AWLC Report : Accelerator

K. Yokoya

LC推進委員会 2014/6/13

Program

- Day1: Plenary
  - ILC Status (M.Harrison)
  - CLIC Status (P.Burrows)
  - Higgs physics, Beyond SM
  - LCB report (Komamiya)
  - LCC Physics/Detector (H.Yamamoto)
  - CLIC detector
  - Technical Developments in Japan (A.Yamamoto)
  - Acc plenary (Hayano, Schulte, Terunuma)
- Day2-Day4 Parallel
  - 9:00-10:30 ADI meeting (N.Walker)
- Day3 pm Joint Plenary: ILC Parameters
  - J.Brau, N.Walker
- Day5: Plenary
  - Staus from Japan (Suzuki)
  - DoE
  - Next LC Workshop at Belgrade
  - Summary (L.Evans)

M.Harrison, Day1 Plenary

Goals & Questions

- How do the lab/campus facilities interact with the project – equipment testing, engineering support, equipment staging and storage, offices, power & water infrastructure, etc…
  - Other than some generic estimates we have little precise information here.
  - We need to decide on the perceived role of the ILC laboratory and start with some form of functional analysis.
  - Principally, but not completely, a domestic issue
- Any significant site-specific impact to the TDR design
  - Nothing apparent to date that affects the basic concept. We need to set the IP location and of course much detailed design work remains to be done.
- Cost vulnerability – can we identify any potential significant cost risk hidden in the post-TDR environment ?
  - No.
- The Interaction Region is still more fluid than we would like, but the potentially largest issue appears to be the ILC laboratory

M.Harrison, Day1 Plenary

LCC-ILC Accelerator Organization

LCC-ILC Director: M. Harrison, Deputies: N. Walker and H. Hayano *KEK LC Project Office Head: A. Yamamoto

Sub-Group	Global Leader Deputy/Contact p.	KEK-Leader* Deputy	Sub-Group	Global Leader Deputy/Contact P.	KEK-Leader* Deputy
Acc. Design Integr.	**N. Walker (DESY)** K. Yokoya(KEK)	K. Yokoya	**SRF**	**H. Hayano (KEK)** C. Ginsburg (Fermi), E. Montesinos (CERN)	H. Hayano Y. Yamamoto
Sources (e-, e+)	**W. Gai (ANL)** M. Kuriki (Hiroshima U.)	J. Urakawa T. Omori	**RF Power & Cntl**	**S. Michizono (KEK)** TBD (AMs , EU)	Michizono T. Matsumoto
Damping Ring	**D. Rubin (Cornell)** N. Terunuma(KEK)	N. Terunuma	**Cryogenics** (incl. HP gas issues)	**H. Nakai: KEK** T. Peterson (Fermi), D. Delikaris (CERN)	H. Nakai Cryog. Center
RTML	**S. Kuroda (KEK)** A. Latina (CERN)	S. Kuroda	**CFS**	**A. Enomoto (KEK)** V. Kuchler (Fermi), J. Osborne (CERN),	A. Enomoto M. Miyahara
Main Linac (incl. B. Compr. & B. Dynamics)	**N. Solyak (Fermi)** K. Kubo (KEK)	K. Kubo	**Radiation Safety**	**T. Sanami (KEK)** TBD (AMs, EU)	T. Sanami T. Sanuki
BDS	**G. White (SLAC),** R. Tomas (Cern) T. Okugi(KEK)	T. Okugi	**Electrical Support** (Power Supply etc.)	TBD	TBD
MDI	**K. Buesser (DESY)** T. Tauchi (KEK)	T. Tauchi	**Mechanical S.** (Vac. & others)	TBD	TBD
			Domestic Program, Hub Lab. Facilities	TBD	H. Hayano T. Saeki

CLIC Organisation

P.Burrows, Day1 CLIC status

CERN LC project leader: Steinar Stapnes

CLIC accelerator:

Collaboration Spokesperson: Phil Burrows

CLIC/CTF3 technical coordinator: Roberto Corsini

Collaboration Board Chair: Lenny Rivkin

CLIC detector + physics:

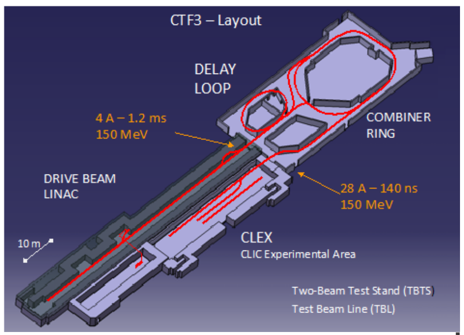
Collaboration Spokesperson: Lucie Linssen

Collaboration Board Chair: Frank Simon

CLIC roadmap

2013-18 Development Phase

Develop a Project Plan for a staged implementation in agreement with LHC findings; further technical developments with industry, performance studies for accelerator parts and systems, as well as for detectors.



