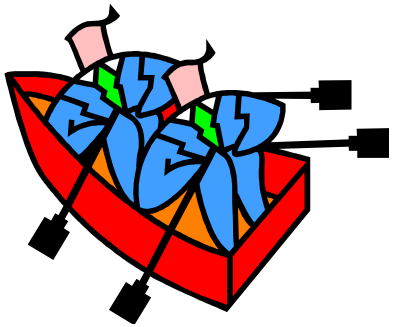
CLIC-ILC Collaboration

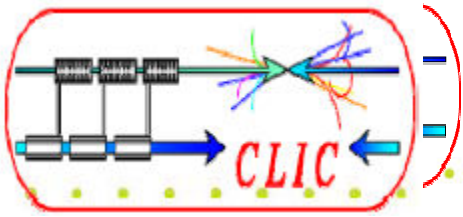
Following constructive visit of Barry @ CERN (Nov 07)

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



Dedicated web site with specific documentation

http://clic-study.web.cern.ch/CLIC-Study/CLIC_ILC_Collab_Mtg/Index.htm

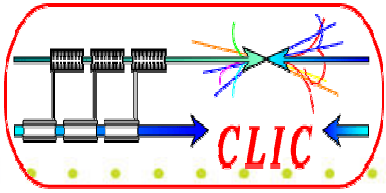


CLIC-ILC Cooperation
ILC "PAC Review" – Vancouver
May 9, 2009

Conventional Facilities
Cost & Schedule
Working Groups

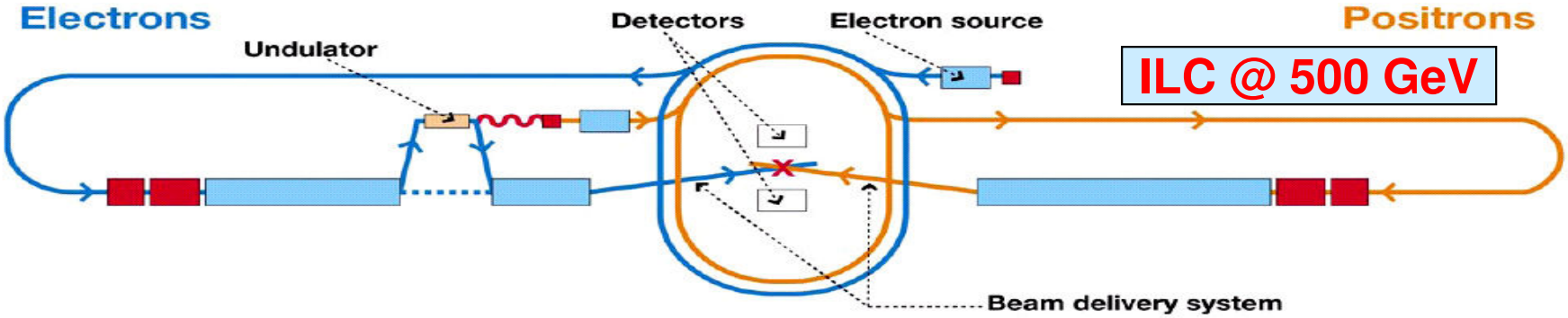
reported by Peter H. Garbincius
CLIC-ILC_phg_9may09.ppt

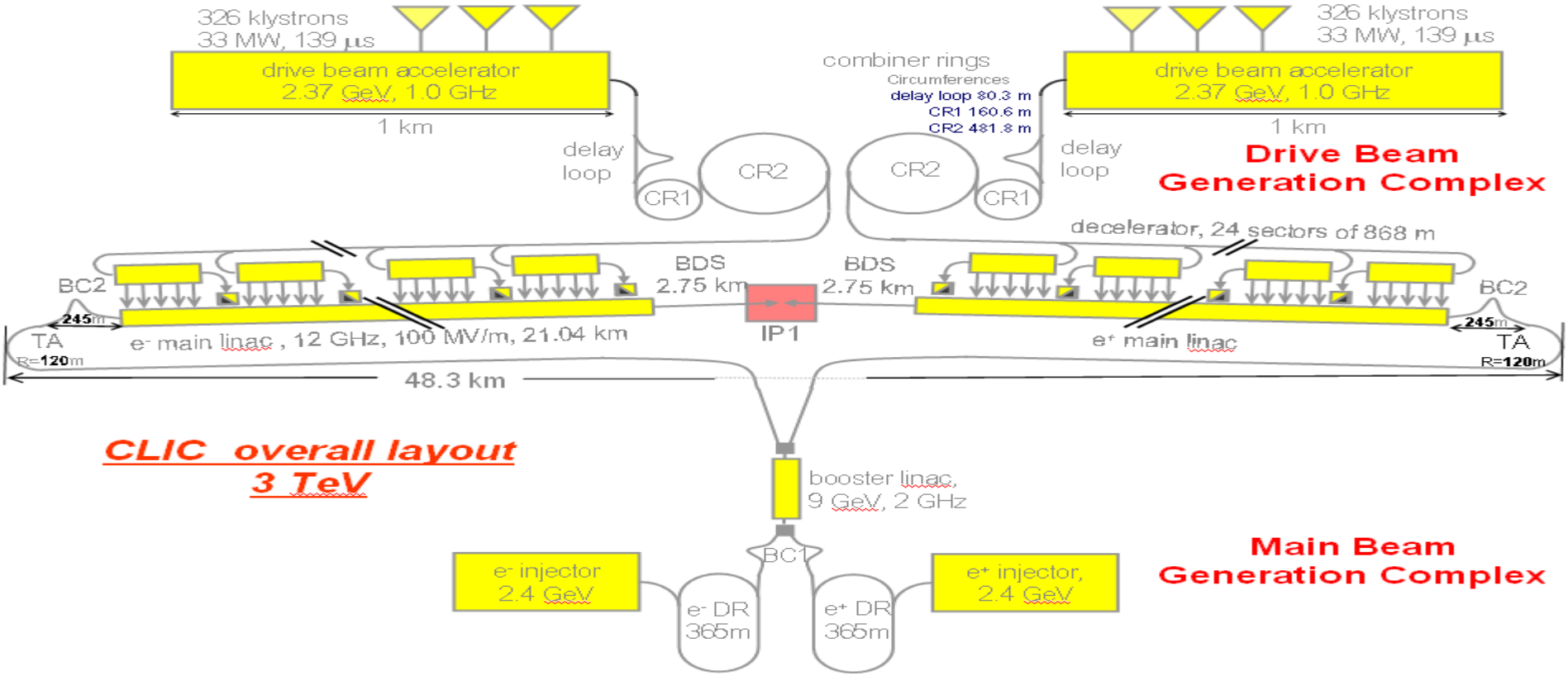
A necessary and beneficial CLIC /ILC Collaboration



- **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**

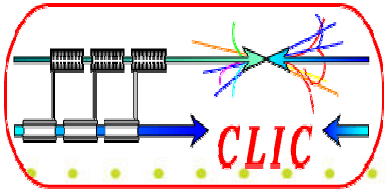
CLIC and ILC layouts





F.Richard
03/11/09

CLIC/ILC technical collaboration on subjects with strong synergies



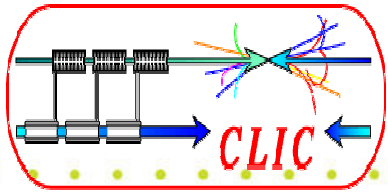
	CLIC	ILC
Physics & Detectors	L.Linssen, D.Schlatter	F.Richard, S.Yamada
Positron Generation	L.Rinolfi	J.Clarke
Damping Rings	Y.Papaphilipou	M.Palmer
Beam Dynamics	D.Schulte	A.Latina, K.Kubo, N.Walker
Beam Delivery System (BDS) & Machine Detector Interface (MDI)	L.Gatignon D.Schulte, R.Tomas Garcia	B.Parker,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

Positron generation

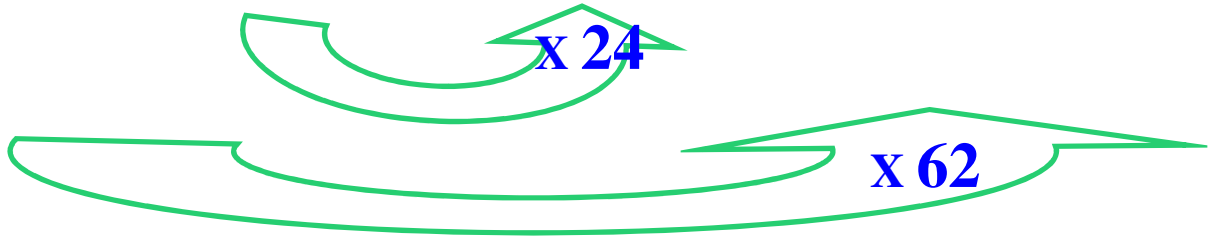
Conveners: J.Clarke/STFC Daresbury, L.Rinolfi/CERN

Mandate: http://clic-study.web.cern.ch/CLIC-Study/CLIC_ILC_Collab_Mtg/ILC_CLIC_e+_working_group.pdf

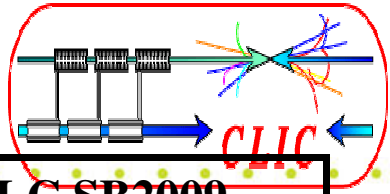
CLIC/ILC positrons flux



	SLC	CLIC	ILC
e^+/ bunch	**3.5×10^{10}**	**0.67×10^{10}**	**2×10^{10}**
Bunches / macropulse	**1**	**312**	**2625**
Macropulse Rep. Rate.	**120**	**50**	**5**
e^+ / second	0.042×10^{14}	1×10^{14}	2.6×10^{14}

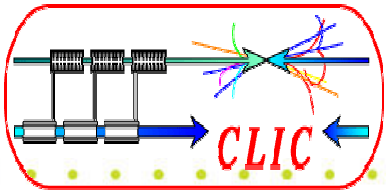


ILC and CLIC e^+ sources



		CLIC baseline (3 TeV)	ILC SB2009 (0.5 TeV)
Primary e^- beam energy	GeV	5	250
Number e^- / bunch	10^9	10	20
Photon Generation	-	Crystal channeling	Undulator
Target system	-	Amorphous	Rotating wheel
Target material	-	W	Ti
Capture system	T	AMD (6 to 0.5)	QWT (4 to 0.5)
RF frequency capture system	GHz	2	1.3
Beam energy of e^+	MeV	200	125
Yield (e^+/ e^-) at the exit		~ 1	~ 1.5
Number of e^+ / bunch	10^9	9.8	30
Polarization	%	0 Compton scheme (30)	~ 30

"CLIC/ILC e^+ generation" working group (Nov 2008)



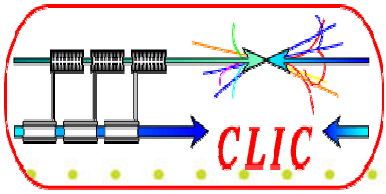
1. **Polarized electron from DC gun:** JLAB (USA)
   SLAC (USA) + CERN
2. **Unpolarized e+ from channeling:** LAL (France) + CERN
3. **Polarized e+ from Compton ring:** LAL (France)
   NSC KIPT (Kharkov)
   KEK (Japan) + CERN

1. **Polarized e+ from Undulator:** Cockcroft Institute (UK)
   ANL (USA)
   SLAC (USA) + CERN

Monthly regular Webex meetings, called "ILC/CLIC e^+ studies" by T. Omori / KEK

Distribution list by G. Moortgat-Pick at: owner-ph-ilc-clic-positronsource@durham.ac.uk

CLIC/ILC present developments



a) Undulator-based source

Develop Geant4 model of collimator, target, capture optics, and capture RF assembly.

Optimise parameters wrt yield, polarisation and cost

Consider timing constraints issues and upgrade paths.

b) Compton source

Design of the Compton ring (Collaboration with NSC KIPT).

Optical stacking cavity (Collaboration with LAL and KEK).

High power lasers.

