L.Rinolfi/CERN**  
**Mandate: To be defined**



## *Collaborations for the CLIC/ILC sources*



- 1) Polarized electron from DC gun: JLAB (USA) Formal agreement  
SLAC (USA) Informal agreement =>

*Will be discussed during this workshop*

- 2) Unpolarized  $e^+$  from channeling: LAL (France) Formal agreement

- 3) Polarized  $e^+$  from Compton ring: LAL (France) Formal agreement  
NSC KIPT (Kharkov) Informal agreement  
KEK (Japan) Informal agreement

- 4) Polarized  $e^+$  from Undulator: Cockcroft Institute (UK) Formal agreement  
ANL (USA) Informal agreement =>

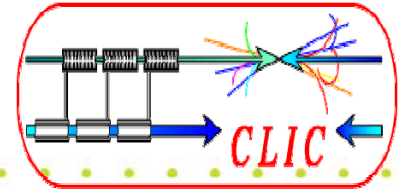
*Will be discussed during this workshop*

- SLAC (USA) Informal agreement =>

*will be discussed during this workshop*



## *ILC/CLIC sources activities (1)*



### 1) Polarized electron from DC gun:

**JLAB (USA)**      **Contributions to the CLIC workshop. More exchanges are foreseen**

**SLAC (USA)**      **Discussions during this workshop**

### 2) Unpolarized $e^+$ from channeling:

**LAL (France)**      **Simulations with hybrid targets have been started. Contributions from IPNL (France) and BINP are already important. 10 deliverables for a period of 2 years (October 2010) have been described. See: <https://edms.cern.ch/document/971601/1>**

### 3) Polarized $e^+$ from Compton ring:

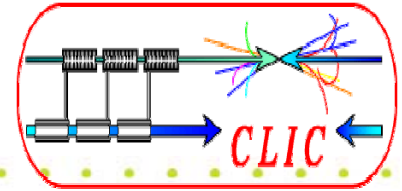
**LAL (France): 24 man-months have been allocated to start studies on Compton source**

**NSC KIPT (Kharkov)** **Simulations for the design of a Compton ring are on going**

**KEK (Japan)**      **A Webex meeting is taking place once a month to review the progress between BNL/CERN/Hiroshima Uni./IPNL/KEK/KIPT/LAL**  
**Optical/stacking cavity (4 mirrors) will be installed on ATF next Summer.**



## *ILC/CLIC sources activities (2)*

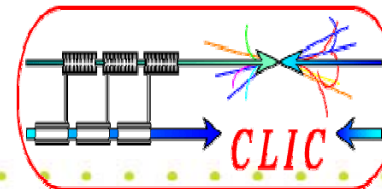


### 4) Polarized $e^+$ from Undulator:

**Cockcroft Institute (UK)** 24 man-months and 9 deliverables have been identified to start studies on Undulator and Compton schemes, Lithium lens and e- source for a period of 2 years (July 2010). Between 2010 and 2012, additional studies are also envisaged to consolidate the CDR work. **Draft MoU (<https://edms.cern.ch/document/977364/>) and will be more detailed during this workshop**

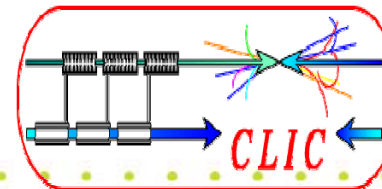
**ANL (USA)** Simulations have been already performed and were presented at the ILC  $e^+$  workshop in Argonne and at the CLIC 08 workshop at CERN. **Following the request made by ANL, a draft for a formal agreement is in preparation and will be discussed during this workshop**

**SLAC (USA)** **Has already contributed to the ANL studies mentioned above**  
**More collaboration will be discussed during this workshop**



## *Damping Ring* *(starting at this workshop)*

**Conveners: M.Palmer/Cornell University, Y.Papaphilipou/CERN**  
**Mandate: To be defined**



# *Beam Dynamics*

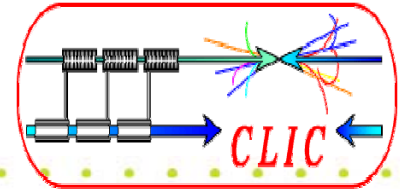
**Conveners: K.Kubo/KEK, A.Latina/FNAL, D.Schulte/CERN, N.Walker/DESY**

**Mandate: [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)**





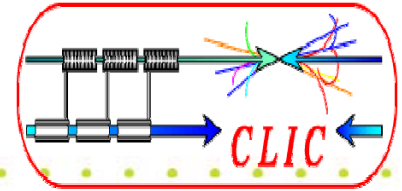
## *ILC-CLIC Beam Dynamics Working Group*



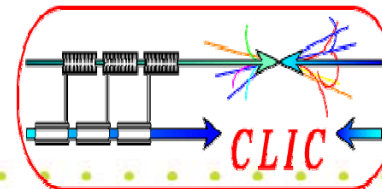
- The working group will foster the exploitation of synergy between the ILC and CLIC beam physics studies, promoting common meetings, standards, codes and studies
- Work has quite some history
  - Significant contributions of CLIC experts to ILC in RDR phase and beyond
    - Benchmarking
    - Beam-based alignment algorithm development
      - Use of bunch compressor for alignment of main linac, dynamic effects during alignment, emittance tuning bumps, tunnel following the earth curvature, impact of crab cavity wakefields, ...
  - Have been severely impacted by limited resources for ILC and generation change for CLIC
    - But situation is somewhat improving
- Significant overlap with BDS and Damping Rings working groups
- Common meetings started via webex



## *Some Example Studies/Activities*



- **CLIC main linac has strong wakefield and dispersive effects**
  - Excellent benchmarking case
  - Complements previous benchmarking on ILC linac
  - Effort planned at Fermilab (Kirti/Andrea), maybe also at KEK (Kiyoshi Kubo)
- **Machine modelling**
  - Pre-alignment and survey
    - Simplified model for ILC compared to full simulation for CLIC
- **Discussion of RTML rational and performance for ILC and CLIC at CLIC08**
  - Currently functional CLIC RTML design is being made
  - Comparison of system design, identification of common issues and differences
  - An important common problem are stray fields
    - Address by common data collection and measurements
- **PhD student from IHEP at CERN on CLIC booster linac and ILC main linac using tracking code PLACET**



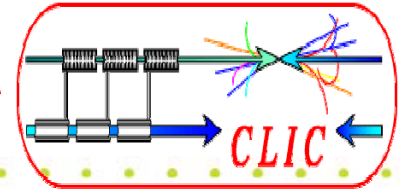
## *Cost & Schedule*

**Conveners: H.Braun/CERN, J.Carwardine/ANL,  
K.Foraz/CERN, P.Garbincius/FNAL, T.Shidara/KEK**

**Mandate:** [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)



# ***ILC-CLIC cost & schedule WG*** ***Organisation of the joint work***



**No regular meeting yet, but a number of recent adhoc meeting**

- GDE meeting, Dubna'08
- FNAL, 19 August
- WEBEX, 19 September
- CLIC'08
- ILC'08
- + many emails