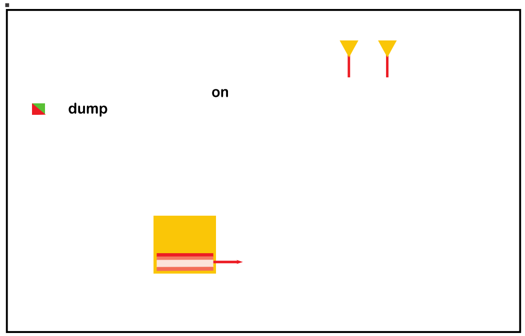
2018-19 Decisions

On the basis of LHC data and Project Plans (for CLIC and other potential projects), take decisions about next project(s) at the Energy Frontier.

4-5 year Preparation Phase

Finalise implementation parameters, Drive Beam Facility and other system verifications, site authorisation and preparation for industrial procurement.

Prepare detailed Technical Proposals for the detector-systems.



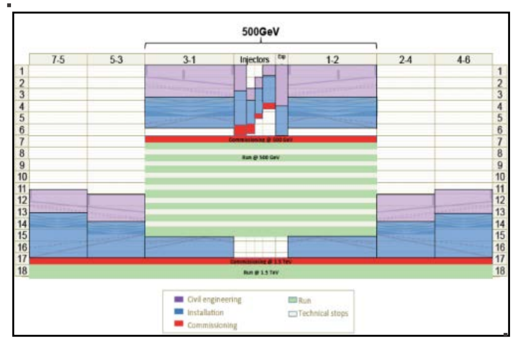
2024-25 Construction Start

Ready for full construction and main tunnel excavation.

Construction Phase

Stage 1 construction of CLIC, in parallel with detector construction.

Preparation for implementation of further stages.



Commissioning

Becoming ready for data-taking as the LHC programme reaches completion.

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昨年は

CLIC project time-line

(input to European Strategy)

ECFAWS@DESY
2013Jun Stapnes

2012-16 Development Phase

Develop a Project Plan for a staged implementation in agreement with LHC findings; further technical developments with industry, performance studies for accelerator parts and systems, as well as for detectors.

2017-22 Preparation Phase

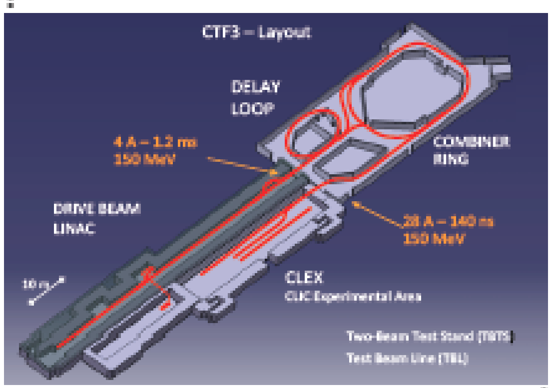
Finalise implementation parameters, Drive Beam Facility and other system verifications, site authorisation and preparation for industrial procurement.

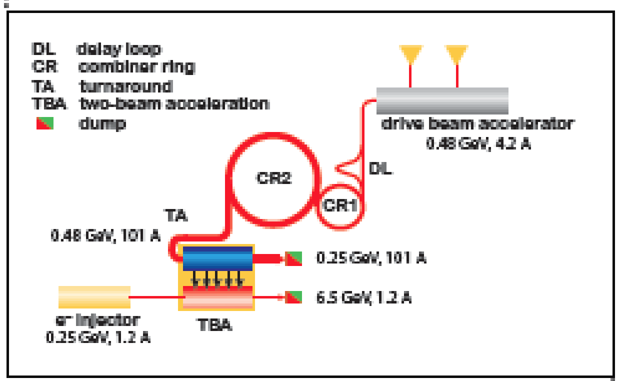
Prepare detailed Technical Proposals for the detector-systems.

