

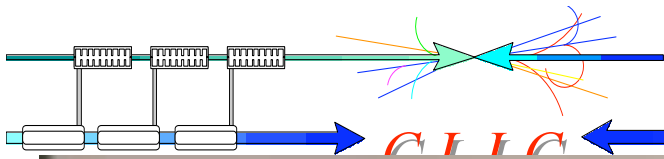
Low Emittance Rings 2010



Low Emittance Rings workshop scope

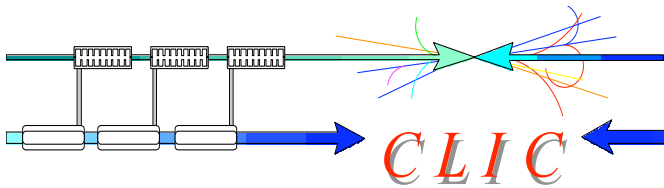
Y. Papaphilippou, CERN

January 12th, 2010



WELCOME TO GENEVA!





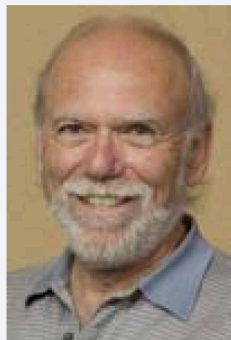
Background



- On November 2008, CLIC-ILC collaboration was formalized with the formation of seven working groups in different areas, among which Damping Rings, chaired by M. Palmer (Cornell) and YP (CERN)

Director's Corner

13 November 2008



Barry Barish

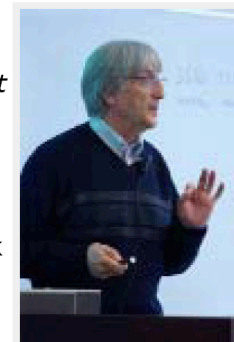
Formalising the CLIC-ILC collaboration

Collaboration between our ILC R&D and design work and the parallel effort towards the CLIC concept stands to be of benefit to both groups. This direction also promises to help break down barriers between the two groups, making the worldwide effort towards a linear collider more integrated and unified. Of course, the underlying concepts are fundamentally different and affect much of the rest of the design: for acceleration in the main linac, the ILC uses superconducting RF, whereas CLIC accelerates through a drive beam. Nevertheless, there is a great deal of mutual interest in other areas and we have formed [five working groups](#) that are already well [underway](#) and two more working groups are being set up. We have now taken the step to formalise the mode of our collaboration, especially regarding guidelines for communication outside the collaboration. This will help enable the joint work to go forward and be used in ways agreeable to both groups.

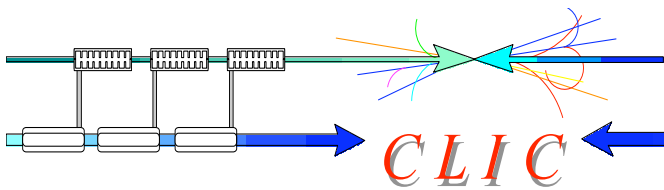
As pointed out in our recent Programme Advisory Committee (PAC) review that I reported on last week: *"The PAC views very positively the recent start of common activities between the ILC and CLIC on many items such as conventional facilities, beam delivery system, detectors, physics, cost estimation, 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."*

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.

The newly agreed joint statements are given below:



Jean-Pierre Delahaye, CERN
CLIC study leader



Working group mandate

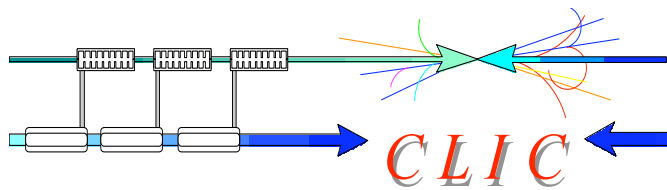


- Develop synergies and **collaborate** in beam dynamics and technical issues of common interest in damping ring design
- Use **common research approaches** and studies when possible including **numerical tools**
- Take advantage of **existing test facilities** or **storage rings** and participate in a common experimental program
- **Trigger communication, establish links** between the two communities, **share knowledge** and document common work

Low Emittance Rings workshop 2010

Organized by S.
Guiducci (INFN), M.
Palmer (Cornell) and
YP (CERN)

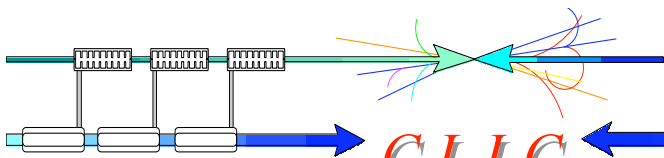
- **Bring together** experts from the scientific communities working on low emittance lepton rings (including damping rings, test facilities for linear colliders, B-factories and electron storage rings) in order to **discuss** common beam dynamics and technical issues.
- Targets **strengthening the collaboration** within the two damping ring design teams and with the rest of the community.
- **Profit from the experience** of colleagues who have designed, commissioned and operated lepton ring colliders and synchrotron light sources.