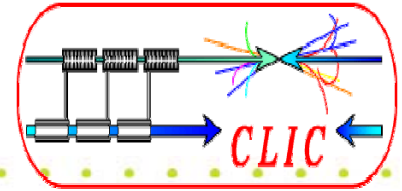
## **Work already done**

- exchange on rules & methodology and status of both studies
- some exchange of existing estimate data
- Exchange on input templates
- Exchange on strategy for cost estimate software tools

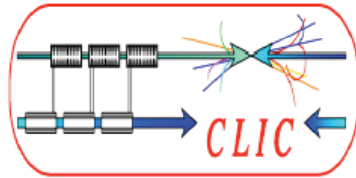


# ILC-CLIC cost & schedule WG

## Planned joint work



- Construction & installation schedules for both CLIC and ILC with same methodology (for June'09)
- Keep work towards cost estimate mutually transparent
- Understand and communicate unavoidable differences in the methodologies used for the two projects
- common ILC/CLIC notes (for mid '09)
  - Tunnel safety underground compliance (together with ILC-CFS and CLIC-CES)
  - Standardization methods to estimate cost of warm magnets including cabling and power supplies
  - ...



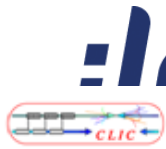
## *Cost & Schedule WG: Activities since ILC Meeting at Dubna*



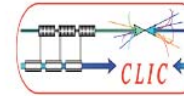
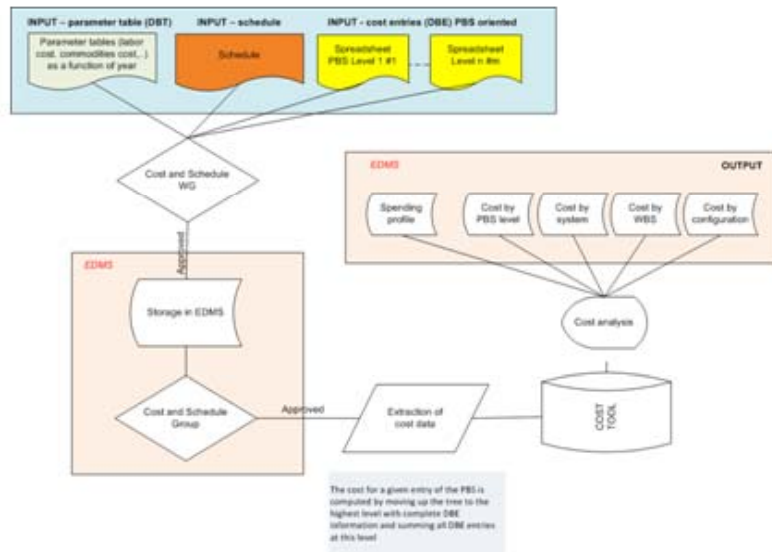
- The work of each group continues ...but essentially no joint activities since Dubna due to limited resources in both teams*

- Costing templates**
  - After comparing the latest ILC and CLIC templates, the approaches are similar but the details are quite different (impractical for common template?)
  - But... we should still explore possible use of common methodologies
- Cost Management processes and tools**
  - ILC tool development has re-started with the hiring of Triad Consulting
  - CLIC has engaged CERN computing group to explore software options, including expansion of in-house tools
- ILC Beam Delivery System cost estimate and back-up materials provided to CLIC at their request**

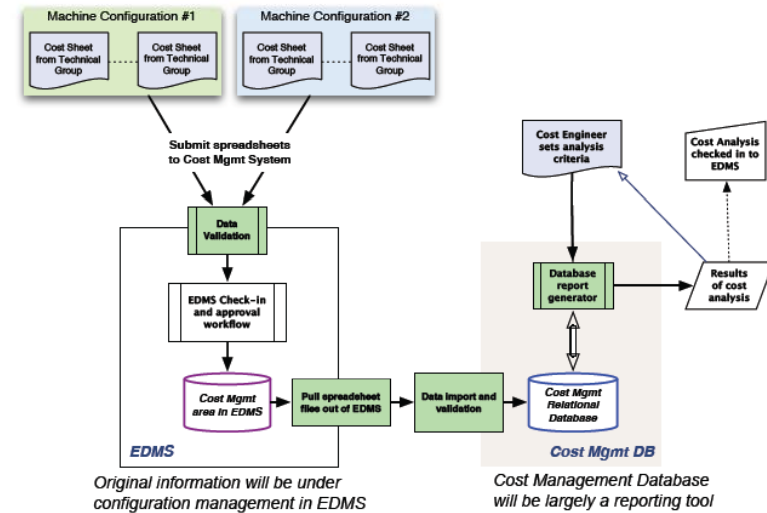




## Model for cost management process



## ILC Cost Management Tools Functional Model



14

Cost for 500 GeV and 3 TeV by 2010  
(for each PBS entry and w/o detailed WBS)

- **Cost Management database (the focus of this talk)**
  - Roll-ups and analyses of cost estimate information
  - Consolidate spreadsheet data provided by technical groups

Starting

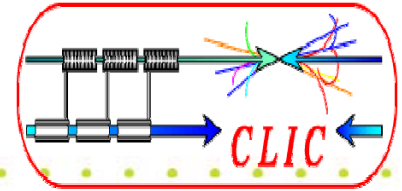
## ILC/CLIC collaboration

J.P.Delahaye:16/11/2008

CLIC requirement for cost, H. Braun, G. Riddone  
Software tool consideration for ILC cost management, J. Cawardine