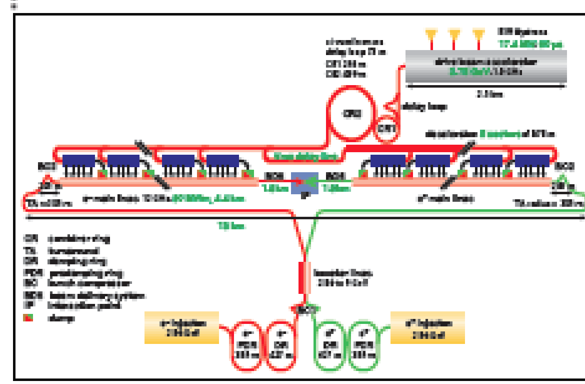
2023-2030 Construction Phase

Stage 1 construction of a 500 GeV CLIC, in parallel with detector construction.

Preparation for implementation of further stages.







2016-17 Decisions

On the basis of LHC data and Project Plans (for CLIC and other potential projects), take decisions about next project(s) at the Energy Frontier.

2022-23 Construction Start

Ready for full construction and main tunnel excavation.

2030 Commissioning

From 2030, becoming ready for data-taking as the LHC programme reaches completion.

ADI (Accelerator Design & Integration)

N.Walker, Day2 Acc Plenary

- Next few years
  - Primary support for Japanese-driven site dependent design
  - Develop an AD&I plan compatible with CFS plans
  - Develop an additional work plan of other AD&I key aspects which are not strictly CFS drivers , but still important
  - Estimate the resources required for the plan
- CFS-Driven ADI
  - Priority 1: Tunnel length
    - Choice of average accelerator gradient
    - Maximum energy (physics scope)
    - Cryomodule length
    - Path length constraint
    - BDS length
  - Priority 2: Underground volume
  - Priority 3: Conventional facilities
- ADI regular fuze meetings
  - Core team (l.h.s. of Mike Harrison's table) + people for topics
  - Common design issues among various groups, not for R&D
  - Keep up momentum, team building

Configuration Management for the Pre-Construction Phase

N.Walker, Day2 Acc Plenary

Change Management for the ILC

Benno List, Nick Walker (DESY)
DESY 05.05.14

DRAFT v 5

EDMS ID D*01057375

DRAFT

Table of Contents

- Lightweight but still formal
- Configuration Management Board (CMB)
- Similar to GDE approach
- Four steps
  - Initiation (change request)
  - Evaluation (review)
  - Decision
  - Implementation — TDD update

Coming soon !

ILC Change Management

Jun.5. ADI meeting, Walker

1. Proposing a design change
- Change Request (CR)
- Change Request Creater (CRC)
- Written document
- Submitted to Change Management Board (CMB)

2. Expert review
- Reviewed by CMB with additional experts as needed
- CMB defines the scope of the review
- Communication with all stakeholders
- Capture relevant documents

3. Decision
- Results with recommendation from (2) presented to ILC Director
- Written summary document
- ILC Director (in consultation with the CMB) makes final decision, or
- Decision is escalated to LCC directorate.

4. Updating TDD to reflect the change
- CMB identiifies team (and team leader) to implement change.
- Generate scope of work
- Develope implementation plan
- Release of updated TDD

Mandatory documents (→ 1, 2, 3)

EDMS update! (→ 4)

Change Management Board (CMB)

- ILC Technical Board
  - Mike Harrison (BNL, CMB chair)
  - Nick Walker (DESY)
  - Olivier Napoly (CEA)
  - Nikolay Solyak (FNAL)
  - Marc Ross (SLAC)
  - Nobuhiro Terunuma (KEK)
  - Yasuchika Yamamoto (KEK)
  - Akira Yamamoto (KEK)
- 1 CFS rep
- 2 Physics and detector reps
- Change Administrator (Benno List)
- + additional experts as deemed fit

- Initial assessment
- Scale of review (determine change review panel)
- Decision
- Implementation planning

