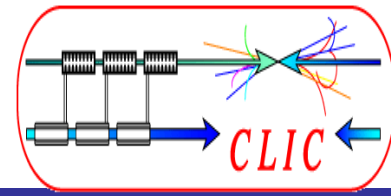
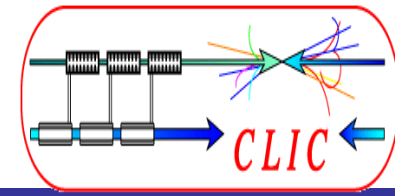


Technical Working Groups  
General Issues working group  
Is the collaboration working ?

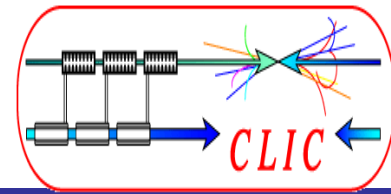


- Making the best use of the available resources
- Focusing on subjects with strong synergy
- Adopting systems as similar as possible by mitigating differences due to technology and energy (techn., cost...)
- Developing common knowledge of both designs and technologies on status, advantages, issues and 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

J.P.Delahaye, ILC PAC Korea , Nov 2009



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



## *Recent joint workshops*

**Damping Rings - "Workshop on Low Emittance Rings 2010", hosted by CERN  
January 12-16, 2010**

**Positrons - "ILC-CLIC Positron Source Group Sixth meeting at the IPPP,  
Durham University, Durham, October 28-30, 2009".**

**Beam Delivery - This group arranged a 3-week informal meeting on IR design  
issues in summer 2009 at SLAC.**

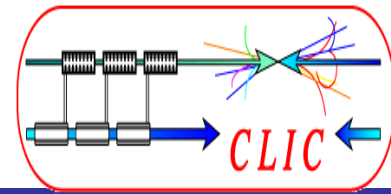
**Beam Dynamics - "ILC-CLIC LET Beam Dynamics Workshop, 23 June 2009 to  
25 June 2009".**

**Conventional facilities - Meetings monthly via webex.**

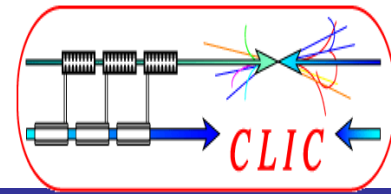
**Cost & schedule - Meetings monthly via webex**

For details see J.P.Delahaye, ILC PAC Korea , Nov 2009

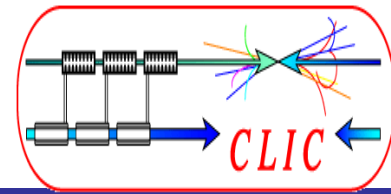




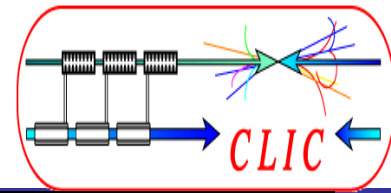
- *In the foreseeable future we intend:*
  - The ILC cost experts will look at the CLIC cost estimate for “uniformity”
  - There is discussion of how to implement a similar risk methodology for the CLIC design report to that adopted for the ILC. This is a difficult topic and is also an item that the general issues WG is contemplating.
  - We will host a joint linear collider workshop later this year which replaces the CLIC annual and ILC annual meetings. October 2010, CERN hosts.
  - Integrated regional 3D CAD design for CFS - CERN lead
  - Installation study based on LHC experience



- *ILCSC and CSC have approved formation of a CLIC/ILC General Issues working group by the two parties with the following mandate:*
  - Promoting the Linear Collider
  - Identifying synergies to enable the design concepts of ILC and CLIC to be prepared efficiently
  - Discussing detailed plans for the ILC and CLIC efforts, in order to identify common issues regarding siting, technical issues and project planning.
  - Discussing issues that will be part of each project implementation plan
  - Identifying points of comparison between the two approaches .
- *The conclusions of the working group will be reported to the ILCSC and CLIC Collaboration Board with a goal to producing a joint document.*