Stacking simulations.

c) Lithium lens capture optics

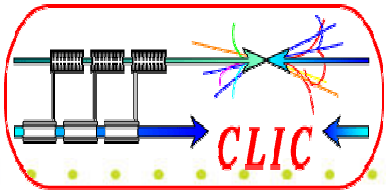
Evaluate suitability for Undulator and Compton schemes (Wide collaboration needed).

d) Conventional sources (Conventional targets and hybrid targets)

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

Evaluate the applicability of the Li lens.

CLIC/ILC mid-term plan (mid-2009 - mid-2010)



Undulator-based source

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

Compton source

Extend Geant4 model to Compton source (Collaboration with LAL) *Not yet started*

Stacking simulations studied in 6D. *Under discussion*

Lithium lens tests

Participate to the BINP tests and CesrTA tests. *Report to the CLIC09 workshop for the initial tests*

Conventional sources

Channelling measurements on NA63 experiment at CERN

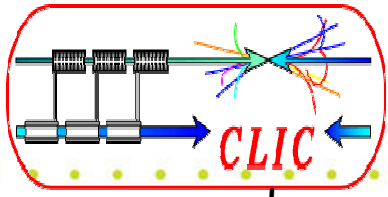
Perform experiments at KEKB positron source. *Reports to the CLIC09 workshop*

Electron source

Perform tracking studies (Collaboration with JLAB and SLAC).

Hardware tests at JLAB and SLAC for the DC gun at very HV.

Long term plan for the e+ source

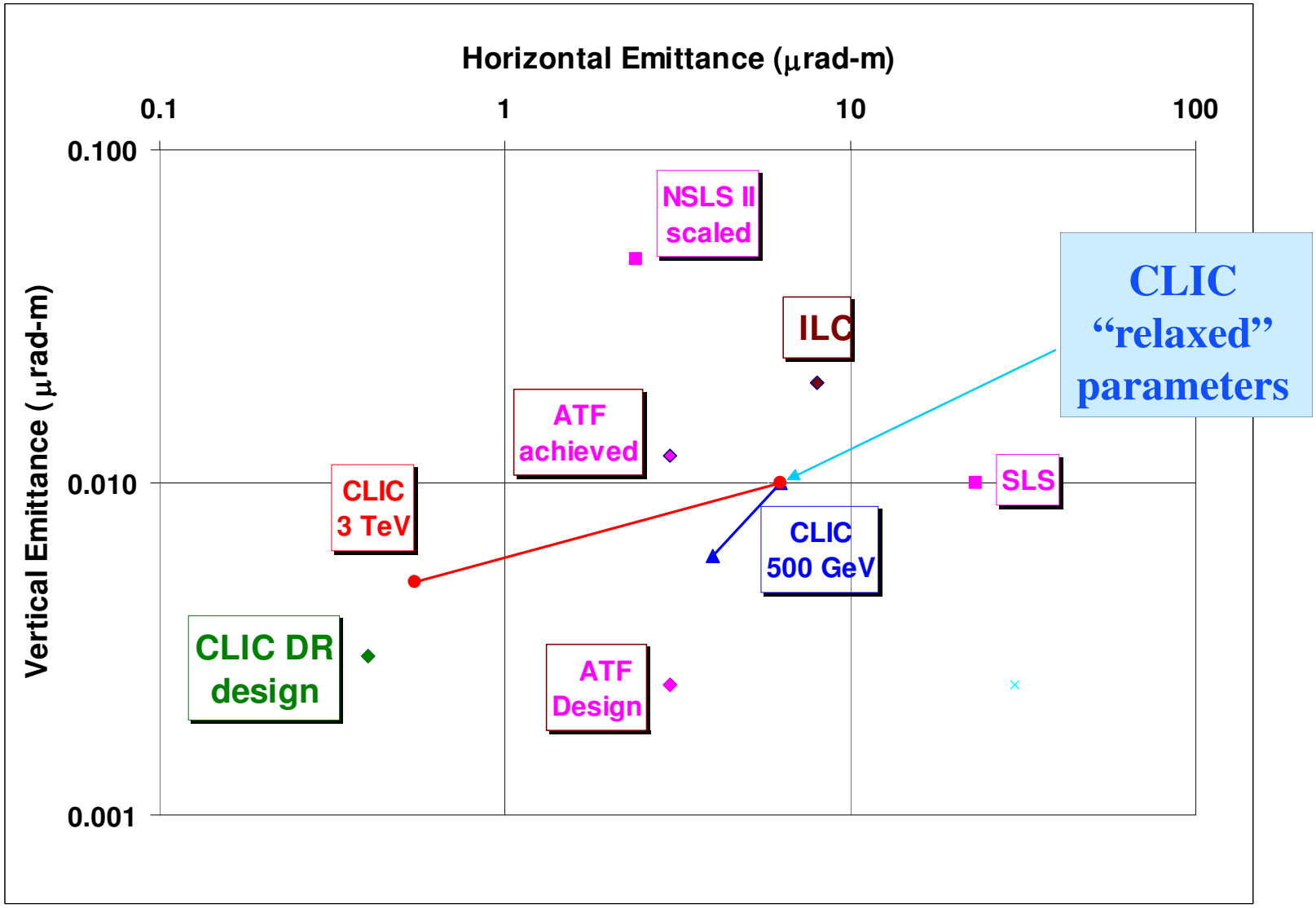


1) Investigate if a single hybrid targets station could cover all e+ source needs
2) Evaluate targets issues (Heat load dynamics, beam energy deposition, shock waves, breakdown limits, activation, ….)
3) Study the integration issues for the target station (remote handling)
4) Study the radioactivity issues
5) Optimize the Adiabatic Matching Devices (AMD)
6) Evaluate the Flux Concentrator issues (magnetic field, engineering for cooling,…)
7) Design and optimize the capture sections (Transport and collimation of large emittances, high beam loading)
8) Compare the existing codes (EGS4, FLUKA, Geant4, PPS-Sim, PSCSim, Parmela, …) and make efficient use of them
9) Evaluate Undulator scheme (Helical undulator, collimators, dumps, civil engineering)
10) Evaluate Compton Ring scheme (Lattice design, Optical cavity)
11) Evaluate Compton ERL scheme (Optical cavity, stacking very demanding)
12) Evaluate Compton Linac scheme (Optical cavities, powerful laser systems)
13) Find out the best trade off between yield, polarization and emittances
14) Design and implementation of the spin rotators
15) Studies the polarization issues (Analyze systematic errors of polarization measurements)

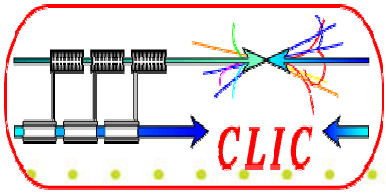
Damping Ring

Conveners: M.Palmer/Cornell University, Y.Papaphilipou/CERN
Mandate: http://clic-study.web.cern.ch/CLIC-Study/CLIC_ILC_Collab_Mtg/ILC_CLIC_e+_working_group.pdf

Ultra-low Beam Emittances Generation at Damping Rings



ILC DR overview



- For the ILC DR main issue is e-cloud mitigation:
  - different under experimental study and working group to make recommendations for the DR design

	ILC	CLIC
Energy (GeV)	5	2.9
Circumference (m)	3238	493
RF Voltage (MV)	7.5	7.4
RF frequency (MHz)	650	2000
Natural chromaticity x/y	-100 / -63	-149 / -79

Low Emittance Rings 2010

January 12-15, 2010

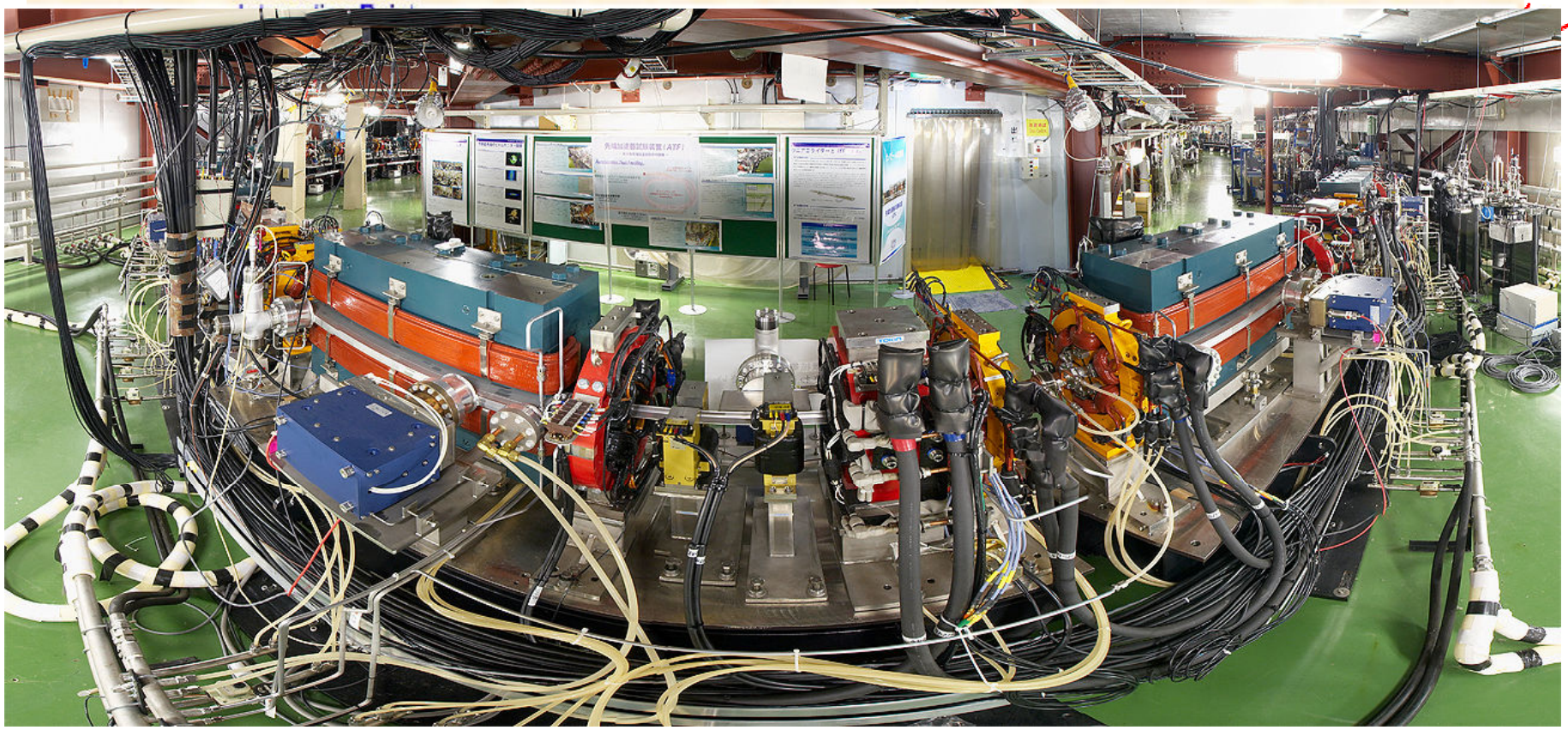
Hosted by CERN

- A conference on low emittance lepton rings (including damping rings, test facilities for linear colliders, B-factories and electron storage rings)
- Discussions of common beam dynamics and technical issues
- Organized by the joint ILC/CLIC working group on damping rings
- Aimed at strengthening the collaboration within our community

systems like wigglers, kickers, feedbacks could be useful.