Jun.5. ADI meeting, Walker

ILC Parameters

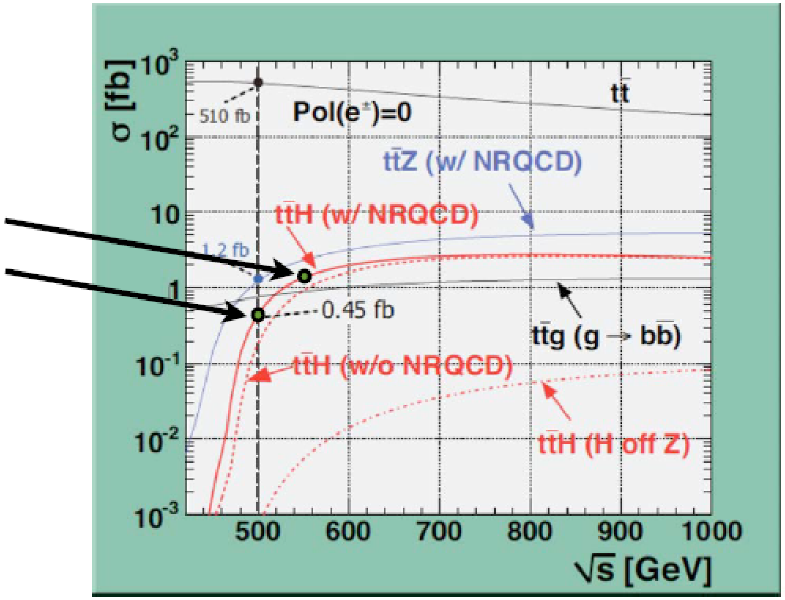
- Parameter Group formed
  - prepare information on ILC machine parameters and staging scenarios as well as potential upgrade paths in a form readily usable by the LCC
  - The first task for the working group is to prepare multiple scenarios for staging up to about 500 GeV
  - Report draft to be presented at LCWS14
- Physics Considerations
  - Phases of energy operation from 250 GeV to maximum baseline energy (eg. 350 GeV, etc.)
    - including required and available int. lumi.
  - Maximum reach baseline energy (we note physics motivation for 550 GeV based on tth)
  - Operation at energies below 250 GeV
  - Safety margin in energy reach and luminosity
  - Polarization

Day3 Plenary
ILC Parameters

Membership
PHYSICS AND DETECTORS: T. Barklow, J. Brau (co-convener), K. Fujii, J. List
ACCELERATOR:Jie Gao, N. Walker (co-convener), K. Yokoya

Maximal Baseline Energy

- 500 GeV is an arbitrary maximum baseline energy.
- However, it is just within reach of an important physics channel, namely ***tth***, where the top Yukawa coupling can be measured.
- The cross section rises sharply at ~500 GeV, suggesting an upper baseline energy of **550 GeV or so,** where the cross section for this important channel is significantly larger than at 500 GeV.

