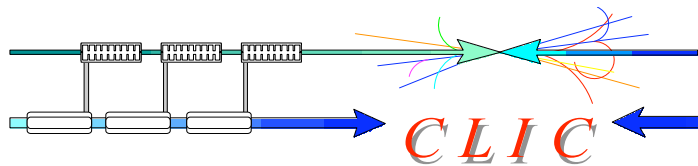


# ILC/CLIC "e<sup>+</sup> generation" working group

J. Clarke (Daresbury), L. Rinolfi (CERN)

**Officially set-up at University of Illinois Chicago - UIC  
during ILC08 workshop: 15<sup>th</sup> - 20<sup>th</sup> November 2008**



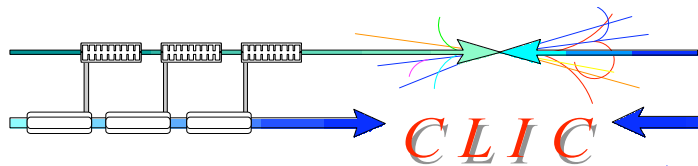
## Mandate of the working group



The ILC study considers the Undulator option as the base line while the Compton ring is an alternative option. The CLIC study considers the Compton ring as the base line while the Undulator is an alternative option.

The working group should:

- Develop the synergy between the ILC and CLIC  $e^+$  studies.
- Evaluate the common technical issues related to both options for the production of polarized positrons.
- Prioritize R&D.
- Consider other alternatives such as ERL, Linac-Compton and conventional sources.
- Review the existing technical and tests facilities where further tests could be performed.
- Evaluate where cost savings could be obtained.
- Promote common meetings and workshops.

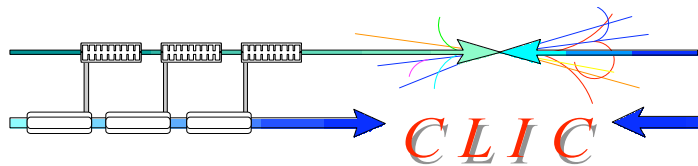


## Beams parameters for $e^+$



At the entrance of the PDR (CLIC) and the DR (ILC)

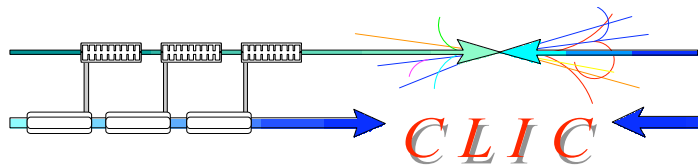
		ILC (0.5 TeV)	CLIC 2008 (0.5 TeV)	CLIC 2008 (3 TeV)
$E$	GeV	5	2.424	2.424
$N$	$10^9$	30	11	6.4
$n_b$	-	2625	312	312
$\Delta t_b$	ns	369	0.5 (6 RF periods)	0.5 (6 RF periods)
$t_{pulse}$	ns	968925	156	156
$\epsilon_{x,y}$	mm.mrad	9000, 9000	(Simulations	9300, 9300
$\sigma_z$	mm	20.6 (full width is 9 mm but much larger after energy compression)	under	5
$\sigma_E$	%	0.5 (50 MeV total spread at 5 GeV)	way)	1.5
$f_{rep}$	Hz	5	50	50
$P$	kW	315	66	38



## Common ILC/CLIC subjects



- 1) Production of polarized photons
- 2) Undulator magnet
- 3) Laser system
- 4) Compton schemes (Ring, ERL, Linac)
- 5) Targets issues
- 6) Optical Matching Device
- 7) Capture and acceleration sections
- 8) Transport and collimation of large emittances
- 9) Optimization for a maximum  $e^+$  yield
- 10) Stacking
- 11) Polarization issues
- 12) Codes development and sharing decks
- 13) Integration issues for the target station
- 14) Radioactivity issues