Timing of the Workshop



- CLIC conceptual design report (2010)
- ILC Strawman baseline (2009) and technical design (2012)
- Vigorous experimental program in test facilities (CESR-TA, ATF)
- Upgrade plans in B-factories (SUPERB, SUPERKEKB)
- Important breakthroughs in light sources for reaching ultra-low vertical emittances (SLS, DIAMOND)
- Commissioning of PETRA III (wiggler dominated light source)
- New light source projects and studies targeting ultra-low emittances in regimes where Intra-beam scattering becomes important (NSLSII, MAX4, Spring-8 upgrade, Ultimate Storage Ring, PEP-X)



Workshop program I



■ Opening session (convener: M. Palmer (Cornell))

- Reviews of studies on damping rings, B-factories, light sources and test facilities

■ Low Emittance Design and Tuning

□ Design of low emittance lattices (convener: S. Guiducci (INFN))

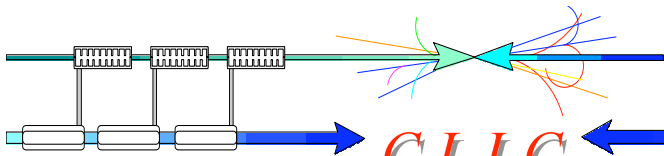
- Lattice studies (ILC, CLIC, SUPERB, SPRING-8, PEP-X, MAX4)
- New concepts (longitudinally varying bends)

□ Low emittance tuning (convener: A. Streun (PSI))

- Experimental results from light sources (SLS, Diamond, Australian Synchrotron), and test facilities (CESR-TA)
- Optimization techniques (Global analysis for optimum lattice, genetic algorithms...)

□ Non-linear dynamics (convener: C. Steier (LBNL))

- Oxford workshop review
- Experimental techniques (SLS, Diamond)
- Simulations (CLIC-PDR, CLIC-DR) and new methods (optimizers)

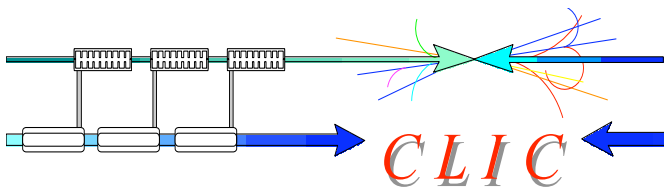


Workshop program II



■ Collective effects

- **FII, IBS and CSR** (convener: D. Schulte (CERN))
 - FII in light sources and test facilities (ATF)
 - IBS measurements (ATF), estimations (PEP-X) and new
 - CSR in light sources (ANKA)
- **Electron Cloud Simulations, Measurements** (convener: G. Rumolo (CERN))
 - Simulations (ILC, CLIC, SUPERB, SUPERKEKB-8)
 - Experiments (CESR-TA, KEKB, DAFNE)
- **Electron Cloud Mitigation** (convener: S. Calatroni (PSI))
 - Coatings (review, NEG@SOLEIL), scrubbing
 - Vacuum design (ILC)
- **Impedance modeling and measurements** (convener: G. Dugan (Cornell))
 - Light sources review and measurements (Elettra, DAFNE)
 - Impedance estimation (CLIC) and minimization methods (non-linear tapering)



Workshop program III



■ Low emittance rings technology

□ Kickers, Magnets and Alignment (convener: M. Palmer (Cornell))

- Fast kicker design and tests (ATF, CLIC, SOLEIL)
- Combined function magnets' design (MAX)
- Magnetic alignment techniques (vibrating wire, beam based)

□ Wigglers (convener: E. Wallen (MAXlab))

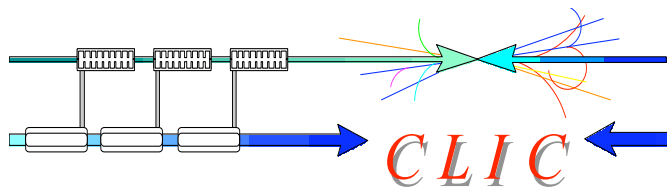
- Wiggler design, performance and radiation absorption (CLIC, PETRAIII, SOLEIL)
- Wiggler error correction techniques (induction shimming)

□ Instrumentation, feedback and RF (convener: T.Lefevre (CERN))

- Beam position monitors (ATF, Liberas@SOLEIL0)
- Fast feedback systems performance (DAFNE, SOLEIL)
- RF systems design (SOLEIL)

■ Closing session (convener: YP (CERN))