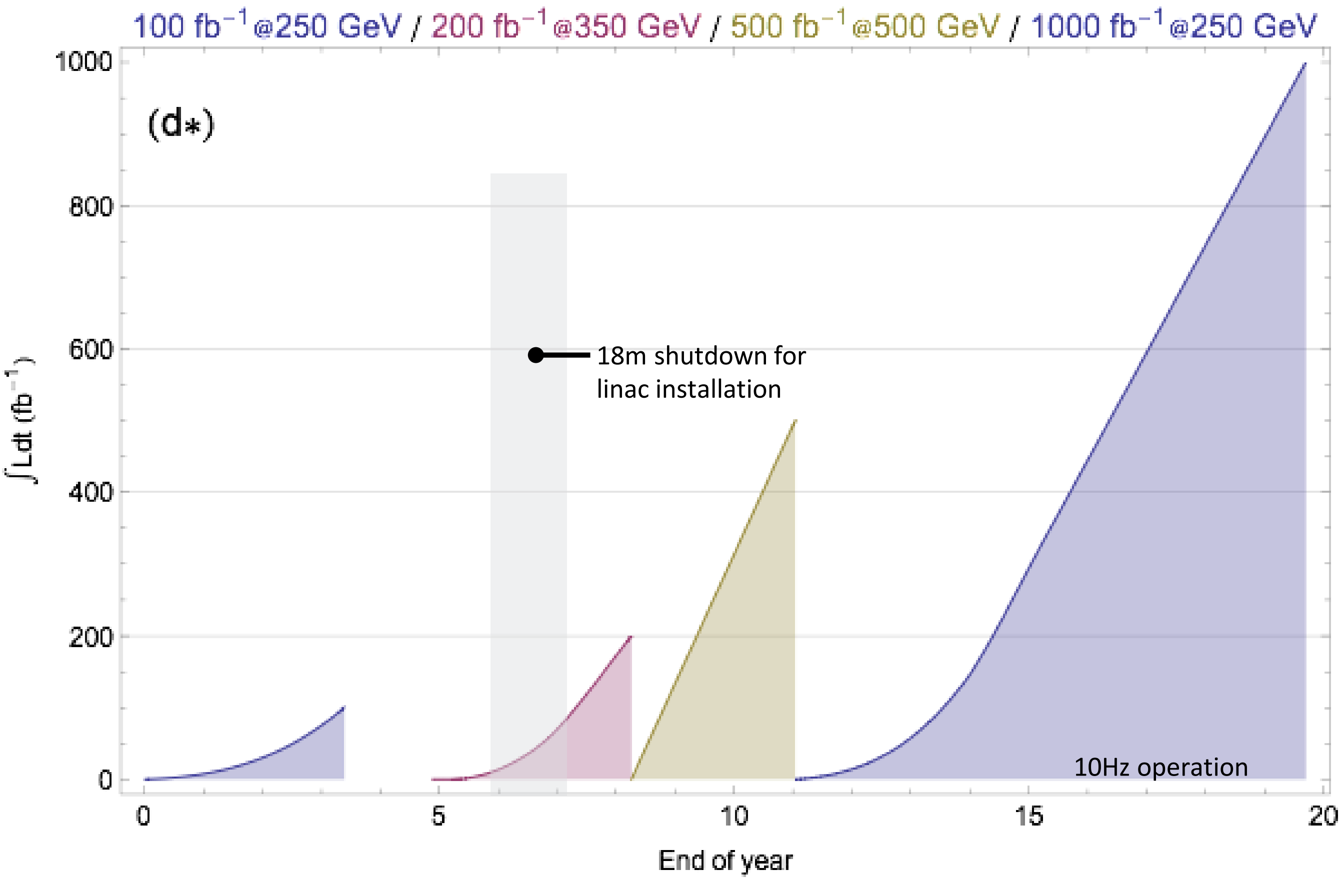


Staging Scenarios

- Designed to explore impact of different sequences of upgrades on evolution of Higgs precision

a.	250 inv.fb @ 250,		500 inv.fb @ 500
b.	250 inv.fb @ 250,		500 inv.fb @ 550
c.	250 inv.fb @ 250,		1000 inv.fb @ 500
	(for comparison with scenario b)		
d.	100 inv.fb @ 250,	200 inv.fb @ 350,	500 inv.fb @ 500
e.	100 inv.fb @ 250,	200 inv.fb @ 350,	500 inv.fb @ 550
f.	25 inv.fb @ 250,	350 inv.fb @ 350,	500 inv.fb @ 500
g.	500 inv.fb @ 250,		500 inv.fb @ 500
a.*		350 inv.fb @ 350,	500 inv.fb @ 500
h.	50 inv.fb @ 250,	200 inv.fb @ 350,	500 inv.fb @ 500,
	1 inv.ab @ 250		
i.	50 inv.fb @ 250,	200 inv.fb @ 350,	500 inv.fb @ 550,
	1 inv.ab @ 250		

Energy staging (example scenario)



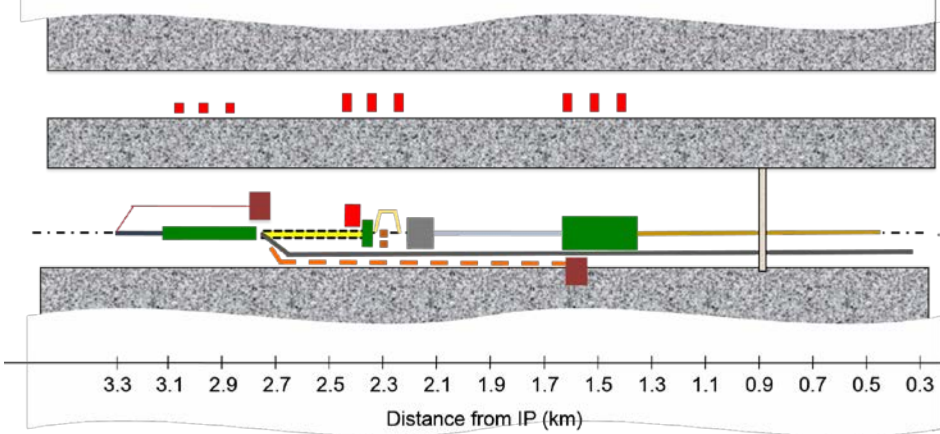
End of construction at year -1
(1st operation year for commissioning)