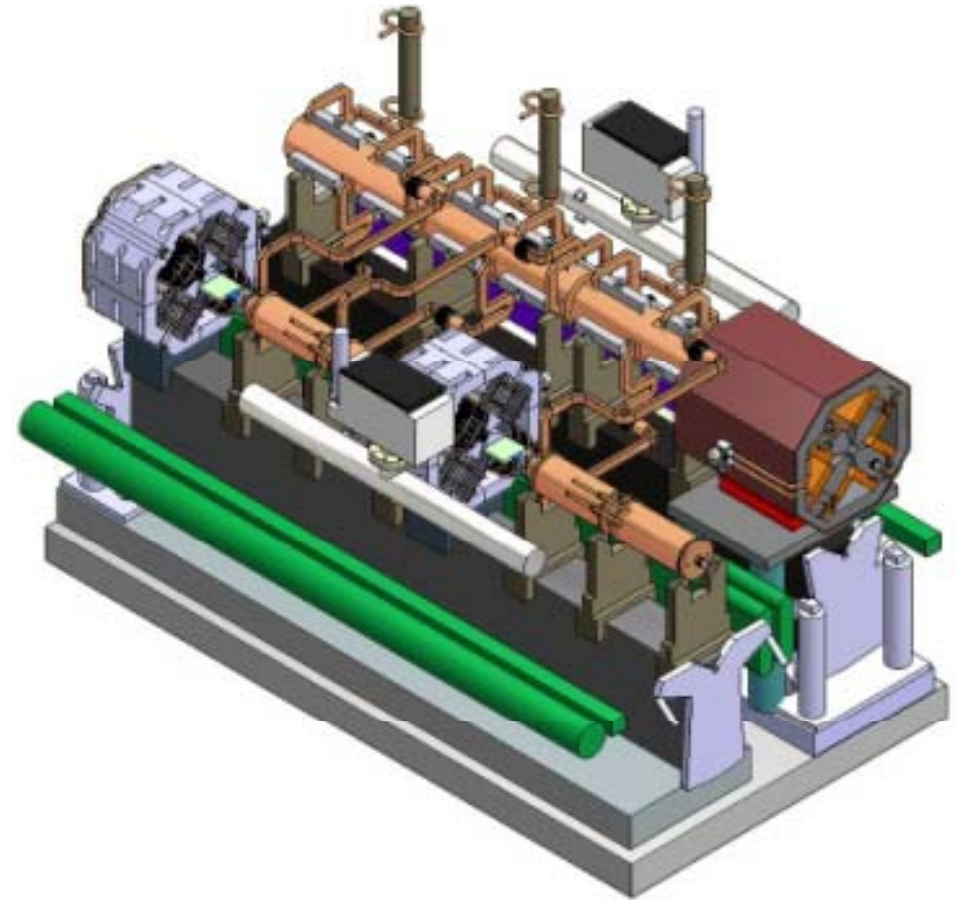


## *Schedule: What has been done*



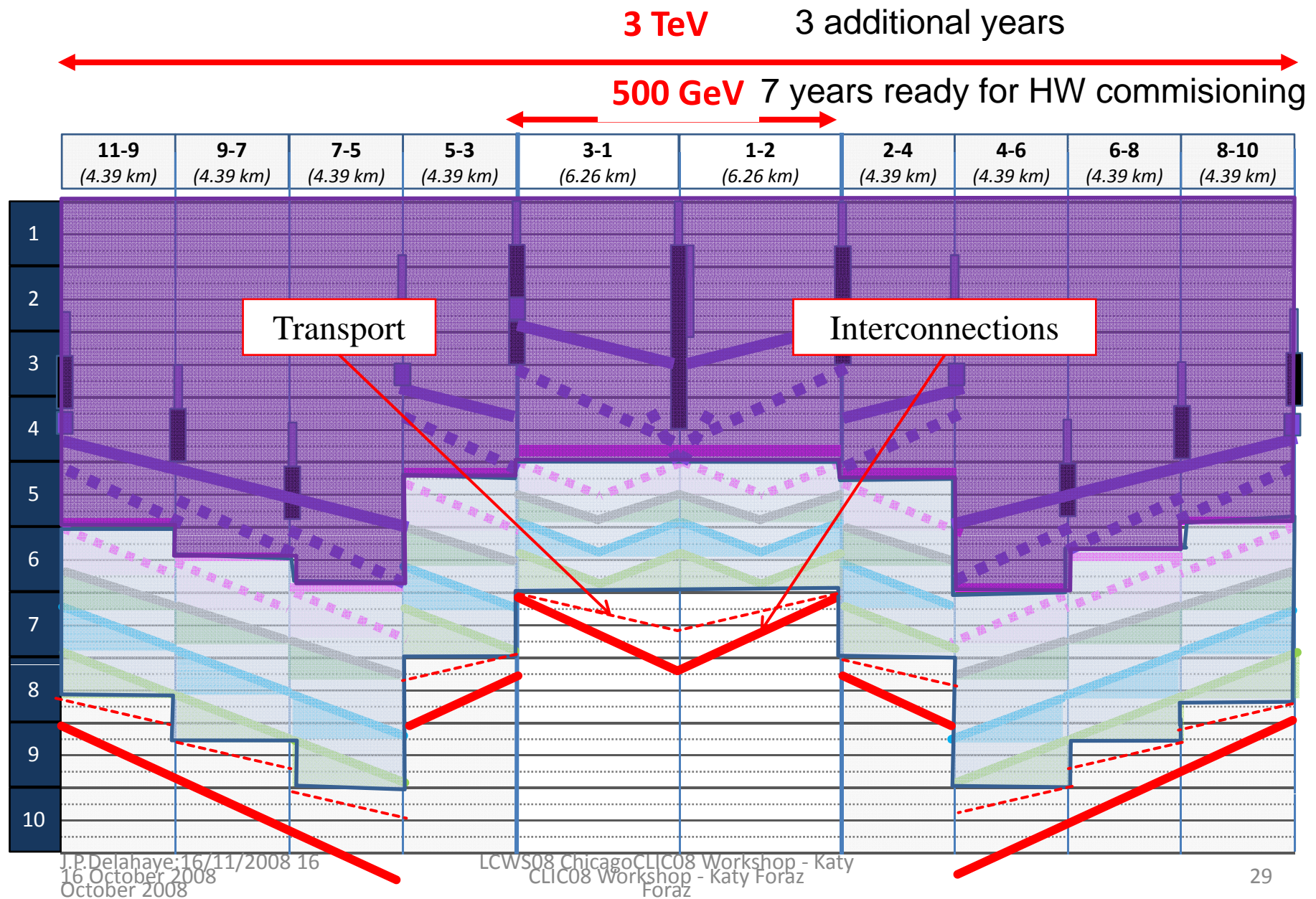
### Main tunnel :

Applying the experience of the construction and installation of the LHC to CLIC.



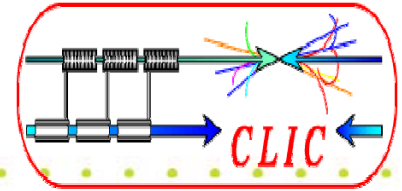


# CLIC Machine installation





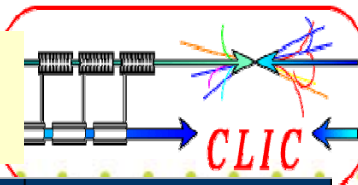
# *Planned work on schedule during LCWS08*



- Complete CLIC schedule (main tunnel, experimental areas, injectors)
- Compare CLIC schedule assumptions with ILC assumptions
- Review ILC schedule with same CLIC assumptions



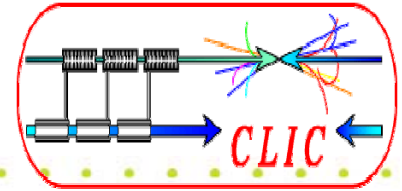
# CLIC & ILC common Test Facilities (identified in red)