- **January 12-15 we will have a joint ILC/CLIC DR workshop**

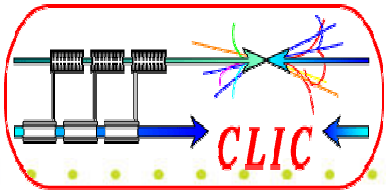
KEK ATF



Addressing feasibility of small beam emittances by international collaboration hosted by KEK

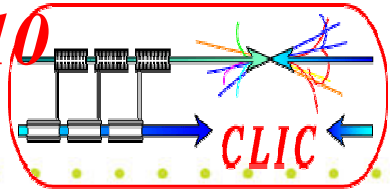
Additional tests on Electron Clouds in CESRTA/Cornell

Events during 2009



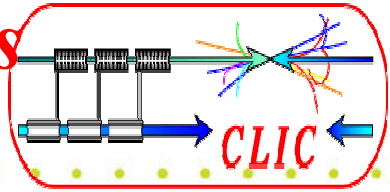
- **Mini-Workshop on the CesrTA Electron Cloud R&D Program for Linear Collider Damping Rings (CTA09), June 25-26 2009, Cornell**
  - **Discussion on current and future experimental studies of common interest in Cesr-TA (e^--cloud, low-emittance, stabilization)**
  - **Extending the collaboration in other subjects**
- **Linear Collider Workshop of the Americas, September 29 - October 3 2009, Albuquerque, New Mexico**
  - **Session on damping rings, with presentations on CLIC damping rings and common issues with ILC, including e-cloud and reducing the ATF2 emittance with super-conducting wigglers (CLIC prototypes)**
- **CLIC Workshop 2009, October 12-16 2009, CERN, Geneva**
  - **Session on damping rings, co-chaired by M. Palmer, S. Guiducci and Y. Papaphilippou, with a number of subjects treated by ILC speakers (kickers, e-cloud simulations, CESR-TA experimental program)**
  - **Organizing continuation of collaboration on e-cloud mitigation techniques (coatings at CERN) and simulations (ILC e-cloud working group), and extending collaboration on low emittance tuning measurements and IBS**

Events during 2010



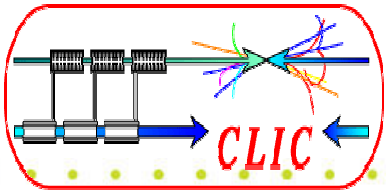
- **Workshop on Low Emittance Rings 2010, January 12-15, 2010, CERN**
  - **Enhance collaboration between the CLIC and ILC DR design teams**
  - **Involve other members of the low emittance ring communities – light sources and super B factories**
- **ECLOUD 10 workshop, October 8-12, 2010, Cornell, Ithaca, New York**
  - **Comprehensive reports on EC mitigations, performance issues and simulations**
  - **Review of proposed techniques and outstanding issues for controlling the impact of the EC in linear collider damping rings**

On-going activities



- **e⁻-cloud**
  - **Electron Cloud Mitigation**
    - First experimental results **on CesrTA with amorphous-carbon coated chamber prepared at CERN (SEY,PEY)**
    - **Additional characterization planned for Nov-Dec 2009 experimental run**
    - **Plans for collaboration on a series of NEG coating and long term aging tests of coatings**
  - **Simulation work using CERN codes for electron cloud built-up (ECLOUD) and instability dynamics (HEADTAIL)**
- **Low Emittance Tuning**
  - **Participation in LET efforts at ATF and CesrTA**
- **Stabilization**
  - **Discussions for installing an actively stabilized quadrupole in CesrTA (late 2010-early 2011) for CLIC LINAC stabilization studies**
- **Wigglers**
  - **Discussions for installing super-conducting wiggler prototypes in CesrTA, ATF(proposal to be submitted on December)**
- **IntraBeam Scattering**
  - **Participation in LET/IBS measurements planned for December 2009 CesrTA run**
  - **Planning for a longer term and more comprehensive set of experiments in IBS dominated beam conditions in CesrTA**

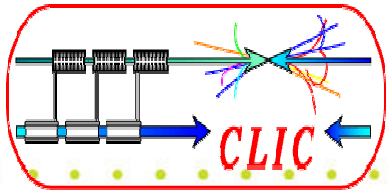
Mandate



- 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

- Original mandate kept
- ILC and CLIC damping ring designs differ as driven from different main linac RF systems, BUT, majority of damping ring issues are generic
- R&D experimental program of CesrTA of 2 years allocated time extremely useful

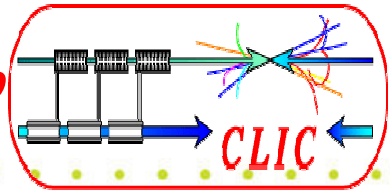
A proposal for a 3 year extension of the experimental program with strong CLIC and ILC support addressing Damping Ring issues will be reviewed by the US NSF early December



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

ILC-CLIC Beam Dynamics Working Group

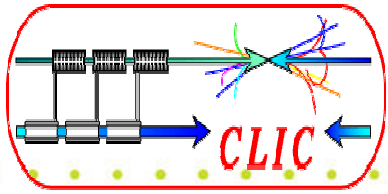


- The working group should foster the exploitation of synergy between the ILC and CLIC beam physics studies. It should promote common meetings, standards, codes and studies

- Common meetings via webex and participation from both sides to ILC and CLIC workshops

- ILC-CLIC beam dynamics workshop June 23-25 at CERN
  - Reviewed progress in both projects
  - Reviewed progress of the collaboration
  - Fostered collaboration

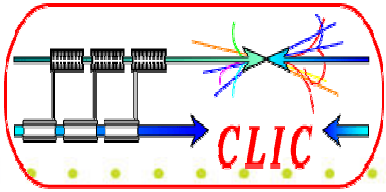
- Generation of sub-working groups corresponding to better match ILC-CLIC collaboration on
  - Injectors
  - Damping rings
  - Interaction region
  - Integrated simulations
  - Test facilities



- **Pre-alignment and survey**
  - **Full model studies are being performed for ILC and CLIC**
  - **Share some computational difficulties**
  - **Potential of synergy (common data format?) to be explored**
  - **Potential for cross checks**

- **Impact of detector solenoid on luminosity studied**
  - **Complex tracking of particles in full field model**
  - **Comparison of codes for ILC and CLIC**
  - **Potential exists to share the mitigation method**

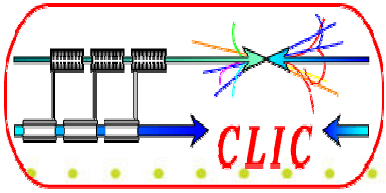
- **Discussion of RTML rational and performance for ILC and CLIC (CLIC08, beam dynamics workshop)**
  - **Currently functional CLIC RTML design is developed**
  - **ILC and CLIC system designs have been compared**
  - **Common issues exist and collaboration is being defined**



- **An important common problem are dynamic electromagnetic stray fields (O(nT))**
  - **Ongoing measurement effort at Fermilab will be complemented with new effort at CERN**
  - **Common data collection foreseen**

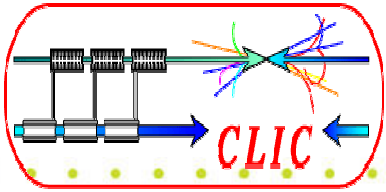
- **PLACET has been developed for CLIC**
  - **Is now developed in common effort with contributions from ILC and CLIC**
  - **Used for ILC RTML**
  - **E.g. our halo generation modules are being extended to cover ILC-like cavities**
  - **At CERN benchmarking has been performed with ELEGANT for RTML**

- **Continued development of GUINEA-PIG**
  - **Identified and solved some issues with GUINEA-PIG++**



- **Significant effort for CLIC beam feedback development**
  - **Feedback layout**
  - **Controler development**
  - **Integrated studies**
  - **Will be useful for ILC**

- **Phase stability is a common issue**
  - **Timing reference system should be a common subject**
  - **Contributions from CLIC to review ILC phase stability concept**

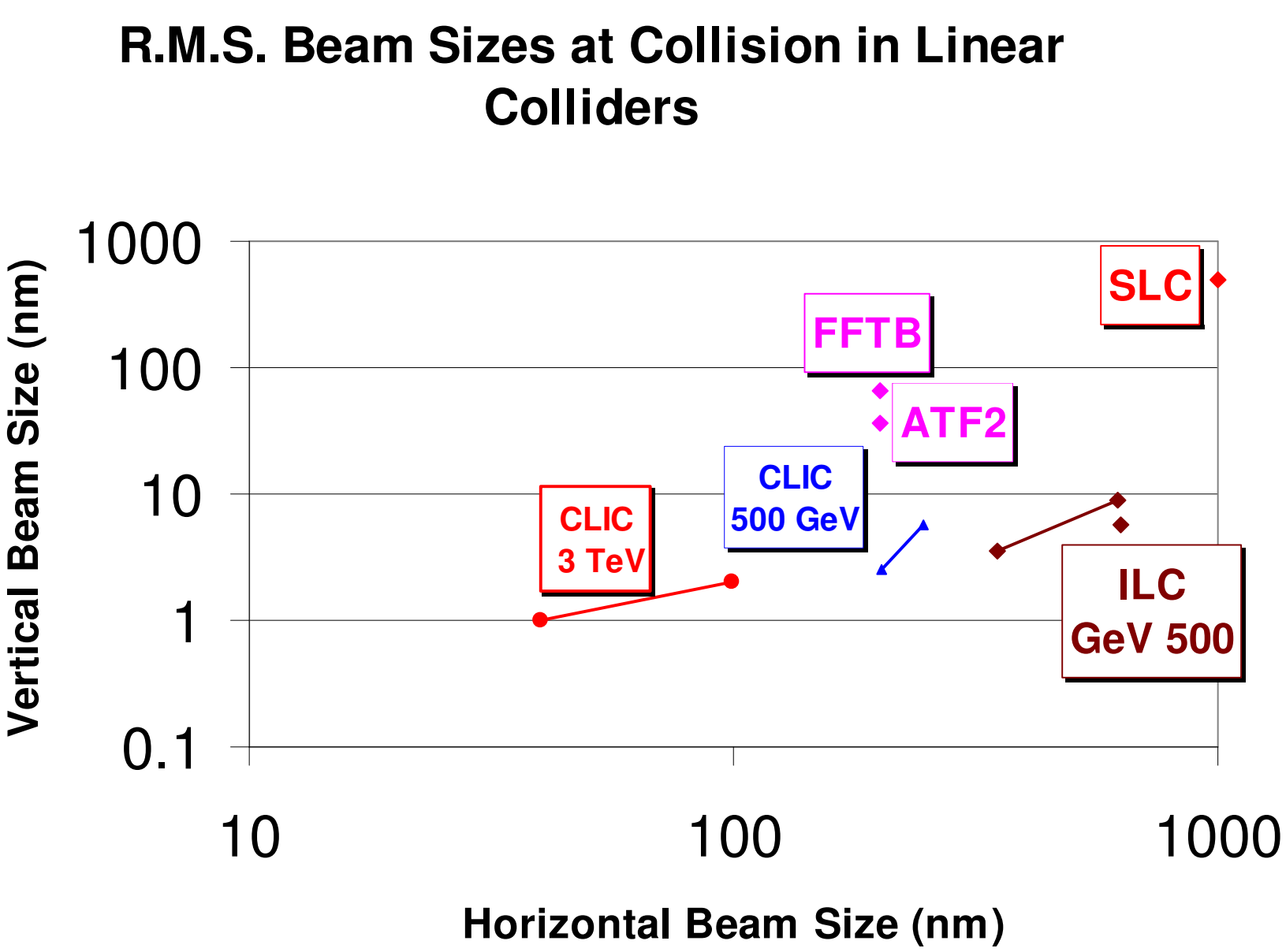


BDS & MDI

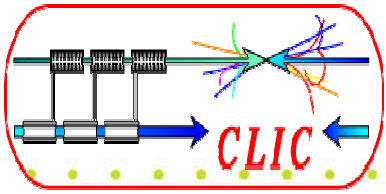
Conveners: B.Parker/BNL, L.Gatignon/CERN, A.Seriy/SNAL, D.Schulte/CERN, R.Tomas Garcia/CERN,