- *The working group consists of Philippe Lebrun (co-chair), Ken Peach, Daniel Schulte, Mike Harrison (co-chair), Kaoru Yokoya, and Eckhard Elsen.*
- *The group meets about monthly by conference call and has had face-to-face meetings in Oxford in January 2010 and Beijing in March. The next is scheduled for Paris in July.*
- *Meeting information, presentations and meeting notes are posted on an INDICO site (password protected).*
- *To date we have analysed the charge, formulating our work plan which covers the time period of 2010-~2012 and initiating the first reports/discussions. The current concept would have the WG producing an interim report at the end of 2010 and a final one two years later. These reports will be relatively short.*

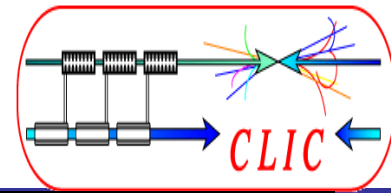


## 1. *Promoting the linear collider*

- Beyond agreement of principle with this goal, the WG did not see how it possessed any special expertise in this area and thought its time better spent in other elements of the charge. Progress in other areas could have this effect naturally of course. Nevertheless, this will be kept under review

## 2. *Identifying synergies to enable the design concepts of ILC and CLIC to be prepared efficiently*

- The WG has embarked on two courses of action. Firstly we have asked the previously appointed, more focused CLIC-ILC technical groups to indicate areas in which they are producing collaborative work, and areas where they believe such synergies are possible in the future. We are consolidating the results.
- Secondly, the WG has decided to think about what might be described as the ultimate synergy; a phased approach to a linear collider complex. In this scenario the WG would see whether it makes sense to consider a scheme which starts with a lower energy ILC-like machine which evolves into a higher energy CLIC-like one. This is evidently a complicated question which may have a simple answer; No. Any answer besides No is also likely to be complicated.



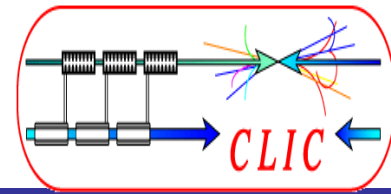
## 1. *Promoting the linear collider*

- Beyond agreement of principle with this goal, the WG did not see how it possessed any special expertise in this area and thought its time better spent in other elements of the charge. Progress in other areas could have this effect naturally of course. Nevertheless, this will be kept under review

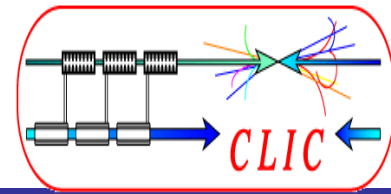
## 2. *Identifying synergies to enable the design concepts of ILC and CLIC to be prepared efficiently*

- The WG has embarked on two courses of action. Firstly we have asked the previously appointed, more focused CLIC-ILC technical groups to indicate areas in which they are producing collaborative work, and areas where they believe such synergies are possible in the future. We are consolidating the results.
- Secondly, the WG has decided to think about what might be described as the ultimate synergy: a phased approach to a linear collider complex. In this scenario the WG would see whether it makes sense to consider a scheme which starts with a lower energy ILC-like machine which evolves into a higher energy CLIC-like one. This is evidently a complicated question which may have a simple answer; No. Any answer besides No is also likely to be complicated.