CLIC critical issues SYSTEMS (level n)		Critical parameters	Crucial design choice or feasibility	Performance issue	Cost issue	Relevant Facilities (also valid for ILC)
Structures	<u>Main beam acceleration structures</u> Demonstrate nominal CLIC structures with damping features at the design gradient, with design pulse length and breakdown rate .	100 MV/m 240 ns 3·10 <sup>-7</sup> BR/(pulse*m)	X	X	X	CTF2&3 (2005-2010) Test Stand (2009-2010) SLAC/NLCTA SLAC/ASTA KEK/NEXTEF
	<u>Decelerator structures</u> Demonstrate nominal PETS with damping features at design power, with design pulse length, breakdown rate on/off capability	136 MW 240 ns	X		X	CTF3 (2005-2010) CTF3/TBTS (2008-2010) CTF3/TBL (2009-2010) SLAC ASTA
Drive Beam	<u>Validation of drive Beam</u> - production - phase stability , potential feedbacks - MPS appropriate for beam power	0.2 degrees phase stability at 12 GHz	X	X		CTF3 (2005-2010) CTF3/TBL (2009-2010) X-FEL LCLS
Two Beam	Test of a relevant linac sub-unit with both beams	NA	X			CTF3/TBTS (2008-2010)
Beam physics	<u>Ultra-low emittances</u> - Generation of low-emittances (damping rings)	Hor:500 nradm Vert: 5 nradm		X		ATF (2008-10): 3000/12 CESR/TA:Electron Cloud NSLSII: Hor 2000nradm SLS: Vert 10nm
	- Preservation of low emittances (main linac + RTML)	Absolute blow-up Hor: 160nradm Vert: 15 nradm	X	X		Beam simulations LCLS SCSS
	- Beam focusing to small dimensions (BDS)	Hor: 40 nm Vert: 1 nm		X		ATF2 (2006-2012) Hor: 200 nm Vert: 36 [20] nm



## *Convener instructions @ LCWS08* *(M.Ross):*



- **Presentation of Collaboration WG activities to GDE**

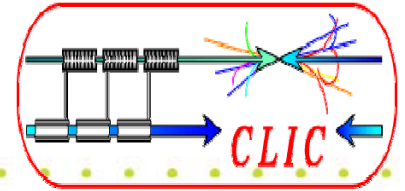
**“The ILC08 WG (where appropriate) should include in their schedule some block to discuss the collaborative work on identified issues of common interest between the CLIC and ILC collaboration presently focused on six working groups (seven including Physics and Detectors).**

**It is expected that a brief progress report on CLIC-ILC collaboration activities will form part of the close-out summary.”**





## *CLIC ILC joint statements*



### **Purpose of these statements:**

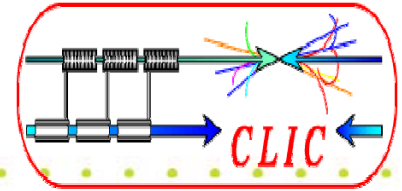
**The CLIC and ILC Collaborations agree to work together, within the framework of the CLIC / ILC Collaboration, to outline comparative statements to be used in presenting their respective projects. The Collaboration members agree to limit statements made about each other's projects to specifically agreed upon statements such as those listed below:**

- **Project design**
- **Test facilities and system tests**
- **Technology maturity and risk**
- **Costing.**

**<http://www.linearcollider.org/newsline/archive/2008/20081113.html>**



## *ILC Programme Advisory Committee (PAC)*



### **Strong support to CLIC ILC Collaboration**

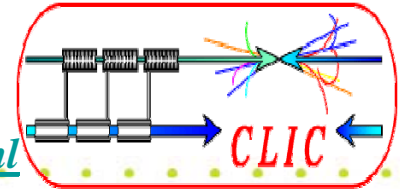
*"The PAC views very positively the recent start of common activities between the ILC and CLIC on many items such as conventional facilities, beam delivery system, detectors, physics, cost estimation, etc.*

*This avoids unnecessary duplication of effort, and keeps the particle physics community focused on the goal of a linear collider as the next major new facility for the field."*



## *Conclusion of Barry*

<http://www.linearcollider.org/newsline/archive/2008/20081113.html>



As we look to the future, we anticipate that LHC results will establish the scientific case for a linear collider.

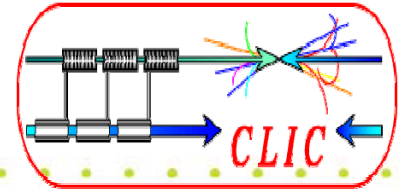
If the science warrants a 0.5 to 1.0-TeV ILC, the agreement for joint ILC/CLIC work will be helpful towards our primary GDE goal of being ready to propose a solid project at that time.

If the LHC results indicate the need for a higher-energy lepton collider, we will be prepared as a community to aggressively continue to develop the CLIC concept on a longer timescale.



## *Conclusion*

TILC08 March 2008

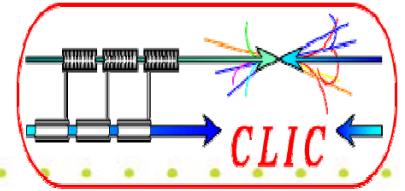


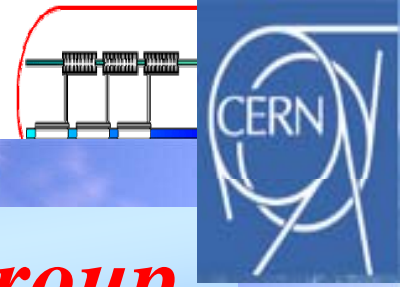
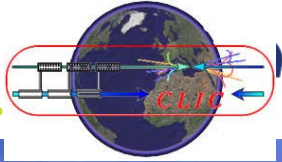
- **CLIC/ILC collaboration on subjects with strong synergy**  
**Win –Win for both studies and for HEP**
- **Ambitious but realistic and practical approach**
  - starting on limited number of subjects
  - plan of actions defined by conveners
  - common work already started
- **Most efficient use of limited resources**
- **Provide credibility to Linear Collider Community by:**
  - mutual understanding of status, advantages, issues of both tech.
  - responsible preparation of the future comparison of the possible options for HEP with agreed pro&cons and well defined criteria

**Collaborative Competition and / or Competitive Collaboration**



# *Spares*

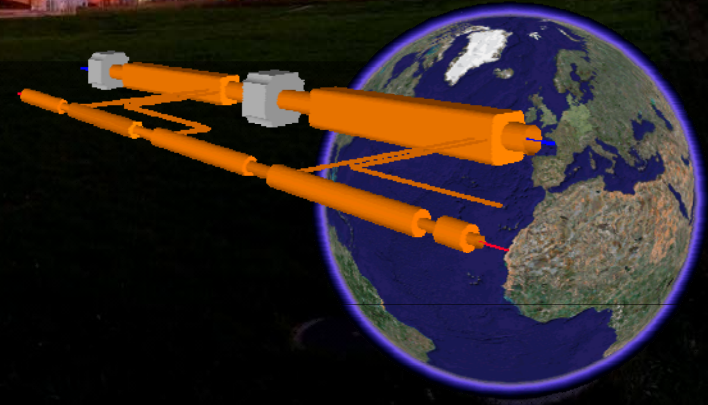




# *Detectors and Physics Working Group*

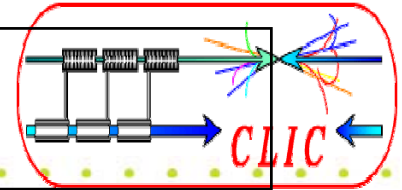
## *A. De Roeck & Yannis Karyotakis*

CLIC Workshop 08





## *Studies for a CLIC Detector Concept*



**Excellent exchange with ILC friends** (already started earlier in 2008)

### Goal

for CLIC Conceptual Design Report, due by end 2010:

- summarize **physics goals** up to 3 TeV,
- provide detector concept for **energy range from 0.5 to 3 TeV**,
- identify **R&D** which goes beyond the ones for ILC.