Mandate: http://clic-study.web.cern.ch/CLIC-Study/CLIC_ILC_Collab_Mtg/Index.htm

Beam sizes at Collisions



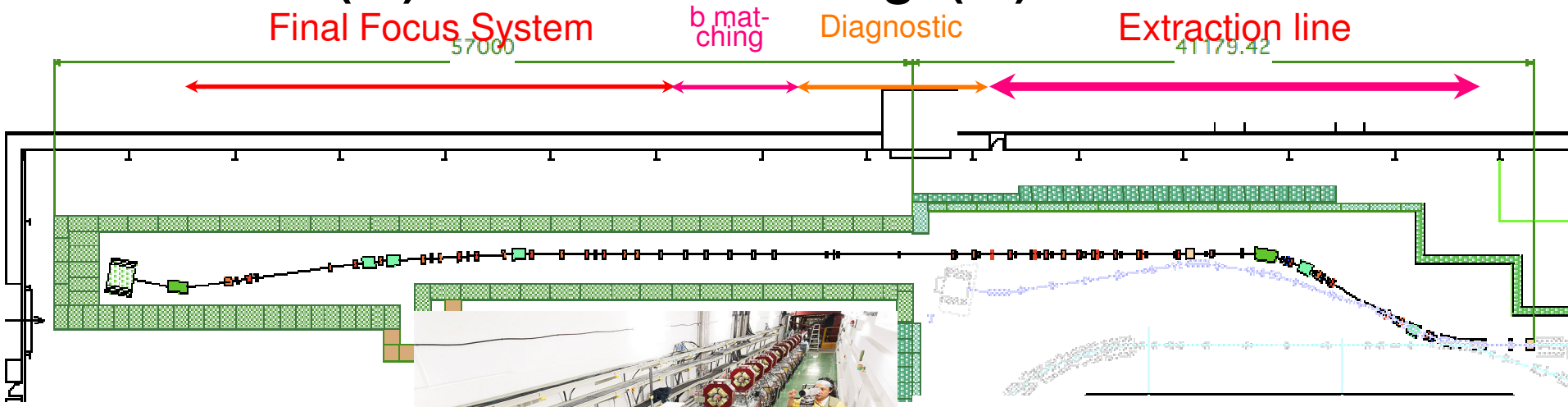
BDS CLIC & ILC parameters

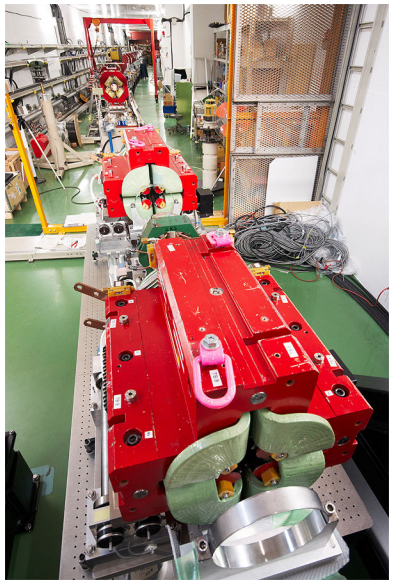


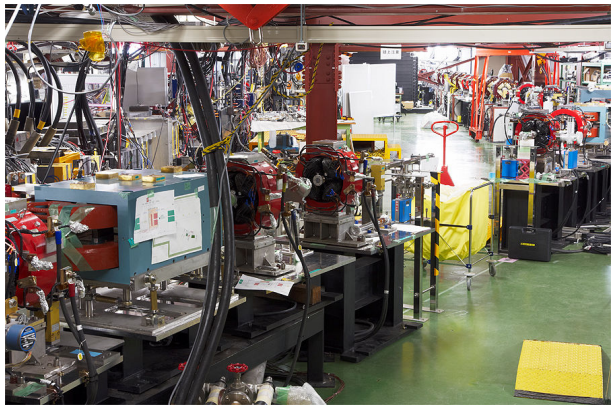
Parameter	ILC	CLIC	CLIC
Center of Mass energy [GeV]	500	**500**	**3000**
Luminosity $L_{99\%}$ [cm^{-2} sec^{-1}]	2 10^{34}	**1.4 10^{34}**	**2 10^{34}**
Pulse frequency [Hz]	5	50	50
Bunch spacing [ns]	369	0.5	0.5
# Particles per bunch	2 10^{10}	**6.8 10^{9}**	**3.7 10^{9}**
# Bunches per pulse	2670	**354**	**312**
IP beta_y [mm]	**0.4**	**0.1**	**0.1**
L* [m]	**3.5**	**4.2**	**3.5**
Chromaticity	**15000**	**54000**	**63000**
BDS length [km]	2.2	**1.8**	**2.8**
Core beam size at IP hori. σ_x^* [nm]	639	**202**	**45**
Core beam size at IP vertical σ_y^* [nm]	5.7	**2.3**	**1**

Nanometer beam sizes in KEK ATF2

Improved performances to address CLIC/ILC issues: small(er) beam sizes and high(er) chromaticities



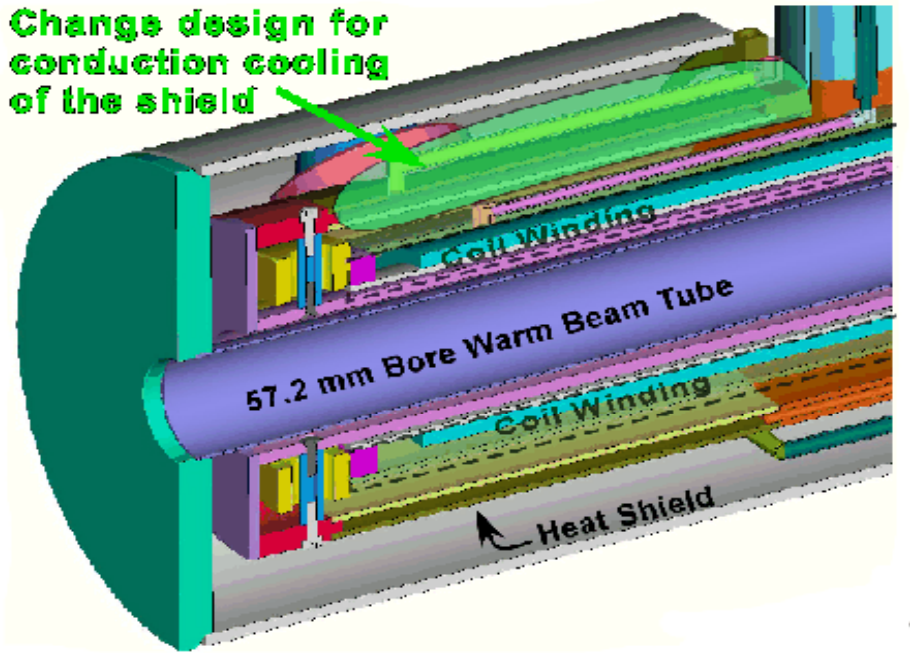


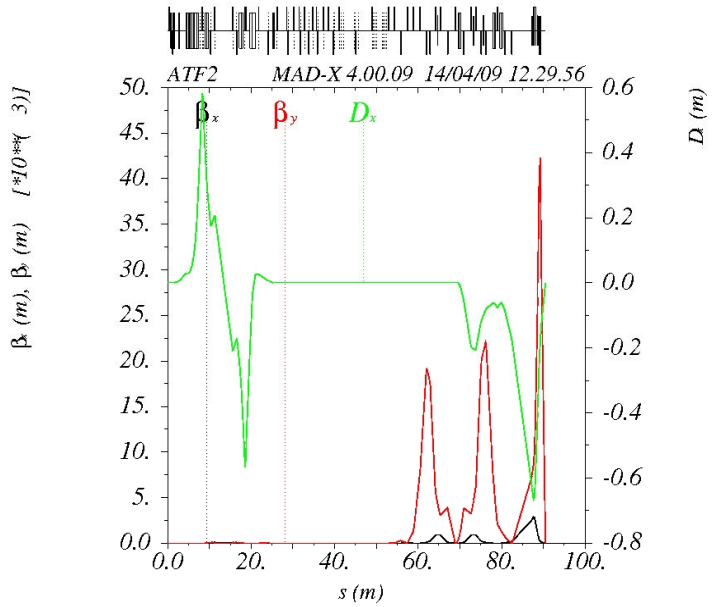


Project	Status	σ_y^* [nm]
FFTB	Measured	70
ATF2	Commissioning	37
ILC	Design	6
ILC low power	Proposed	4
CLIC	Design	1

J.P.Delahaye

ATF2 ultra low Beta & SC FD

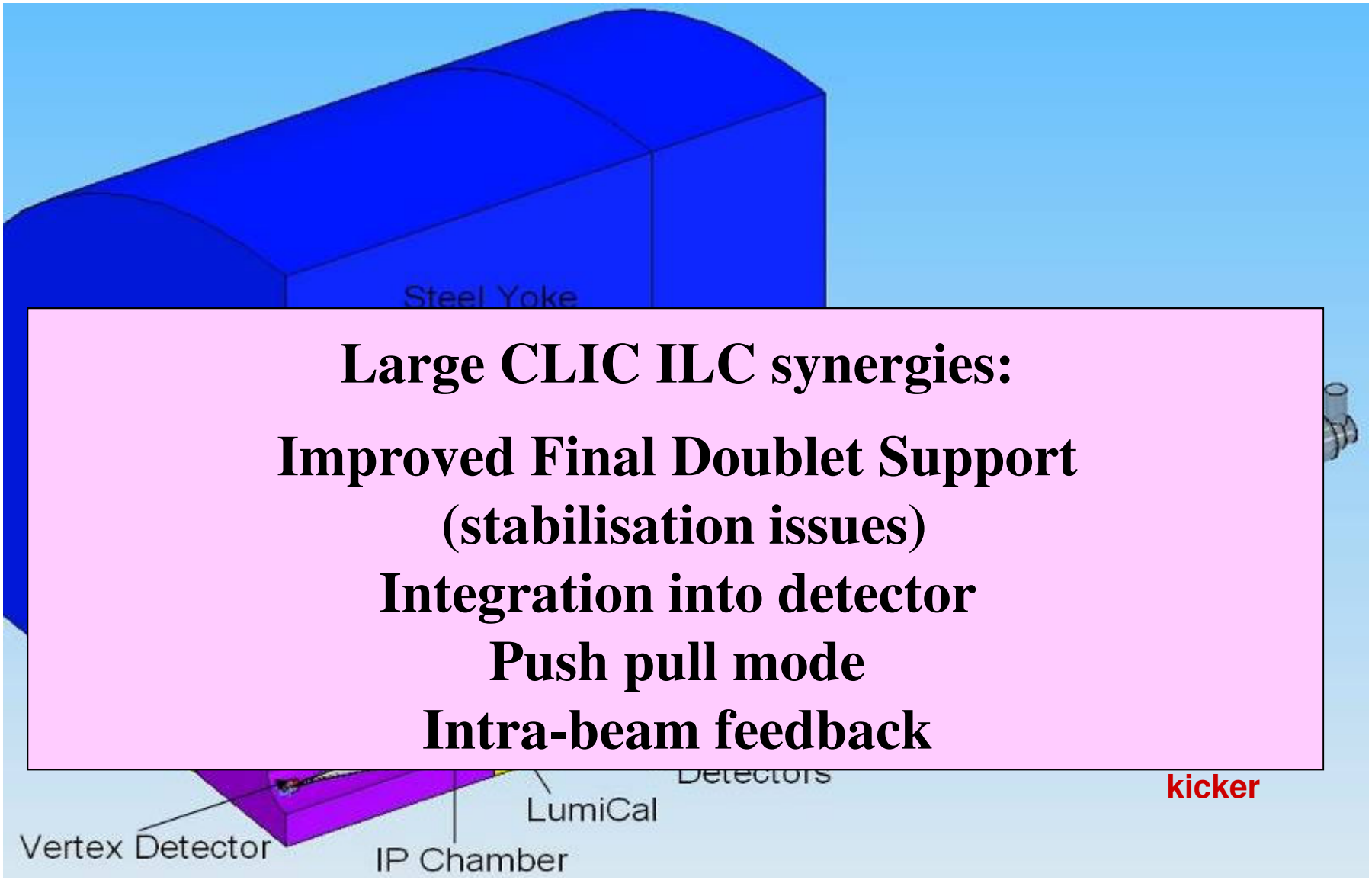




BNL design of a SC quad for ATF2

ATF2 ultra low beta optics

Machine Detector Interface



Large CLIC ILC synergies:

Improved Final Doublet Support (stabilisation issues)