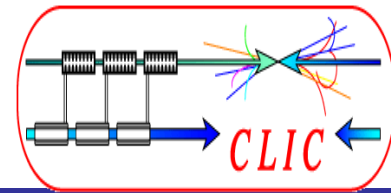




- **Mandate of the joint WG:**
  - Develop synergies and collaborate in beam dynamics and technical issues of common interest in damping ring design
  - Use common research approaches and studies when possible including numerical tools
  - Take advantage of existing test facilities or storage rings and participate in a common experimental program
  - Trigger communication, establish links between the two communities, share knowledge and document common work
- **Membership of the joint WG (names, affiliations):**
  - Ioannis Papaphilippou - CERN
  - Mark Palmer - Cornell University
  - Sergio Calatroni - CERN
  - Giovanni Rumolo - CERN
  - Fanouria Antoniou - CERN
  - Alessandro Vivoli - CERN
  - Gerald Dugan - Cornell University
  - Yulin Li - Cornell University
  - David Rubin - Cornell University
  - Susanna Guiducci - INFN-LNF, Frascati
  - Mauro Pivi - SLAC
- **Operating since: November 2008**
- **Typical frequency of meetings (Webex, face-to-face):**
  - WebEx meetings somewhat sporadic to date, but we are targeting at least 6 per year.
  - Face-to-face meetings at CLIC, ILC, or damping ring workshops are presently held about 4 times per year.



- Topics treated since WG creation:
  - Principle efforts have been to:
    - Raise awareness among members of each of the damping ring teams of similar efforts being carried out by the other team and to encourage close collaboration wherever possible
    - Develop experimental plans to use the available test facilities (CesrTA and KEK-ATF)
    - Organize a joint workshop (LER2010) to bring together both damping ring groups as well as representatives of the light source and collider communities
- Deliverables produced (documents, publications, presentations,...) since WG creation:
  - Presentations have been made at several workshops:
    - LCWA09
    - CLIC09
    - LER2010
- Topics to be addressed by the WG in 2010, with corresponding deliverables:
  - LER2010 Workshop
    - Deliverable: Development of joint working teams on key design and R&D topics seeded from the meetings/discussions at LER2010 (targeting the involvement of researchers from the light source and collider communities in addition to the DR development teams)
  - Experimental R&D
    - Deliverables: Updated assessment of EC mitigation issues, review of items requiring further R&D through 2013 which are suitable for joint investigation, collaboration on low emittance lattice design and development of a joint experimental effort on low emittance tuning.



• **Future topics until 2012:**

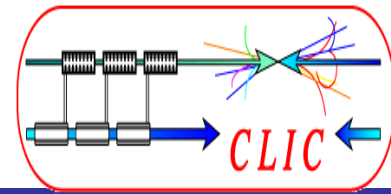
- Working groups (which span the low emittance ring community) are being formed for the following research areas (coordinators still being confirmed):

Subject	Coordinators
<b>1 Low emittance cells design</b>	M. Borland (APS), Y. Cai (SLAC), A. Nadgi (Soleil)
<b>2 Non-linear optimization</b>	R. Bartolini (DIAMOND/JAI), C. Steier (LBNL)
<b>3 Minimization of vertical emittance</b>	A. Streun (PSI), R. Dowd (Australian Synchrotron)
<b>4 Integration of collective effects in lattice design</b>	R. Nagaoka (SOLEIL), Y. Papaphilippou (CERN)
<b>5 Insertion device, magnet design and alignment</b>	S. Prestemon (LBNL), E. Wallen (MAXlab)
<b>6 Instrumentation for low emittance</b>	M. Palmer (Cornell), G. Decker (APS)
<b>7 Fast Kicker design</b>	P. Lebasque (Soleil), C. Burkhardt (SLAC)
<b>8 Feedback systems (slow and fast)</b>	A. Drago (INFN/LNF), B. Podobedov (BNL), T. Nakamura (JASRI/SPring8)
<b>9 Beam instabilities</b>	G. Rumolo (CERN), R. Nagaoka (SOLEIL)
<b>10 Impedance and vacuum design</b>	K. Bane (SLAC), S. Krinsky (BNL), E. Karantzoulis (Elettra), Y. Suetsugu (KEK)

• **Main benefits from joint WG:**

- The working group has helped to significantly strengthen the ties and collaboration between the CLIC and ILC design teams. Members of each team are working to unify the research efforts in key areas. A key benefit has been the increase in the flow of information between different stakeholders in the low emittance ring community. This helps to enable the most efficient use of the limited resources that are available within the groups designing the linear collider damping rings.