### Strategy

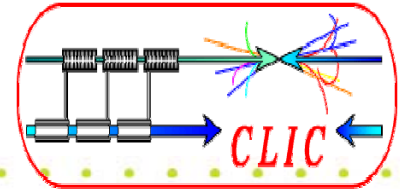
In close collaboration with ILC detector groups:

- identify how to **upgrade the ILC concepts** (SiD, ILD, 4<sup>th</sup>) for multi-TeV physics.
- in particular, study **solenoid** (field?) and **calorimeter** options (HCAL depth?)
- Issues besides higher energy: CLIC bunch **timing (0.6 ns)** and beam related **background**.
- establish CLIC concepts for at least 2 different tracker options (à la SiD with all silicon and à la ILD with a TPC)





## *Activities*



### Past

- CERN Report 2004-05: “Physics at the CLIC Multi-TeV Linear Collider” based on TESLA detector concept at 300 GeV

### Now

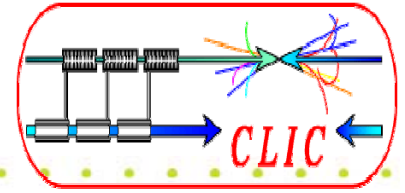
New Working group at CERN in contact with LAPP/Annecy(SiD), RAL(SiD), SLAC(SiD), Cambridge(ILD). Next with DESY(ILD), etc

- detector simulations using existing LC software for geometry, simulation, reconstruction and visualisation.
- Preliminary CLIC detector concept, “CLIC000”, defined, based on SiD. First goal: redefine hadron calorimeter and coil for 3 TeV.
- Detector performance studies have started.
- Forward region, collaboration with FCAL, revisit mask design.

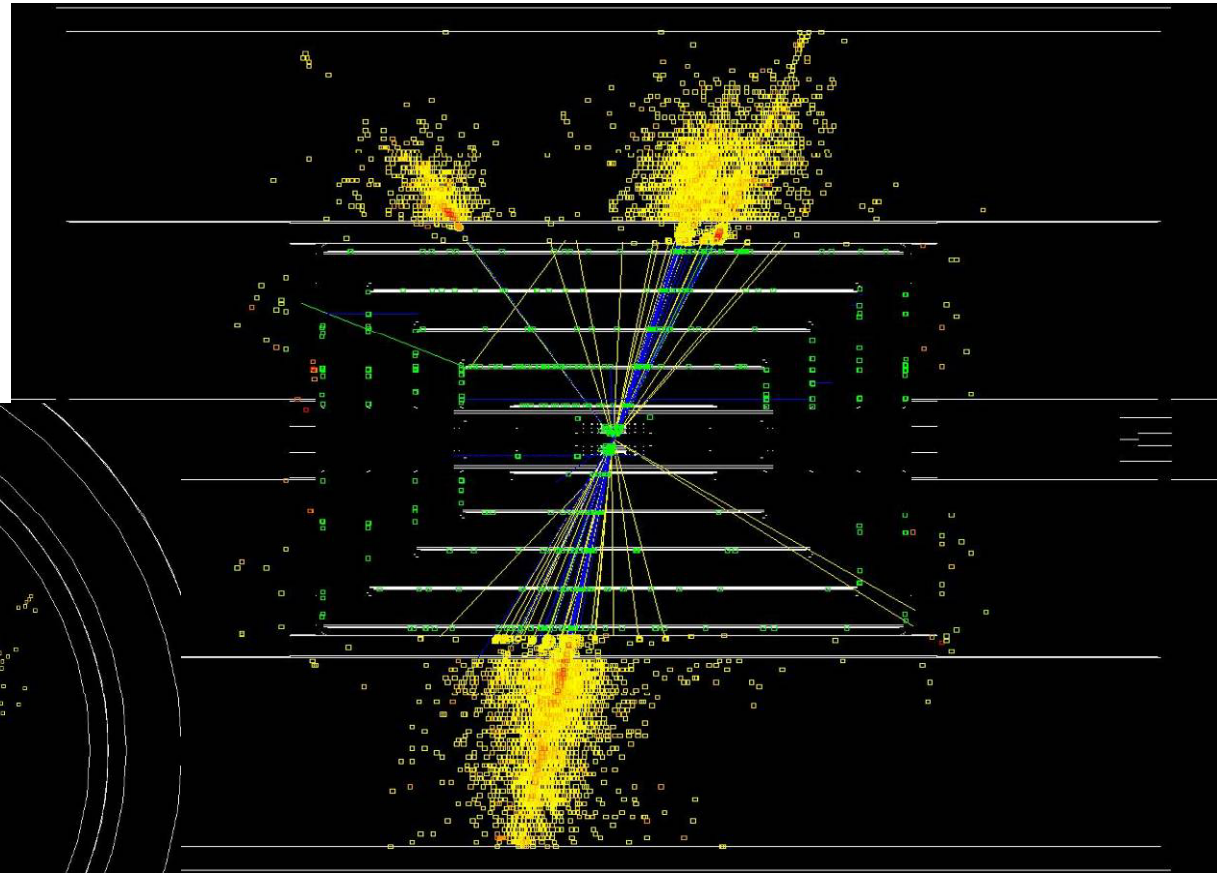
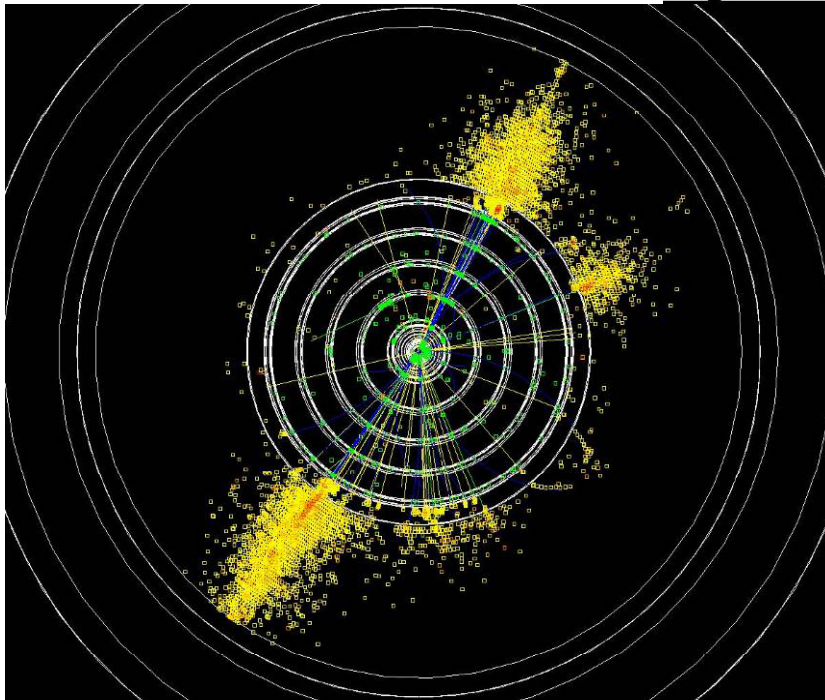