Integration into detector

Push pull mode

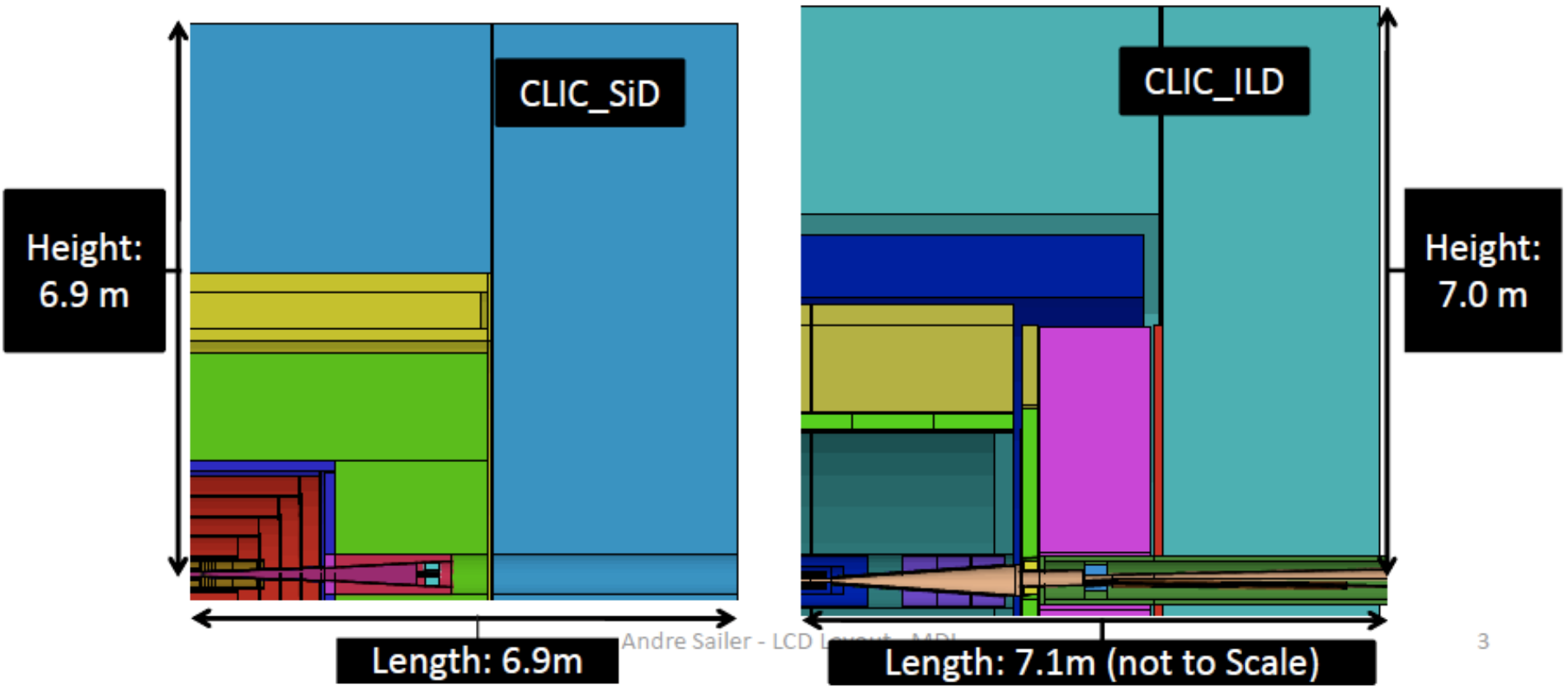
Intra-beam feedback

From ILC to CLIC Detectors

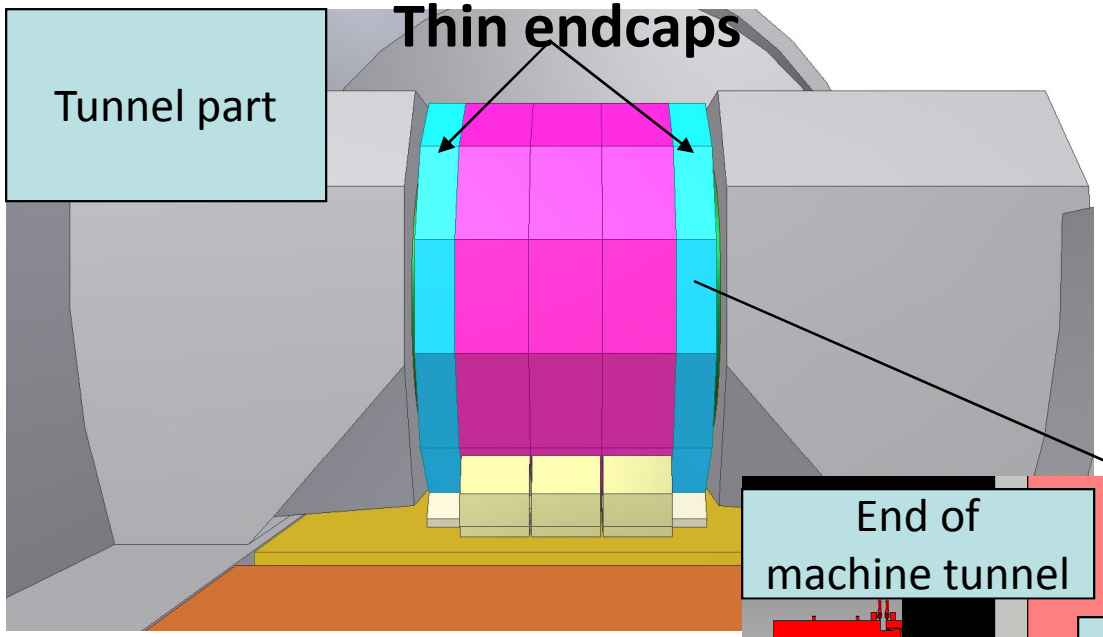
- Detectors for CLIC (3 TeV) are based on the two Detectors for ILC (500GeV)

Changes:

- 20 mrad crossing angle (instead of 14 mrad)
- Vertex Detector, due to Beam-Beam Background
- Hadron Calorimeter (due to higher energetic Jets)
- For CLIC_SiD: Moved Coil to 2.9m (CMS Like)

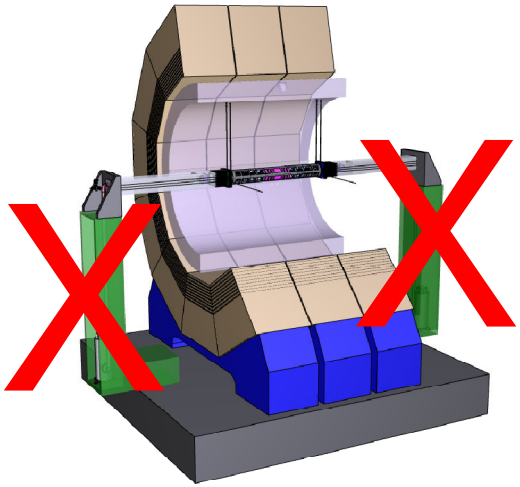


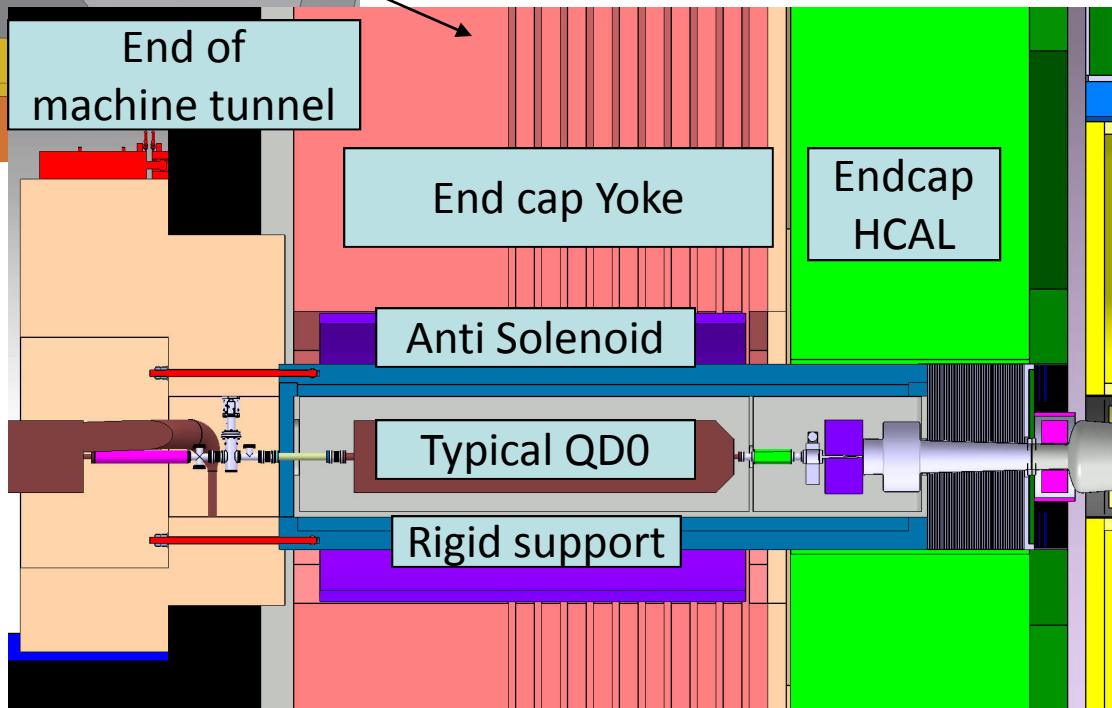
Nanometer Stability compatible Supporting Scheme being developped



Possible improvement to both CLIC and ILC

Mandatory for CLIC with sub-nm stability.

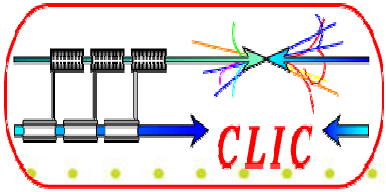




Conveners: C.Hauviller/CERN, V.Kuchler/FNAL J.Osborne/CERN

Mandate: http://clic-study.web.cern.ch/CLIC-Study/CLIC_ILC_Collab_Mtg/Index.htm

Main areas of synergy leading up to CLIC CDR / ILC TDR



- Tunnel configuration including Cooling, Ventilation, Installation requirements : Cost driver of CLIC & ILC
- Joint safety document
- Transport & Installation
- 3d modelling
- Updated construction schedule for new layouts
- Updated cost estimates for CES activities

CES meetings are scheduled for 2nd Wednesday of the month
2:30pm with ILC Webex link
CFS Webex every Tuesday at 2:00pm

CAD Software *Mix!*

Global Cooperation

Civil Eng: CERN - Catia

IP

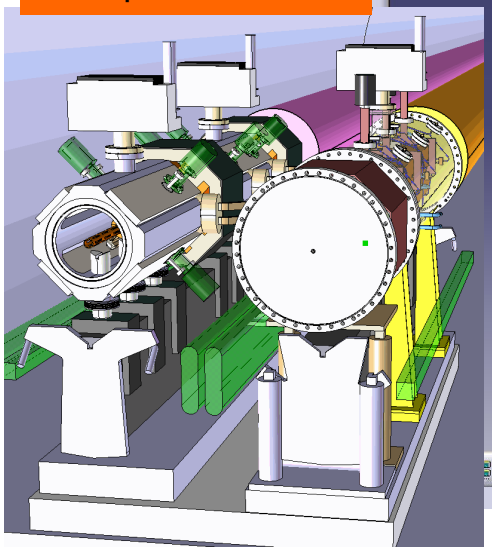
BDS: SLAC - Solid Edge

Bulk Component Footprints

Main Linac: FNAL – I-DEAS

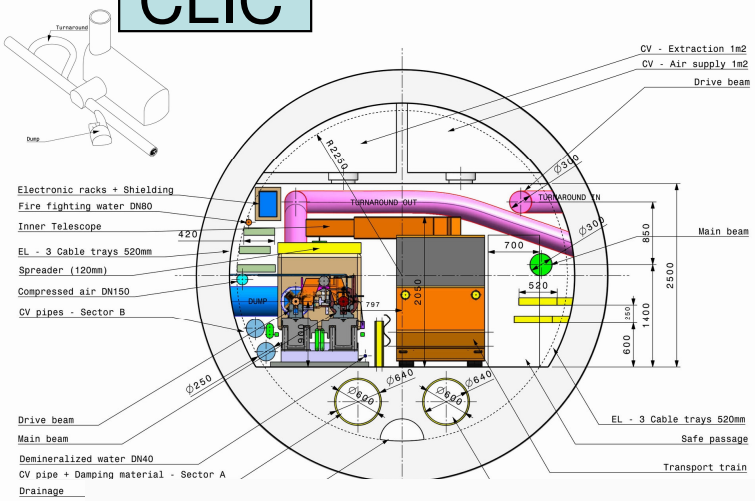
Translated by SKIP into I-DEAS & stored in ILC EDMS by DESY