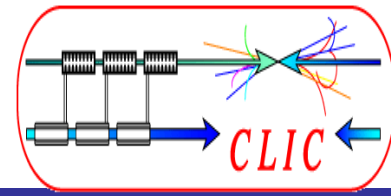


## • Mandate of the joint WG

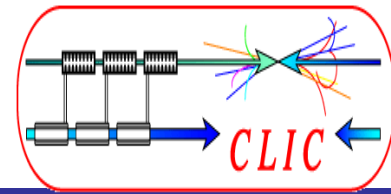
- Compare the **assumptions and methodology** adopted by both projects in matter of cost.
- Establish **functionalities for cost data analysis**:
  - Parametric cost models to define variation of costs as a function of the main parameters
  - Risk/uncertainty assessment.
- **Compare costs for certain items** (to be defined with the agreement of management) to better understand the difference subsystem by subsystem between the two technologies
- Develop **common approaches** to traceability, requirements, cost estimates, and the bases of estimates.
- Compare the basic **assumptions and baseline units for schedule**.

## • Membership of the joint WG (names, affiliations):

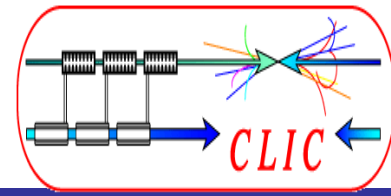
- |   |                              |   |
|---|------------------------------|---|
| - | <b>CERN:</b>                 | <b>Philippe Lebrun, Germana Riddone, Katy Foraz</b> |
| - | <b>Fermilab:</b>             | <b>Peter Garbincius</b>                             |
| - | <b>Argonne National Lab:</b> | <b>John Carwardine</b>                              |
| - | <b>KEK:</b>                  | <b>Tetsuo Shidara</b>                               |
| - | <b>DESY:</b>                 | <b>Frank Lehner</b>                                 |



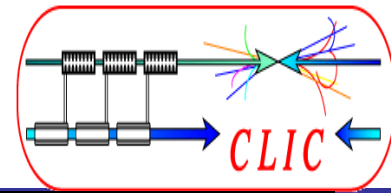
- **Operating since:** May 2008
- **Typical frequency of meetings (Webex, face-to-face):**
  - We try to have a quasi-monthly WEBEX meeting.
  - We also have a few hours' face-to-face at Linear Collider workshops
- **Topics treated since WG creation:**
  - Descriptions & comparisons of CLIC & ILC cost estimating & cost risk methodologies
  - CLIC WBS and CLIC Study Costing Tool
  - ILC Cost Estimating Tool (ICET)
  - Scheduling of ILC civil construction and installation using LHC methodology
  - Transfer of complete ILC WBS template (without estimates) and the specific ILC Beam Delivery System estimate (with costs) and back-up documentation to CLIC
  - Probabilistic Cost Analysis (European/LHC experience & methods, Ph. Lebrun) compared with US (P. Garbincius) and XFEL (F. Lehner) methods
- **Deliverables produced (documents, publications, presentations,...) since WG creation:**
  - **Peter Garbincius' presentations**
    - LCWS08, Chicago, November 2008
    - TILC09, Tsukuba, April 2009
    - ILC PAC Review, Vancouver, May 2009
  - **PhL's presentations**
    - TILC09, Tsukuba, April 2009
    - CLIC ACE, May 2009
    - CLIC-ILC Executive Meeting, June 2009
    - CLIC Two-beam Module Review, September 2009
    - CLIC Workshop, October 2009