*“CLIC000”*

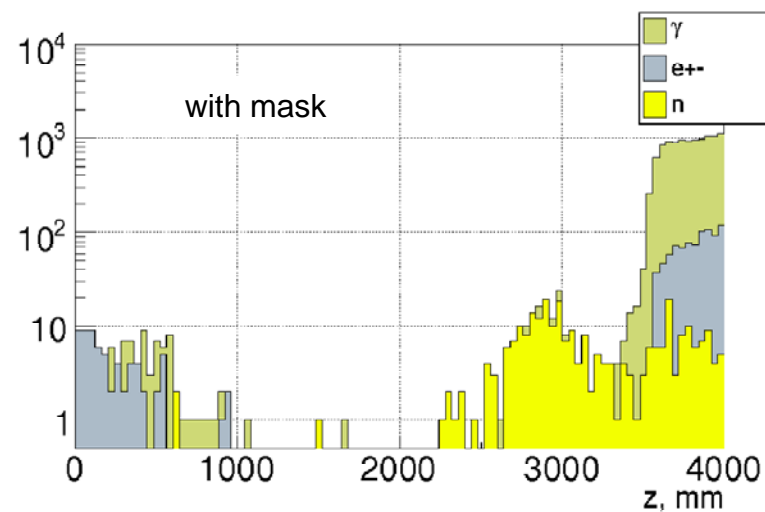
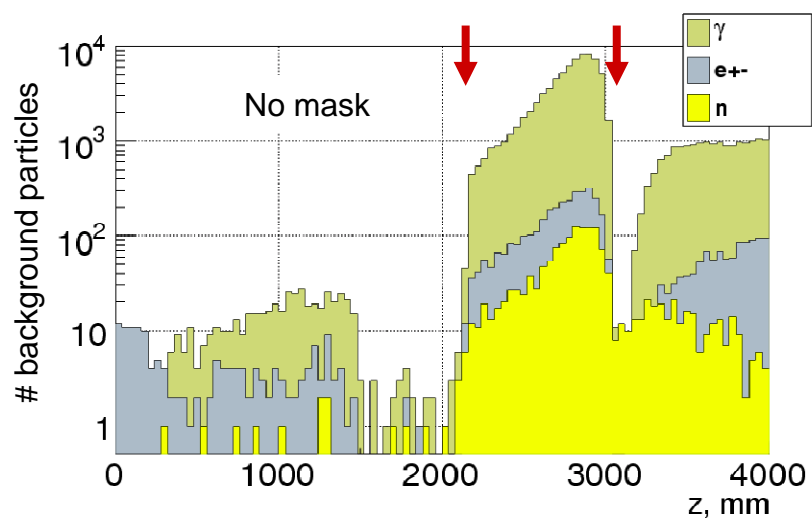
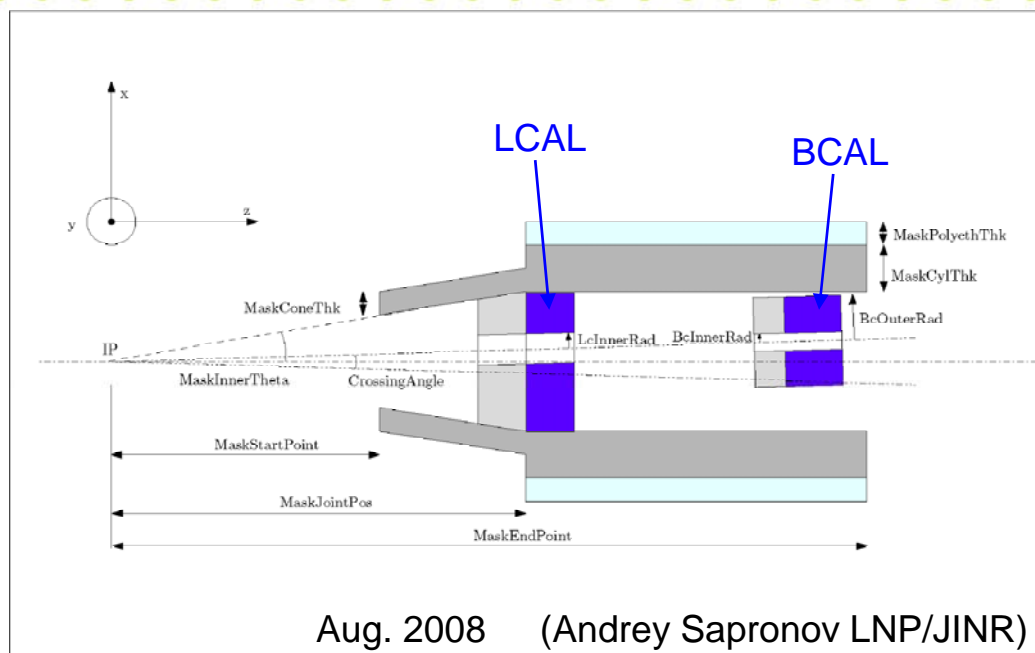
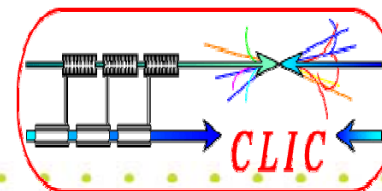