Can add details e.g. Catia – CLIC components later

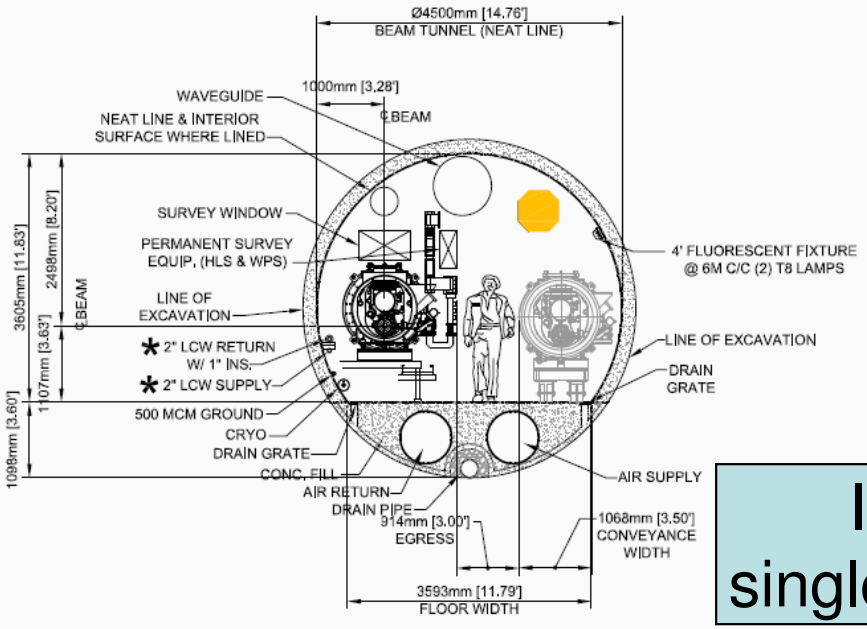


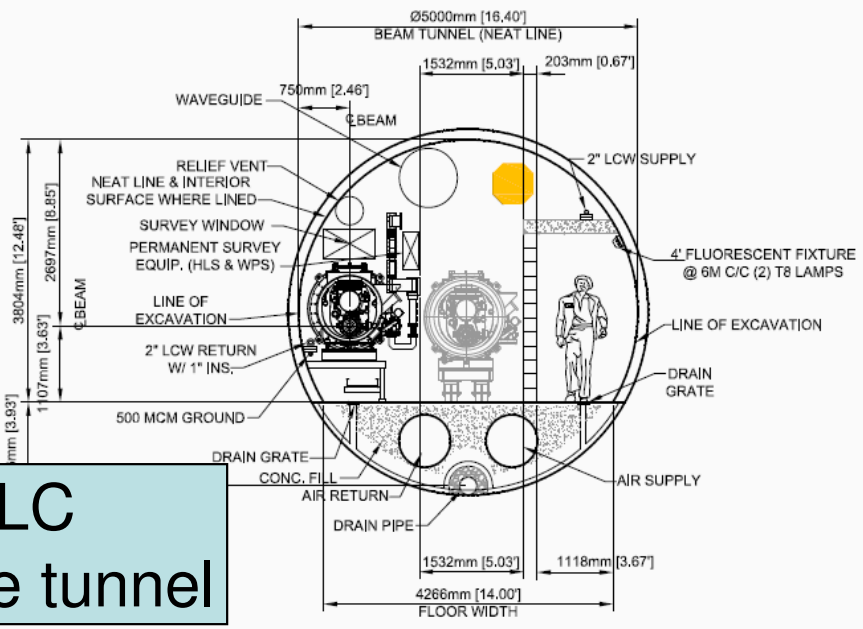
Layouts developed for CLIC & ILC are mutually assisting design process for both projects

CLIC



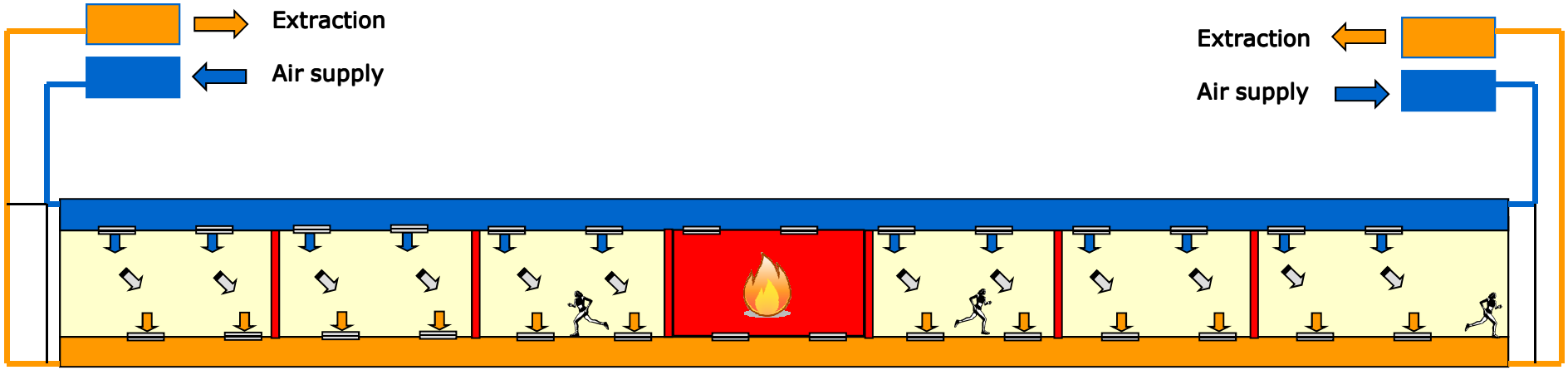
***Collaboration Example* : Europe have adopted 'transversal' ventilation & fire barriers for single tunnel design (for CLIC & ILC). ILC Americas are considering a 'closed escape gallery' for SB2009 single tunnel. Comparing & contrasting the safety concepts is greatly benefiting both projects.**





ILC
single tunnel

Safety driven Transverse Ventilation

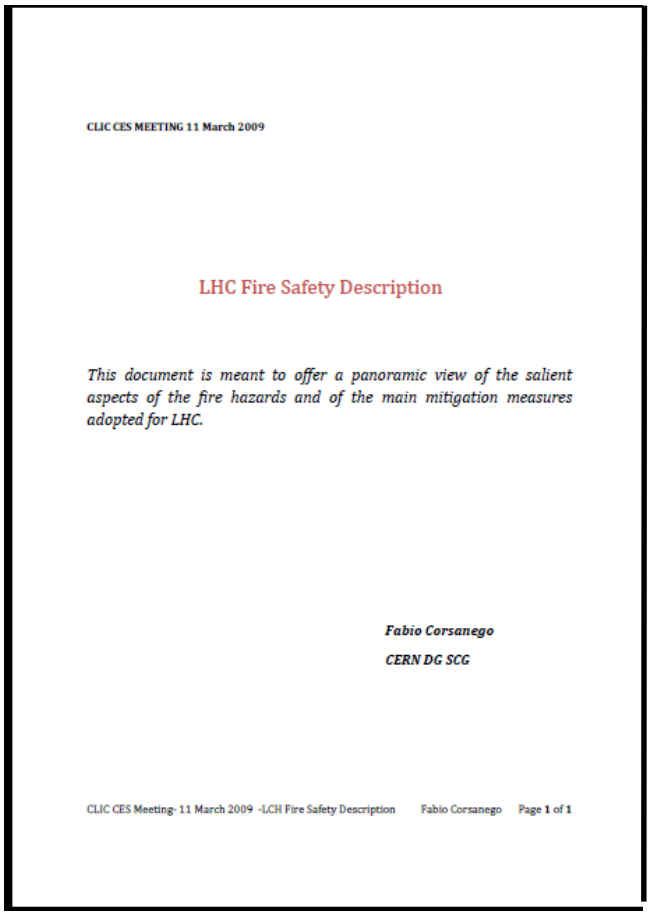


SHAFT
POINT

- Control of the pressure from both ends of a sector.
- Control of the pressure (overpressure or underpressure in each area).
- Fire detection per sector compatible to fire fighting via water mist.

Joint ILC/CLIC Safety Note

- **Initial idea of having 'a definitive safety note' for a such a project to be built anywhere in the world is proving difficult**
- **It was agreed it would be better if this exercise was used more to collect safety data on similar projects that have been, or are currently under construction in the physics world eg LHC, XFEL, Project X etc.**
- **At CERN, F.Corsanego in the CES Group, has drafted the 'LHC Chapter'**
- **XFEL document has been translated**
- **KEK are producing a similar document for Fire Safety Issues**



CLIC CES MEETING 11 March 2009

LHC Fire Safety Description

This document is meant to offer a panoramic view of the salient aspects of the fire hazards and of the main mitigation measures adopted for LHC.

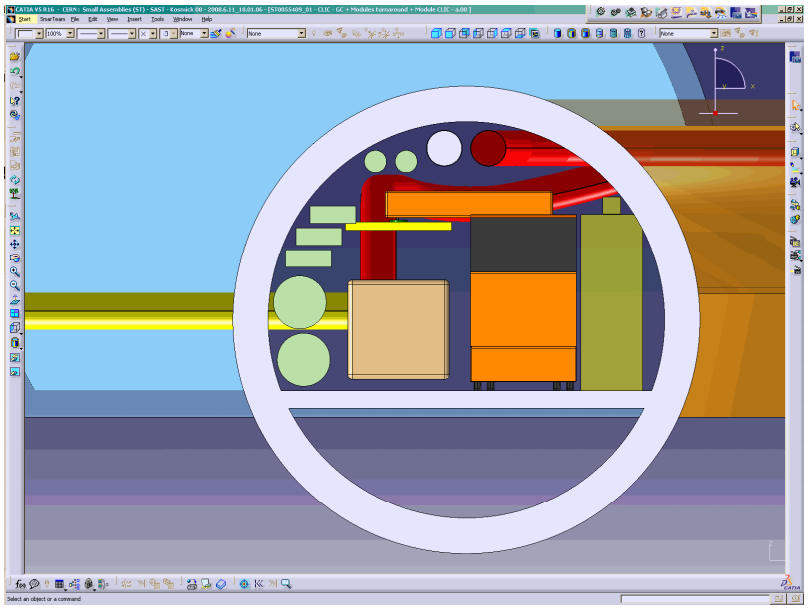
Fabio Corsanego

CERN DG SCG

CLIC CES Meeting- 11 March 2009 -LCH Fire Safety Description Fabio Corsanego Page 1 of 1

Transport & Installation

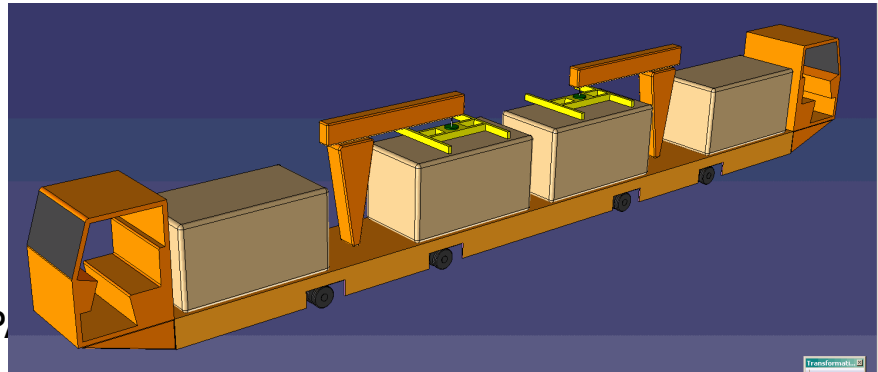
Keith Kershaw (CERN)