- **Topics to be addressed by the WG in 2010, with corresponding deliverables:**
  - Submitted abstract to IPAC2010, Kyoto, May 2010 on "Assessing risk in costing high-energy accelerators: from existing projects to the future linear collider"
  - We will need to write this up and present it, and maybe a more complete version
  - Continuing to develop scheduling methodology, depending on personnel availability
  - We've had a goal of compiling a standard methodology and parameterization for estimating the cost of warm (room temperature copper) magnets and their associated power supplies and cabling, but again, have been limited by availability of experts
  - WG will provide expert members for Peer Review of CLIC Costs in Autumn 2010
- **Future topics until 2012:**
  - Keep informed on both the CLIC and ILC cost estimating
  - Ensure that both estimates are presented in a way that facilitates comparison
  - Goal is to serve on each other's internal quality assurance/review boards to make sure CLIC and ILC design reports (including cost estimates) for 2012 are ready for international review and public release.
- **Main benefits from joint WG:**
  - Since both ILC and CLIC will be international projects, it is vital to get as many view points as possible from each country and region.
  - The CLIC-ILC Collaboration is a good start, but it is still too narrow.
  - The "Governance" studies by Brian Foster and his committee address some of the political logistics. Maybe it is always a matter of international politics, but similar things must be done from the component fabrication, installation, operation and maintenance viewpoints. The LHC experience was a start. Much experience (some good, much bad) is being provided by XFEL & ITER.



- **Main difficulties in running joint WG:**
  - Lack of availability of people!
- **Remarks and suggestions to the CLIC-ILC WG on General Issues:**
  - See response to "Main benefits from joining WG"
- **Name of person(s) filling questionnaire:**
  - Peter Garbincius
  - Philippe Lebrun

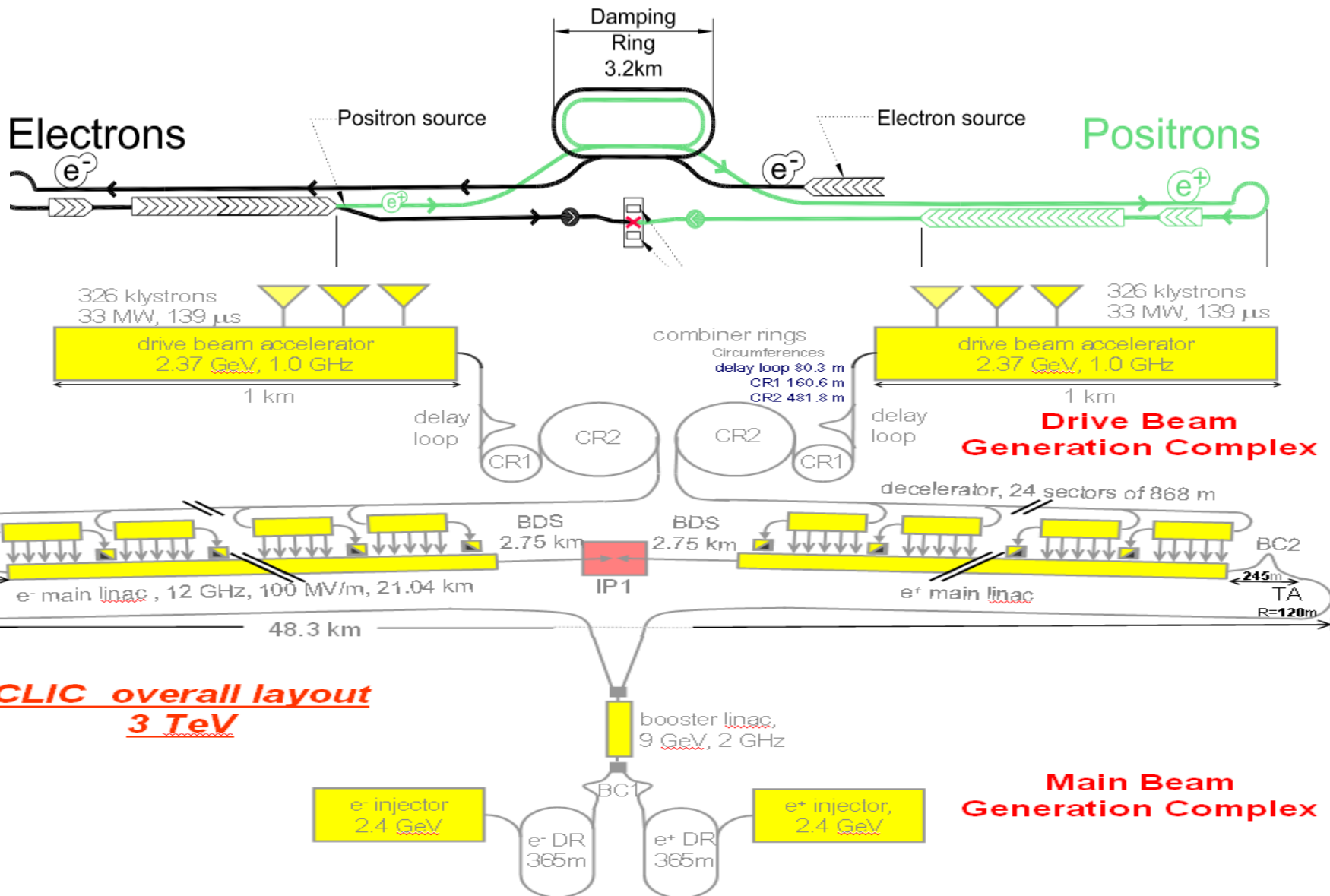
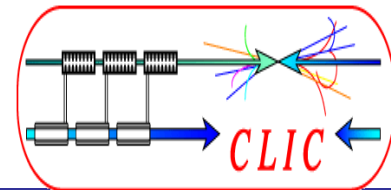