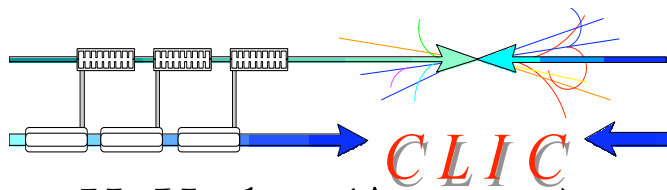
- Summaries



Discussion sessions



- Dedicated sessions at the end of each day
- Special discussion session tomorrow evening on methodology for designing rings with extremely small emittance (organized by K. Sutome (Spring-8))
- As program is very dense, please:
 - Upload your presentation using indico at least before the start of the session
 - Allow at least 5 minutes at the end of your presentation for questions and discussion
 - Organize off-line discussions with colleagues and let the session conveners know of the outcome in order to report it in their summaries



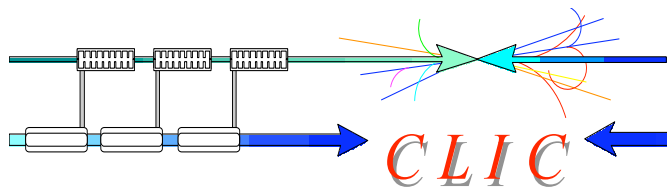
Program committee



K. Harkay (Argonne)
L. Emery (Argonne)
E. Levichev (BINP)
Y. Papaphilippou (CERN)
G. Rumolo (CERN)
F. Zimmermann (CERN)
A. Wolski (Cockroft)
M. Palmer (Cornell)
G. Dugan (Cornell)
D. Rubin (Cornell)
K. Balewski (DESY)
R. Bartolini (Diamond)
P. Elleaume (ESRF)
M. Biagini (INFN-LNF)
S. Guiducci (INFN/LNF)
P. Raimondi (INFN/LNF)

J. Urakawa (KEK)
K. Kubo (KEK)
K. Ohmi (KEK)
Y. Suetsugu (KEK)
K. Kanazawa (KEK)
C. Steier (LBNL)
J. Byrd (LBNL)
F. Willeke (NSLSII)
L. Rivkin (PSI)
A. Streun (PSI)
Y. Cai (SLAC)
T. Raubenheimer (SLAC)
M. Pivi (SLAC)
J. Seeman (SLAC)
J.M. Filhol (Soleil)
K. Soutome (Spring-8)

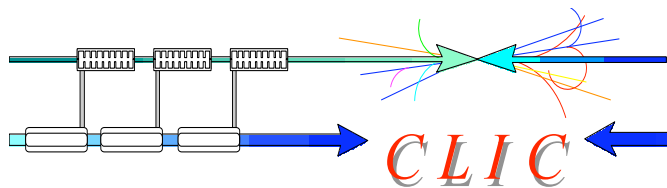
THANK YOU



LER2010 demographics



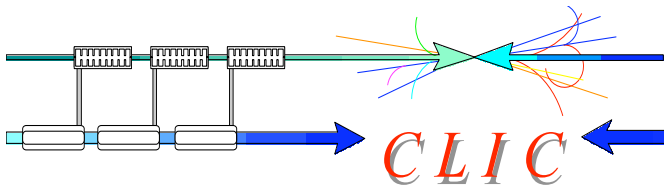
- 69 registered participants (+ WebEx)
- 12 countries (4 continents)
 - Australia, France, Germany, Greece, Italy, Japan, Russia, Spain, Switzerland, Sweden, UK, USA
- 24 institutes:
 - Argonne (1), Australian Synchrotron (1), BINP (3), BNL (2), CELLS (1), CERN (17), CERN/NTUA (1), CERN/EPFL (2), Cockroft Institute (2), Cornell Un. (3), DESY (1), Diamond/JAI (1), Elettra (1), Fermilab (2), KEK (2), KIT (2), JASRI/SPring-8 (2), LBNL (1), LNF-INFN (8), MAX-lab (2), PSI (4), PSI/EPFL (1), SLAC (2), SOLEIL (6), Un. of Minnesota (1).



Workshop logistics



- **Apologies** for the workshop room change (may return to original room – to be confirmed later this afternoon)
- **Registration** will continue today during coffee breaks and lunch (13:30-14:00). In all other times, please contact local organizers (YP, A. Augier, F. Antoniou, A. Vivoli).
- **Workshop badges** serve as access card for entering CERN
- **Photo tomorrow** (Wednesday) at the end of morning sessions (building 40 or 500 depending on weather)
- **Welcome drink, today** at 19:00 at the Globe
- **Workshop dinner on Thursday**, at 19:30 in Restaurant 2



**I Wish you all
a very Happy New Year
and a successful workshop**