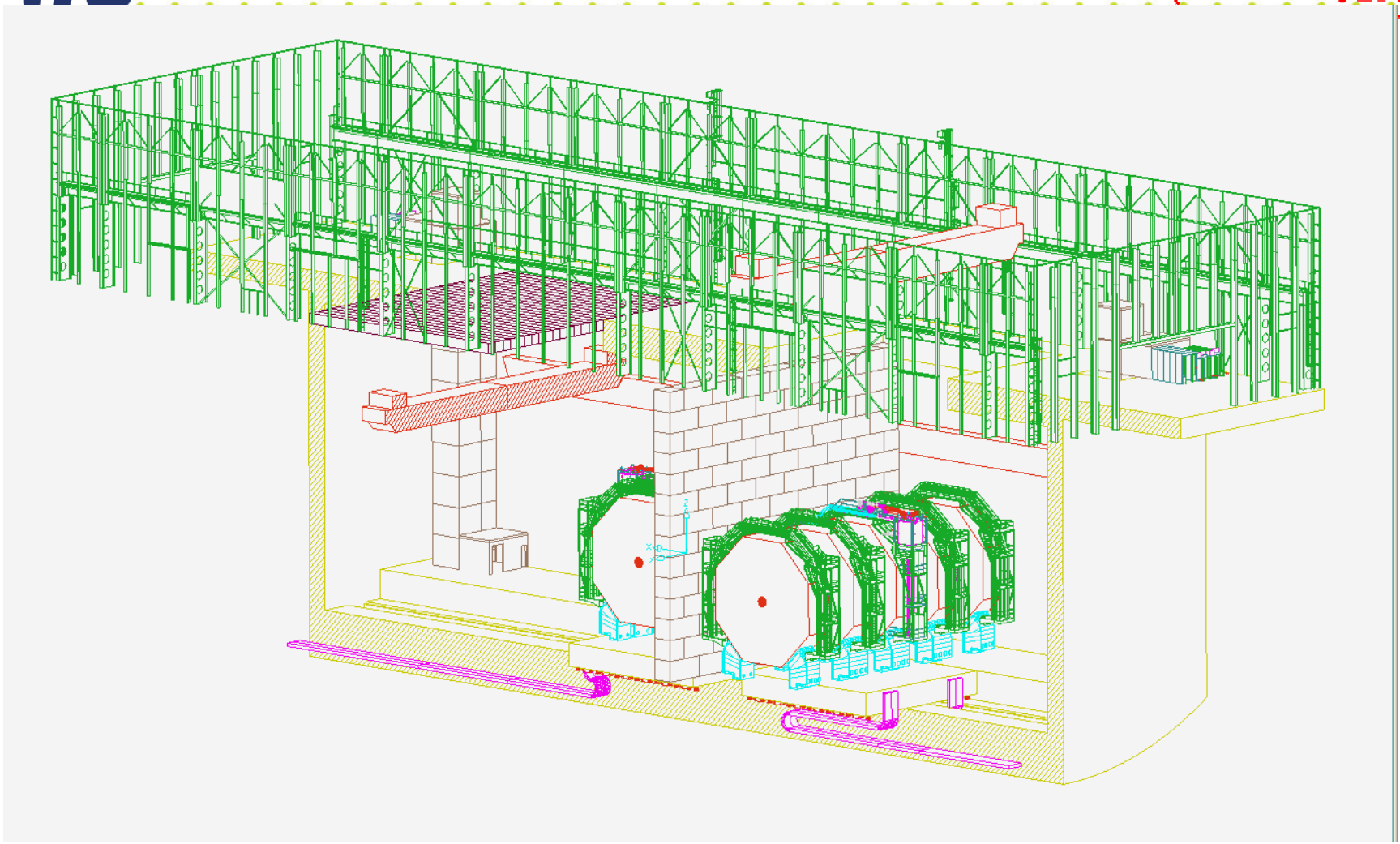


typical CLIC tunnel cross section

also J. Leibfritz (FNAL) and A. Enomoto (KEK)

Experience gained from LHC & CLIC transport study currently being applied to ILC eg suitability of transport vehicles for sloped access tunnels for Asian site.





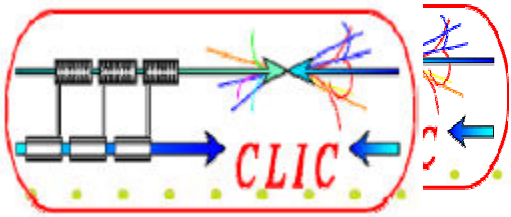
Infrastructure design for the Experimental Areas will be a joint effort between CLIC & ILC

Cost & Schedule

Conveners: J.Carwardine/ANL, K.Foraz/CERN, P.Garbincius/FNAL, P.Lebrun, G.Riddone/CERN, T.Shidara/KEK

Mandate: http://clic-study.web.cern.ch/CLIC-Study/CLIC_ILC_Collab_Mtg/Index.htm

On going C&S joint work



- **Keep work towards cost estimate mutually transparent and profit by synergies**

- **As similar methodology as possible for cost estimation of the two projects, understanding, communicating and mitigating unavoidable differences**

-**No mutual cost endorsement but (request to) peer-review CLIC cost by ILC experts before being public**

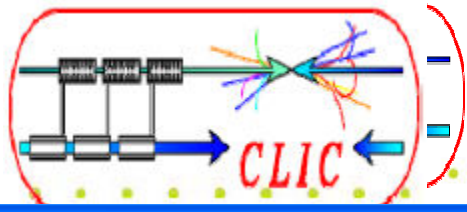
- **Construction & installation schedules for CLIC & ILC with same methodology**

- **Common ILC/CLIC notes**
  - **Cost risk assessment**
  - **Standardization methods to estimate cost of warm magnets including cabling and power supplies**
  - **…**

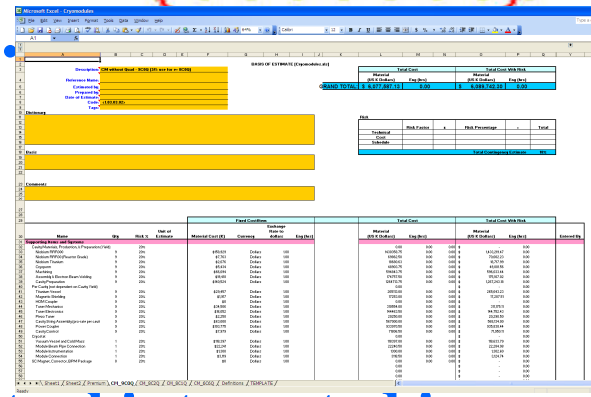
CLIC-ILC Cost & Schedule Working Group WEBEX Meetings

1400 GMT - 2nd Thursday of each month (CLIC Cost & Sched – last Thurs)

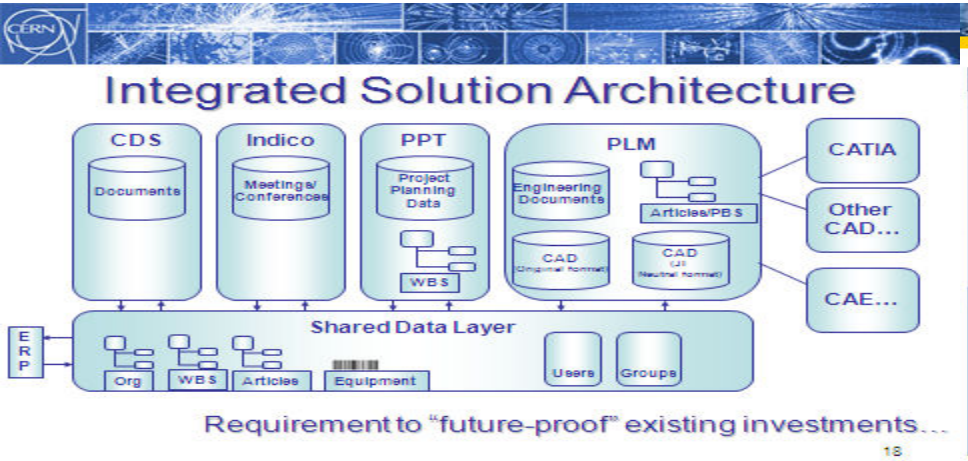
Cost Estimating Tools & Methods

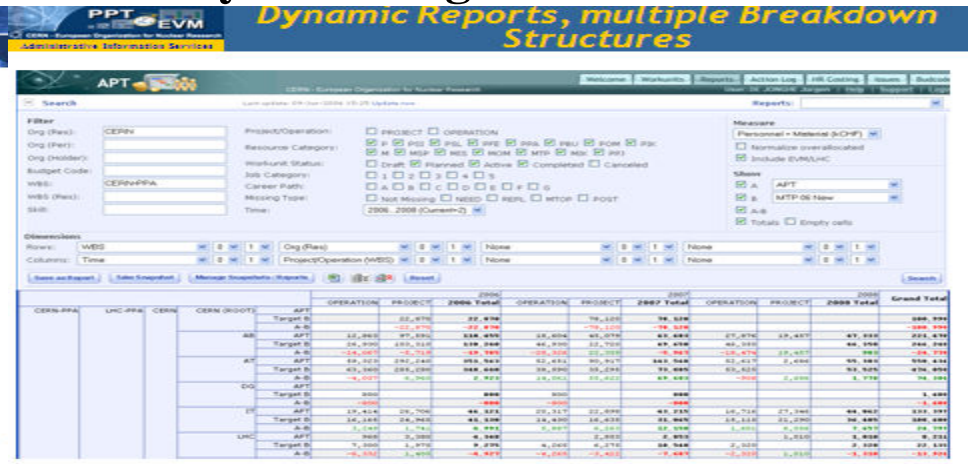


- **ILC – using Triad Project Management, Inc.**
  - Developing ILC Cost Estimating Tool (ICET)
    - WBS- linked Excel Cost Estimating Modules
    - mySQL DataBase => Reports
    - Store CEMs and Reports in ILC EDMS at DESY

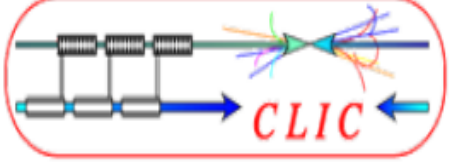


- **CLIC – new development of cost estimation tool integrated in CERN project support:**
  - Based on Project Breakdown Structure (PBS @ 3 TeV & 500 GeV)
  - Data based integrated tools: CAD, EVM, APT, PPT, EDMS, CDS, Indico
  - Public access available for HEP community including ILC



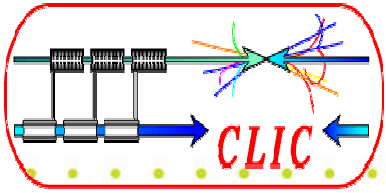


CLIC-ILC collaboration on costing



- Cost risk analysis
  - Open exchange of views with ILC team in face-to-face and Webex meetings
  - Different methods imposed by regional rules and procedures, but full awareness of each other's approaches
  - Common document in preparation
- Learning curves for large series production
  - Standard methodology applied by CLIC and ILC
  - Extrapolation needed from previous projects to very large series components ⇒ conservative approach recommended

Cost variance factors
(assumed statistically independent)



- **Evolution of configuration**
  - Maturity of design
  - Technology breakthroughs
  - Variation of applicable regulations