## 1. *Promoting the linear collider*

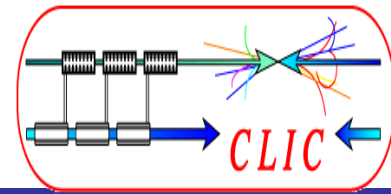
- Beyond agreement of principle with this goal, the WG did not see how it possessed any special expertise in this area and thought its time better spent in other elements of the charge. Progress in other areas could have this effect naturally of course. Nevertheless, this will be kept under review

## 2. *Identifying synergies to enable the design concepts of ILC and CLIC to be prepared efficiently*

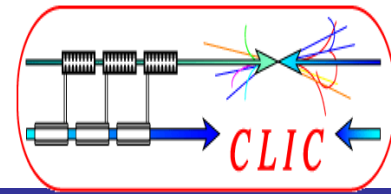
- The WG has embarked on two courses of action. Firstly we have asked the previously appointed, more focused CLIC-ILC technical groups to indicate areas in which they are producing collaborative work, and areas where they believe such synergies are possible in the future. We are consolidating the results.
- Secondly, the WG has decided to think about what might be described as the ultimate synergy; a phased approach to a linear collider complex. In this scenario the WG would see whether it makes sense to consider a scheme which starts with a lower energy ILC-like machine which evolves into a higher energy CLIC-like one. This is evidently a complicated question which may have a simple answer; No. Any answer besides No is also likely to be complicated.







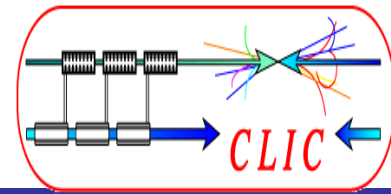
3. *Discussing detailed plans for the ILC and CLIC efforts, in order to identify common issues regarding siting, technical issues and project planning.*
  - The WG decided to produce a common indicative timeline/roadmap, showing essential milestones up until 2015 as a first step to identifying common issues. We have had some initial discussions regarding siting and will have some observations on the subject.
4. *Discussing issues that will be part of each project implementation plan*
  - The GDE has an outline of a project implementation plan which has been presented to the WG. The CLIC collaboration has not thought too much about this issue yet. The WG spent some time pondering this topic and then decided to table it for now.



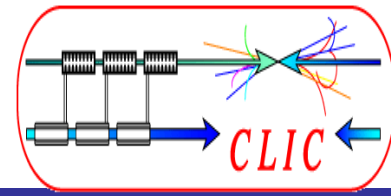
## 5. *Identifying points of comparison between the two approaches*

- It appears to the WG that this will involve a mixture of physics, cost and technical risk. Detailed physics scenarios will require the initial LHC results (at least). Cost information is available for the ILC but it will require the CLIC Conceptual Design Report later in 2010 before CLIC costs are evaluated. The CLIC Conceptual Design Report will include a scaled 500 GeV version which could be built as a first step to the main 3 TeV design, so the basic information will exist. ILC technical risks are reasonably well understood at this point. The CLIC technical challenges are a major goal of the 2010 study thus any risk comparisons require the CLIC report to be completed.
- This is evidently a complex problem but the WG believes that while a definitive answer is likely elusive this WG is a good place to start the process. Significant progress is unlikely before the CLIC Conceptual Design Report is completed.