W W @ 3 TeV



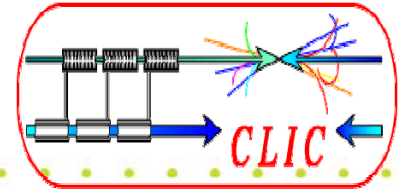


# CLIC Forward Mask revisited





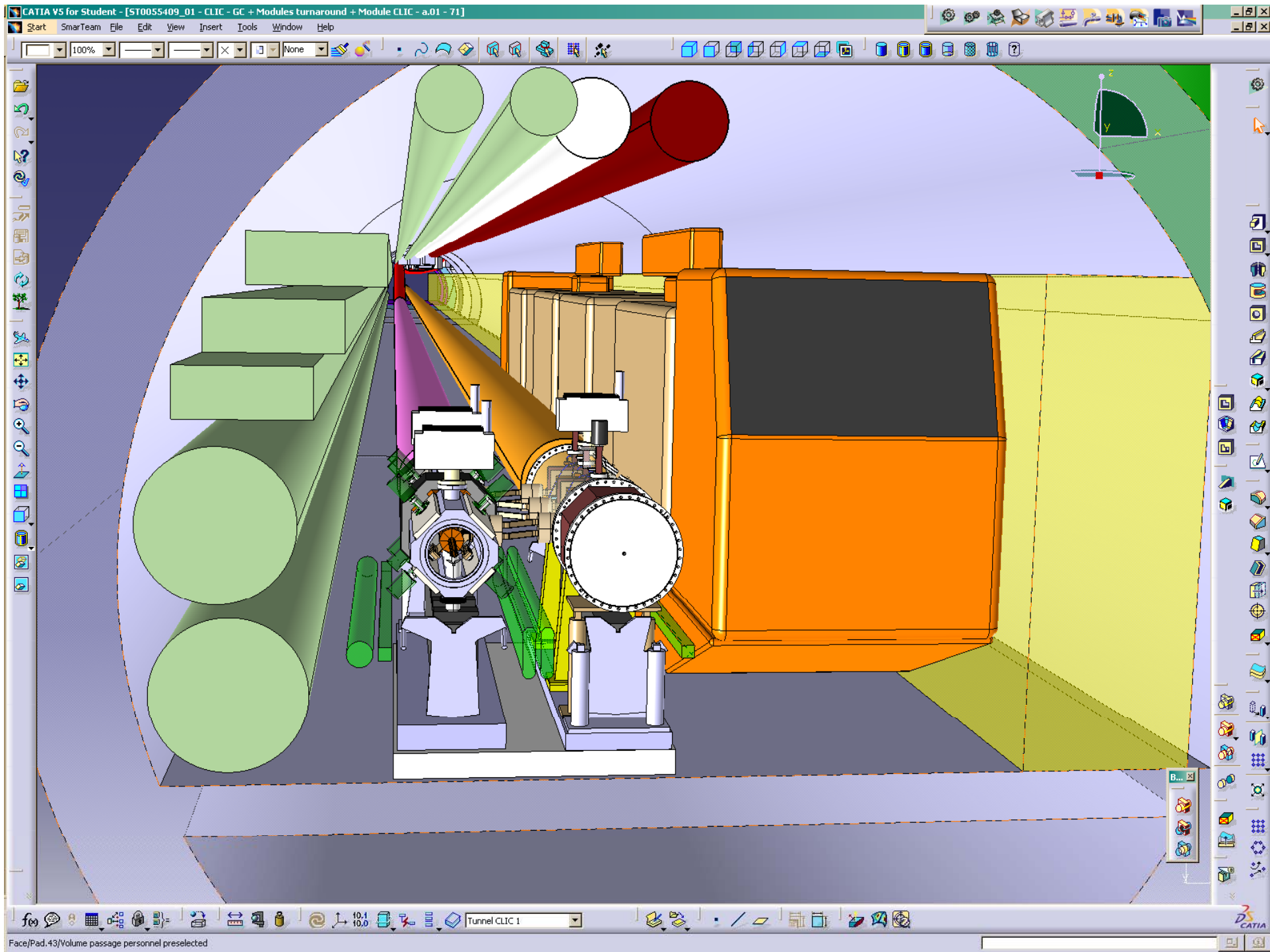
## *R&D topics*

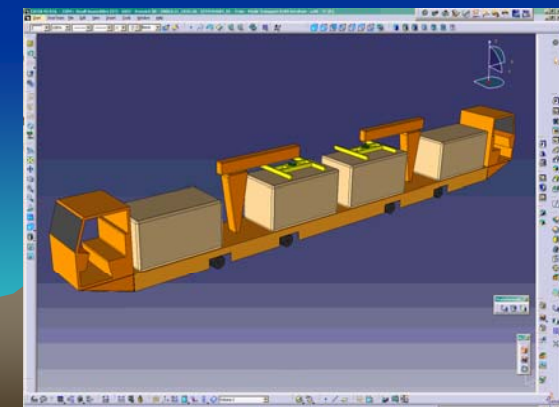
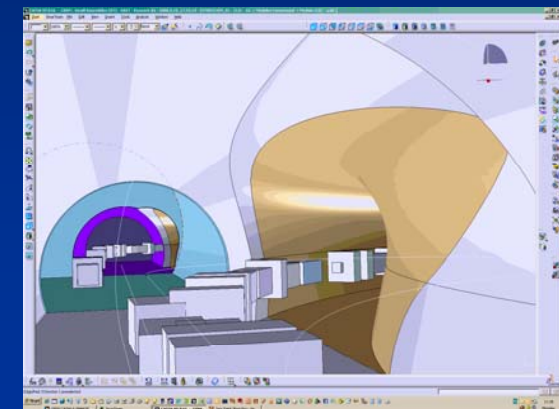
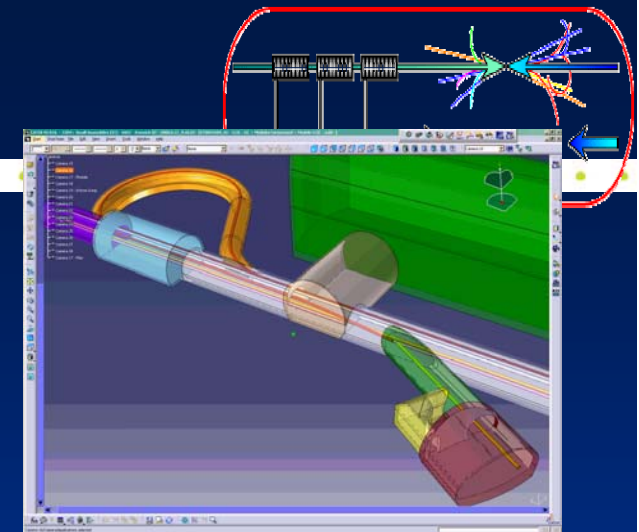
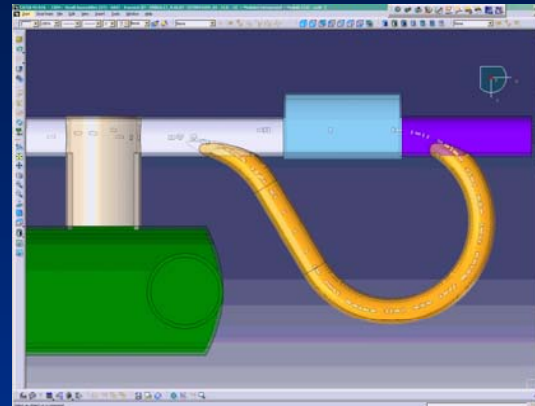
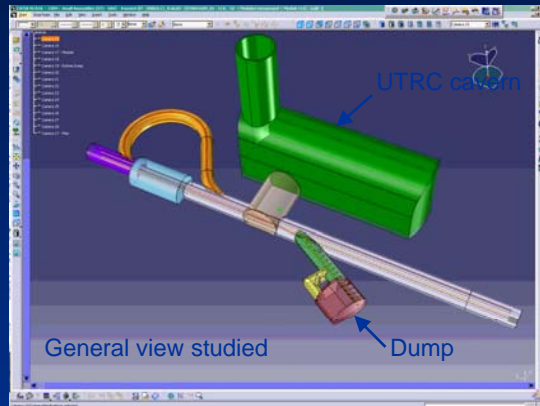


1. **Time stamping.** Develop specific layers in tracker and calorimeter to reject background events from other bunches crossings ( 0.6 ns separation).
2. **High-field solenoid conductor.** Replacement of the pure aluminum coil stabilizer and replacement of the electron beam welding.
3. **Mechanical engineering support.** Integration, heavy HCAL, coil, etc.
4. Alternative to PFA calorimetry (e.g. **dual readout** calorimetry with crystal fibres).
5. **EUDET** activities for TPC TimePix pixel readout.
6. R&D between LC and SLHC for **on-detector powering** and for **monolithic silicon pixel detectors**