Engineering judgement of project team

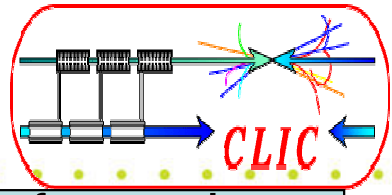
- **Technical execution**
  - Off-the-shelf or special product
  - Qualification & experience of vendors
  - State of completion of R&D, of industrialization
  - Series production, automation & learning curve
  - Rejection rate of production process
- **Structure of market**
  - Mono/oligopoly or Mono/oligopsone
- **Commercial strategy of vendor**
  - Market penetration
  - Competing productions

Reflected in scatter of offers received from vendors (LHC experience)

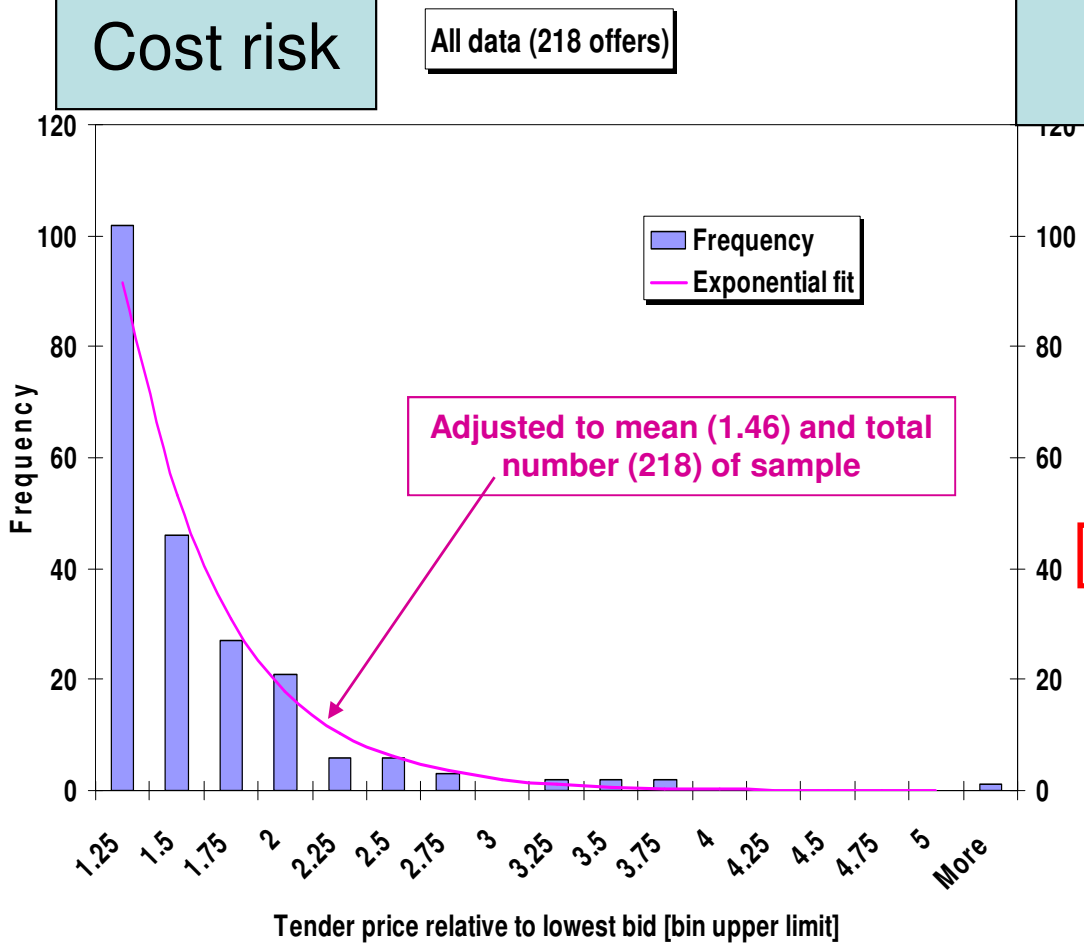
- **Inflation and escalation**
  - Raw materials
  - Industrial prices
- **International procurement**
  - Exchange rates
  - Taxes, custom duties

Tracked and compensated

Integrating LHC experience



Cost risk



Cost reduction factor by learning in large series

TABLE IV

LEARNING PERCENTAGE OF SELECTED REFERENCE INDUSTRIES

Industry	ρ
Complex machine tools for new models	75%-85%
Repetitive electrical operations	75%-85%
LHC magnets	80%-85%
Shipbuilding	80%-85%
Aerospace	85%
Purchased Parts	85%-88%
Repetitive welding operations	90%
Repetitive electronics manufacturing	90%-95%
Repetitive machining or punch-press operations	90%-95%
Raw materials	93%-96%

LHC tender prices for accelerator components

Schedule

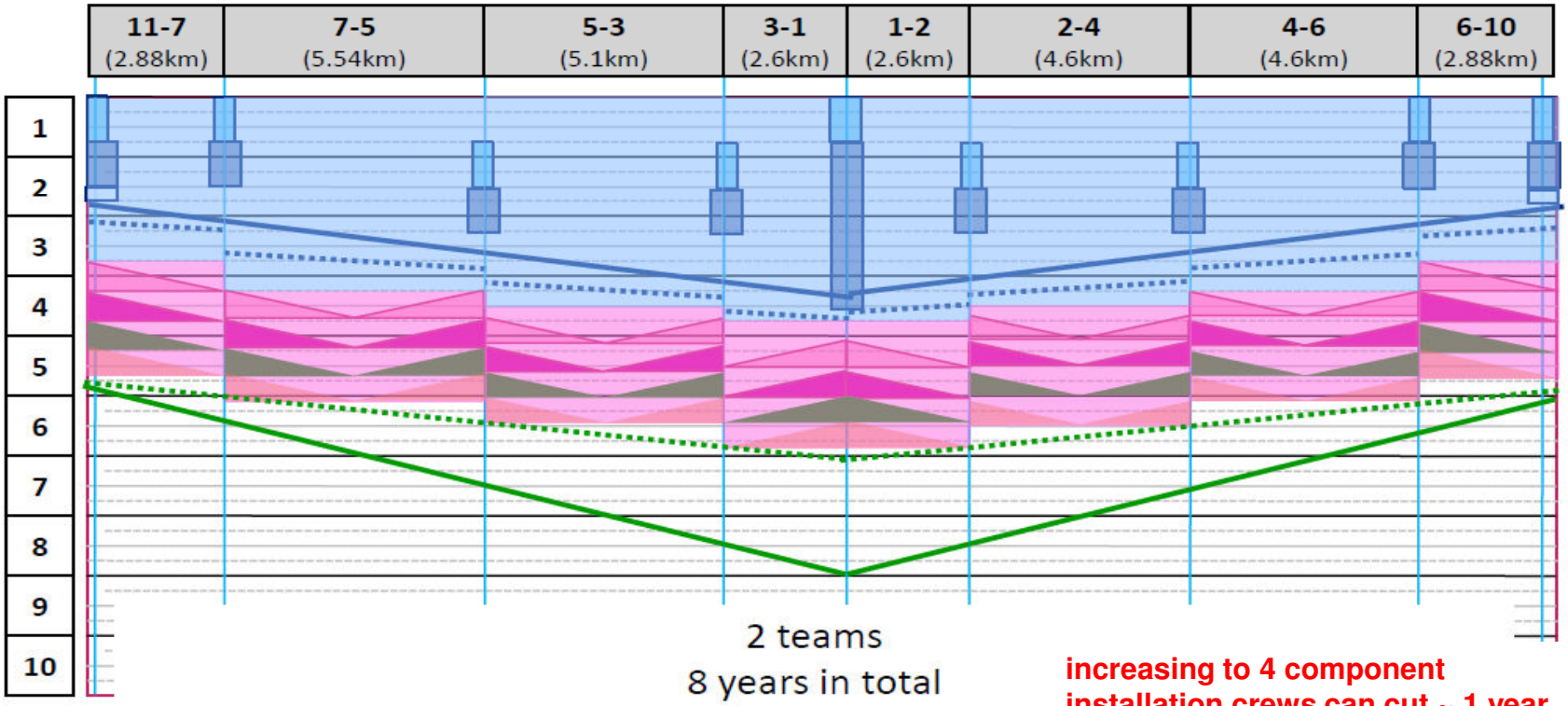
Applying the experience of the construction and installation of the LHC to CLIC and ILC.

- **Refine general schedule and derive manufacturing/reception testing/installation constraints**
- **Update estimates of power & energy consumption, including part-load operation**

Impact of 1 Tunnel on ILC Schedule

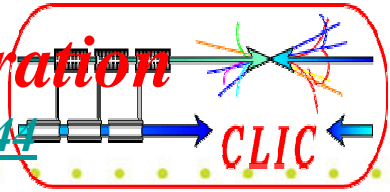
- **Katy Foraz, LHC scheduler, performed a preliminary comparative study considering:**

1 tunnel – Resource levelled ** Machine



Towards closer CLIC/ILC collaboration

http://www.linearcollider.org/cms/?pid=1000645



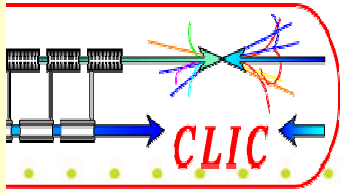
- **Common meeting on 12/06/09 at CERN between CERN, CLIC & ILC managements**
- **Statement of Linear Collider Common Intent:**

  Promoting and developing together scientific and technical preparations for a linear collider and to exploit wherever possible synergies to enable the design concepts for the ILC and CLIC to be prepared efficiently in the best interest of linear colliders and more generally of high-energy physics
- **Creation of joint CLIC/ILC working groups on Accelerator and Detector Linear Colliders issues**
- **Crossed participation in CLIC and ILC Executive Committees**
- **Common Linear Collider workshop from 2010:**

  First at CERN on 20-24/09/10

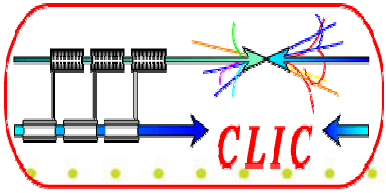
  ECFA LC workshop covering CLIC & ILC Accel. & Detectors

CLIC / ILC Joint Working Group on Accelerator General Issues



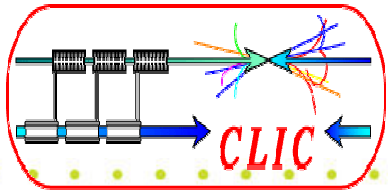
- **ILCSC has approved formation of a CLIC/ILC General Issues working group by the two parties with the following mandate:**
  - **Promoting the Linear Collider**
  - **Identifying synergies to enable the design concepts of ILC and CLIC to be prepared efficiently**
  - **Discussing detailed plans for 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:**
  - **preliminary by end 2010?, final by end 2012?**

CLIC/ILC joint Working Group: Accelerator General issues



- **Co-chaired CLIC/ILC**
- **ILC: M.Harrison (co-chair), E.Elsen, K.Yokoya**
- **CLIC: P.Lebrun (co-chair), K.Peach (CLIC Collaboration Board chair), D.Schulte**
- **First meeting: November 9, 2009**
- **Close contact and coherence with similar working group on Detectors required**

A complementary Linear Collider schedule



Physics requests based on LHC results?
Linear Collider evaluation based on technology maturity, performance, cost and risks?

CDR

TDP1

TDP2

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
ILC								?	?	?	?
CLIC											?

R&D,Conceptual Design&Cost Estimation

Technical design & industrialisation

Project approval & final cost

CDR

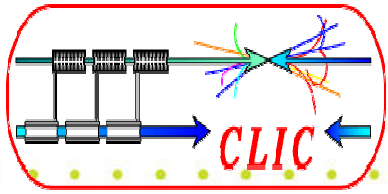
TDR1

TDR2

CLIC cost peer review (ILC experts)?

CERN Council decision CLIC Technical Design

Conclusion



CLIC/ILC collaboration: Win–Win for both studies & HEP

Ambitious but realistic and practical approach

- **starting on limited number of subjects with great synergies**
- **common work in constructive/collaborative spirit**
- **Mid & long(er) term plan of actions well defined**

Evolving towards common reflection on general linear collider issues

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**

A major step towards a future Linear Collider