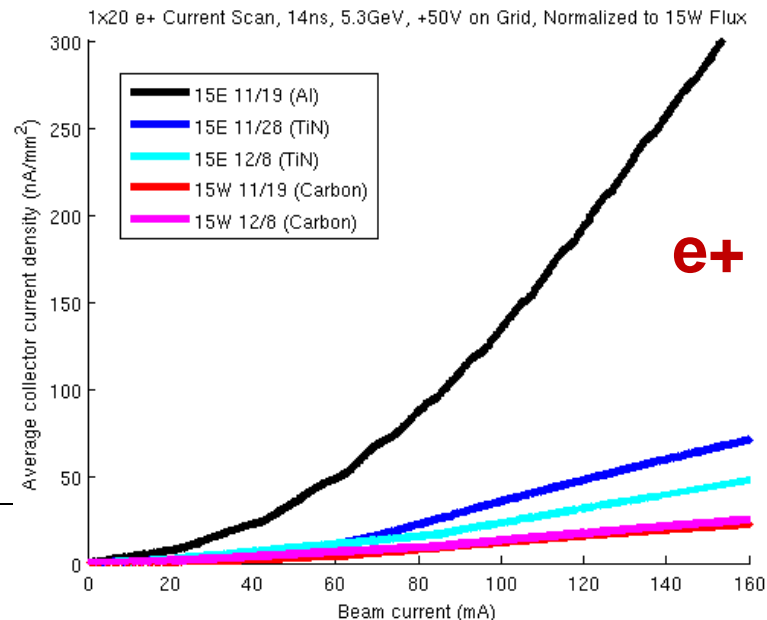


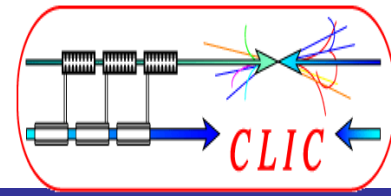


- *Details of the WG intentions were presented for comments to the CLIC Board, the ILCSC & the GDE EC.*
- *We will concentrate on items 2 -> 4 in 2010 and await the CLIC feasibility study before considering item 5. The interim report will therefore be principally on items 2 -> 4.*
- *The WG will consider whether there are any other topics that naturally fall into this program. To date we have not identified anything we would propose to add.*



- *Not all synergies are created equal*
  - Beam dynamics tends to be rather one sided due to the fact that CLIC is technically more challenging.
  - The much greater positron flux required by the ILC creates many more issues in this area than CLIC
- *Beam test facilities*
  - Certainly the results from both CESR TA and ATF2 would appear positive in this regard



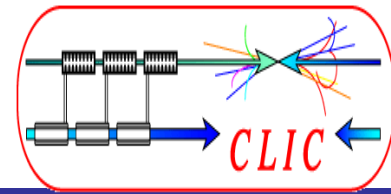


- *CERN 2010 medium term plan - the 5 year rolling strategic document.*

*From the executive summary :*

This MTP is science-driven thirdly by the preparations for the future of CERN as the main global accelerator laboratory in the following areas:

- R&D for CLIC;
- enhanced CLIC – ILC collaboration;
- linear collider detector R&D in the framework of a world-wide collaboration, mandatory to arrive at a CDR for CLIC, potentially followed by a TDR for the linear collider;
- R&D for high-power proton sources.



- *There is evidently a significant amount of activity involving the technical working groups. Most of this work would not be taking place without these initiatives.*
- *Anecdotally the process is viewed positively by the participants.*
- *Collaboration is strongly supported by the CERN and the GDE managements*
- *Project level synergies (rather than the technical ones) remain to be demonstrated*