Has to be done in collaboration of CERN and outside institutes







# Clic 3d studies using Catia Software



## Integrated Project Support Study Group Findings

### Study Group Members

Jurgen De Jonghe IT-AIS  
Christophe Delamare TS-CSE  
James Purvis IT-AIS (Chair)  
Tim Smith IT-UDS  
Eric Van Uytenck TS-CSE

### Additional Contributions from

Jean-Yves Le Meur IT-UDS  
Per-Olof Erlman TS-CSE  
Timo Tapio Hakulinen TS-CSE  
Nils Halmyr IT-CS

### Thanks for supporting information from

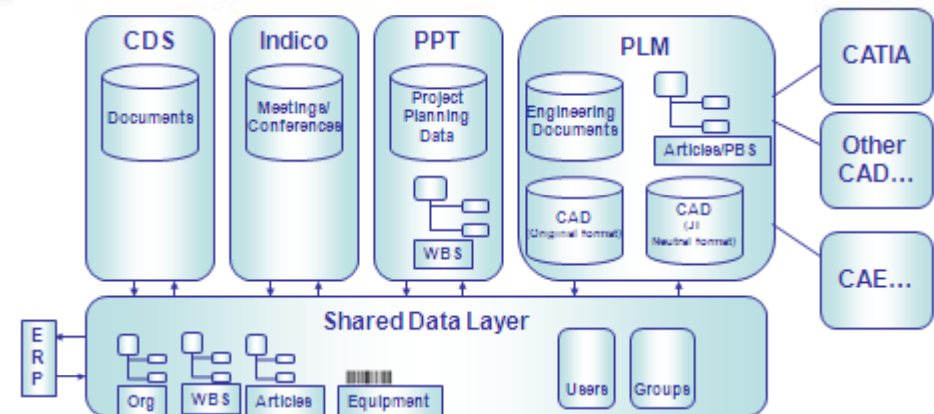
Alessandro Bartarelli TS-MME  
Johan Burger DESY  
Ramon Folch TS-MME  
Lars Hagge DESY  
Don Mitchell FNAL

James Purvis  
HR

*Recruitment, Programmes & Monitoring*

Full report:  
<https://edms.cern.ch/document/1247665/684/1>  
<http://cdsweb.cern.ch/record/971016/>

## Integrated Solution Architecture



Requirement to "future-proof" existing investments...

18

Strong recommendation:  
integrated tool from the first  
phase of the project

This is the good moment to  
define better tools for the  
whole community : what is  
available, what would be  
needed in the future?

Common reflection: common  
tool

## The Tools



- CAD (Euclid/CATIA)
- Earned Value Management (EVM)
  - Project schedule & costing of the accelerator
- Project Progress Tracking (PPT)
  - Project management of the experiments
- Engineering Data Management System (EDMS)
- Indico
  - Event, Agenda, Conference Management
- CERN Document Storages (CDS)
  - Long term archiving

## Cost Estimate Tool

For CLIC

Jurgen De Jonghe CERN / IT-AIS

jurgen.de.jonghe@cern.ch,

## Dynamic Reports, multiple Breakdown Structures

APT CERN - European Organization for Nuclear Research

Welcome | Workbooks | Reports | Action Log | HR Coding | Issues | Feedback

User: DE JONGHE Jurgen | Help | Support | Log Out

Search: Last update: 09-Jun-2008 15:25 Update now

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Org (Holder):  
Budget Code:  
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WBS (Rec):  
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Workunit Status:  
Job Category:  
Career Path:  
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Include DUAL/LC  
Show:  
A: APT  
B: MTP/DL/Now  
A-B  
Totals  
Empty cells

Dimensions:  
Rows: WBS  
Columns: Time

Org (Rec):  
Project/Operation (WBS):  
None

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CERN-PFA	LHC-PFA	CERN	CERN (GROUP)	APT	2006		2007		2008		Grand Total
					OPERATION	PROJECT	OPERATION	PROJECT	OPERATION	PROJECT	
					2006 Total	2007 Total	2008 Total				
				Target B	22,870	22,870	22,870	22,870	22,870	22,870	22,870
				A-B	-22,870	-22,870	-22,870	-22,870	-22,870	-22,870	-22,870
			AB	APT	12,893	97,692	118,495	28,494	46,079	69,494	27,476
				Target B	12,893	107,115	118,495	46,910	22,700	69,494	44,194
				A-B	-14,067	-15,713	-19,785	-28,524	-22,350	-5,865	-19,476
			AC	APT	29,320	291,142	319,562	12,411	49,417	61,828	17,417
				Target B	29,320	314,190	319,562	19,190	59,595	78,810	59,595
				A-B	-4,027	-5,897	-5,897	-14,051	-22,021	-6,695	-204
			DAG	APT	690	690	690	690	690	690	690
				A-B	-690	-690	-690	-690	-690	-690	-690
			DE	APT	19,414	25,704	44,373	29,117	22,599	49,715	14,714
				Target B	19,414	26,940	44,373	26,430	16,430	49,715	22,280
				A-B	2,147	1,741	6,993	2,047	6,161	1,711	6,441
			LHC	APT	9,000	3,990	4,990	6,000	6,000	2,000	3,000
				Target B	9,000	1,970	6,000	6,000	6,000	2,000	3,000
				A-B	-1,000	1,000	-1,000	-1,000	-1,000	0,000	-1,000

Jurgen De Jonghe CERN/IT-AIS

## Advantages / Disadvantages

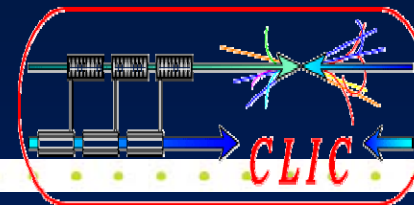
Based on CLIC cost requirements and APT experience, a proposal for a cost tool has been made

Questions: cost estimate tool as part of integrated tool, ICL/CLIC common tool?

J.P.Delahaye:16/11/2008

- ✓ We have the experience of rolling out this kind of applications, we have the technology, we can reuse existing components. We do have to develop and apply these to the CLIC cost domain.
- ✓ We are in full control of the data, so we can export to another application later if needed.

- Not a standard, commercial-off-the-shelf tool.
- Further development may be required for risk analysis, what-if scenario's.
- We are overloaded and will need help with manpower.



CERN Technical Support (TS) Department Input		Approx
General Co-ordination	J.Osborne / C.Hauviller	10%
Civil Engineering	J.Osborne	25%
Civil Engineering Draughtsman	N.Baddams / A.Kosmicki	15%
Cooling & Ventilation	J.Inigo Golfin / C.Martel	20%
Horizontal transport	K.Kershaw	15%
Vertical Handling	I.Ruehl	5%
Safety Advice	F.Corsanego / S.Weisz	10%
		100%

\*No input from Electrical Group available at the moment