## Institutes and tests facilities



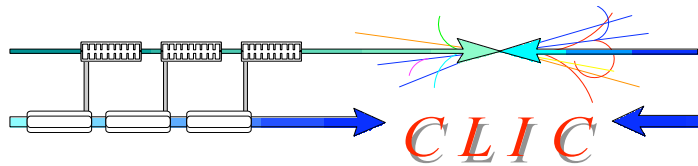
### Positron sources:

ANL	BINP	BNL	CERN	CI	Cornell	DESY	Durham	NSC-KIPT
IPNL	KEK	LAL	LLNL	STFC				

### Electron sources:

JLAB	CERN	KEK	SLAC
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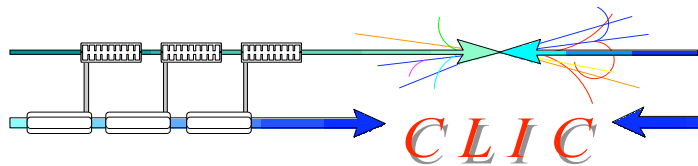
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- Positron target tests (CI) at Daresbury
  - ATF at KEK
  - Li lens, window tests, liquid Li and Pb targets at BINP
  - Li lens for  $e^+$  beam at CsrTA
  - Optical cavity at LAL
  - NA63 experiment at CERN



## Communication



- ILC  $e^+$  workshop 29<sup>th</sup> -31<sup>st</sup> October 2008 at Daresbury
- LCWS08 & ILC 08 workshop 15<sup>th</sup> -20<sup>th</sup> November 2008 at Chicago
- GDE meeting 17<sup>th</sup> -21<sup>st</sup> April 2009 at KEK
- POSIPOL workshop in June 2009 in Lyon
- CLIC workshop 12<sup>th</sup> -16<sup>th</sup> October 2009 at CERN
- Regular Webex meetings (once a month)
- Joint ILC/CLIC workshop on sources from 2010
- Establish a mailing list



## CLIC/ILC work plan (1)



Short-term plan 2008 - mid-2009

### Undulator-based source

Develop Geant4 model of collimator, target, capture optics, and capture RF assembly.  
Optimise parameters wrt yield, polarisation and cost. (Collaboration with ANL).  
Consider timing constraints issues and upgrade paths.  
Consider electron beam quality issues.

### Compton source

Design of the Compton ring (Collaboration with NSC KIPT).  
Optical stacking cavity (Collaboration with LAL and KEK).  
Stacking simulations.

### Lithium lens capture optics

Evaluate suitability for Undulator and Compton schemes. (Wide collaboration needed)

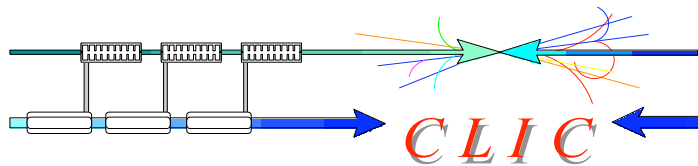
### Conventional sources (Conventional targets and hybrid targets)

Simulations to optimize the unpolarized  $e^+$  yield (Collaboration with LAL).

### Electron source

Set-up the CERN, CI, JLAB, SLAC collaboration for tracking studies.  
Preliminary tests at HV for the DC gun.

**DRAFT**



## CLIC/ILC work plan (2)



Long-term plan mid-2009 - mid-2010

### Undulator-based source

Consider optimal target technology: thermal load, shock waves, activation (Collaboration with LLNL).

### Compton source

Extend Geant4 model to Compton source (Collaboration with LAL)  
Stacking simulations studied in 6D.

### Lithium lens tests

Participate to the BINP tests and CesrTA tests.

### Conventional sources

Channeling measurements on NA63 experiment at CERN

### Electron source

Perform tracking studies (Collaboration with JLAB and SLAC).  
Hardware tests at JLAB and SLAC for the DC gun at very HV.

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