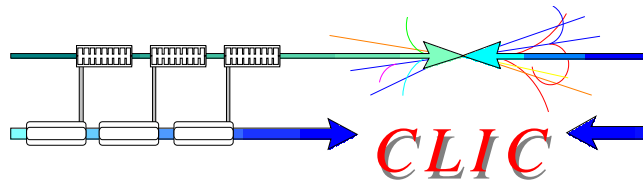


CLIC/ILC collaboration working group on damping rings

Mark Palmer (Cornell) and
Yannis Papaphilippou (CERN)



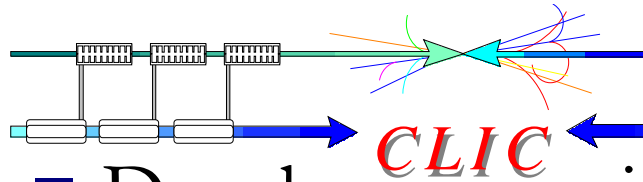
CLIC/ILC DR parameters



S. Guiducci, INFN-LNF during CLIC'08

- Intense interaction between ILC/CLIC in the community working on the DR crucial issues: ultra low emittance and e^- -cloud mitigation.
- Common WEBEX collaboration meetings already organized for CESR-TA, ILC and CLIC DR (subscribe yourself to the mailing list)
- It is very important to strengthen the collaboration and include also other beam dynamics and technical aspects.

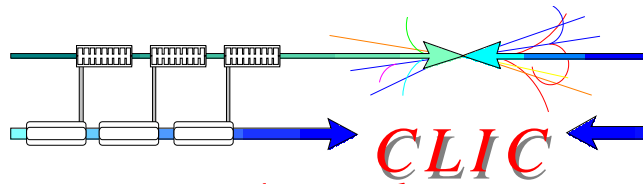
	ILC	CLIC
Energy (GeV)	5	2.4
Circumference (m)	6476	365
Bunch number	2700 - 5400	312
N particles/bunch	2×10^{10}	3.7×10^9
Damping time τ_x (ms)	21	1.5
Emittance $\gamma\epsilon_x$ (nm)	4200	381
Emittance $\gamma\epsilon_x$ (nm)	20	4.1
Momentum compaction	$(1.3 - 2.8) \times 10^{-4}$	0.80×10^{-4}
Energy loss/turn (MeV)	8.7	3.9
Energy spread	1.3×10^{-3}	1.4×10^{-3}
Bunch length (mm)	9.0 - 6.0	1.53
RF Voltage (MV)	17 - 32	4.1
RF frequency (MHz)	650	2000



Draft 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



Common subjects



■ **e⁻-cloud**

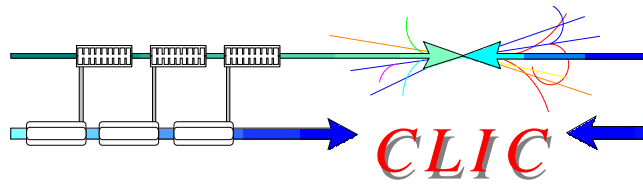
- Vacuum chamber design (coatings)
- Impedance estimation

■ **Low emittance tuning (correction systems)**

- Lattice design
- Diagnostics

■ Collective effects (IBS, Fast ion instability) and feedback

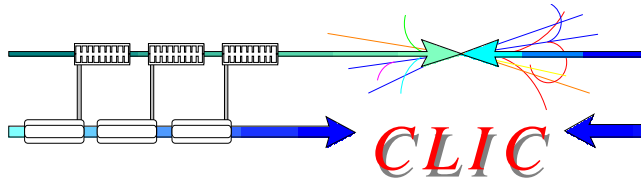
■ Magnet technology including wiggler and radiation absorption schemes



Methods and Codes

- Use common beam dynamics methods and share, compare and benchmark numerical tools
 - Good example is the simulation work done for e^- -cloud by Cornell, LBNL, SLAC, INFN-LNF, ANL, CERN et al.
 - Other examples may include
 - Lattice design (tuning low emittance cells)
 - Correction systems (low emittance tuning) and dynamic aperture optimization (tracking codes, resonance analysis)
 - Collective effects (IBS, fast ion instability)
 - ...

Test facilities



CLIC

CESR-TA

ATF

**Storage rings
(SLS, ANKA,
DIAMOND,
SOLEIL...)**

e^- -cloud, chamber tests,
mitigation techniques

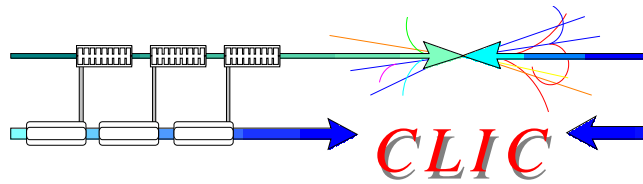
Low emittance tuning

Diagnostics (X-BSM, BPMs,...)

Resonance analysis and
correction systems

Equilibrium emittance in IBS
and wiggler dominated regime

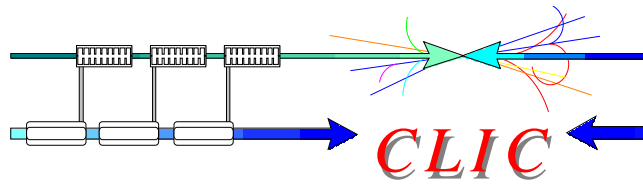
Collective effects (FII, feedback)



Communication



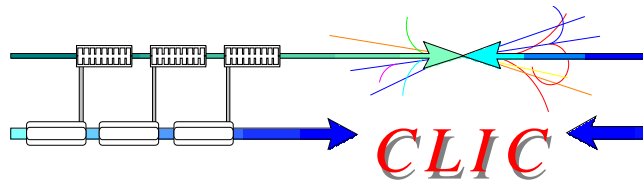
- Promote communication and sharing of knowledge through common meetings (WebEx) in order to facilitate the understanding of the similarities and differences of the two designs
- Working group mailing list and Web-page
- Document common work in a working group report
- Organize a workshop



Working Plan



- Short term (mid 2009)
 - Numerical tools
 - Collaboration for e^- -cloud simulation work
 - Participate in common experiments at test facilities
 - e-cloud, chamber tests @ CESR-TA
 - Low emittance tuning @ CESR-TA, ATF
 - Fast Ion Instability @ ATF
 - Communication
 - Organize regular common meetings (already existing)
 - Set-up a working group mailing list and web page



Working Plan



- Long term (2009-2010)
 - Numerical tools
 - Lattice design and non-linear dynamics
 - Impedance estimation
 - Participate in common experiments at test facilities
 - IBS experiments @ CESR-TA
 - Low emittance tuning @ SLS
 - Resonance analysis @ ATF, CESR-TA, Light Sources
 - Communication
 - Organize a workshop
 - Document common work in a working group report