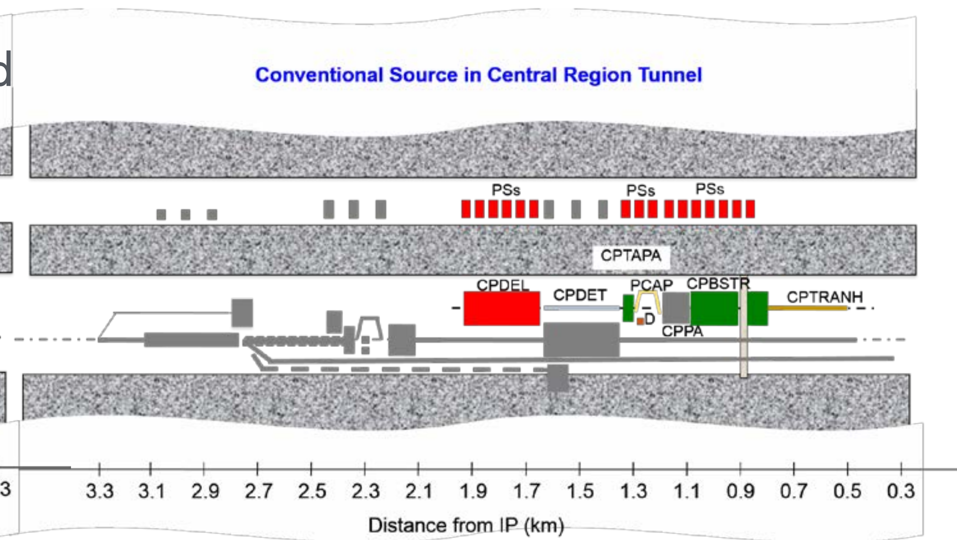
Lyn Evans, Closing

Topics From Accelerator Areas

Sources

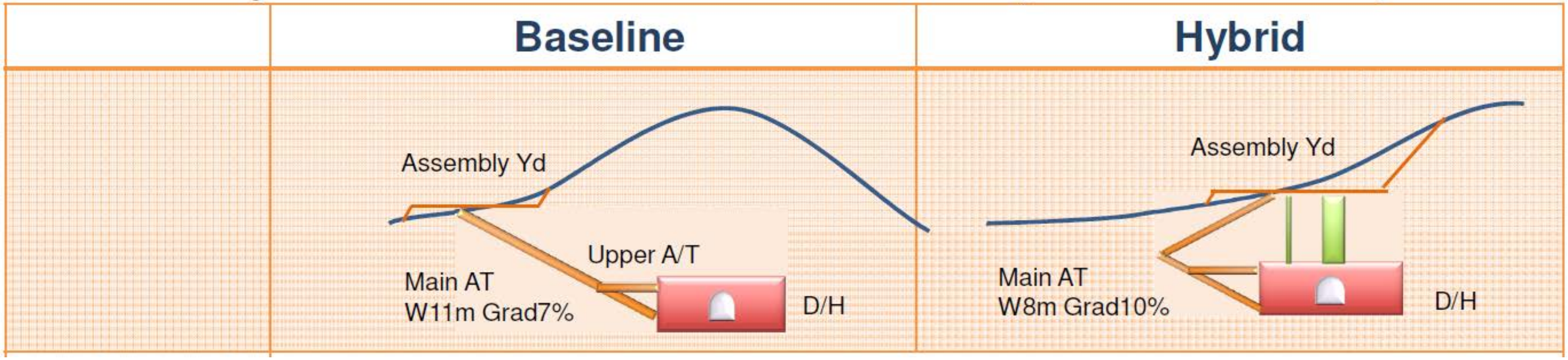
- Polarized electron source
  - No major problem
- Undulator positron source
  - Target and flux concentrator R&D yet to be done
  - Differential pumping, longer time scale flux concentrator, yet design only
  - Hoping R&D budget according to P5
- Electron-driven positron source
  - Simulation shows sufficient yield
  - Target prototype R&D on-going
  - Possible CFS footprint proposed





BDS & MDI

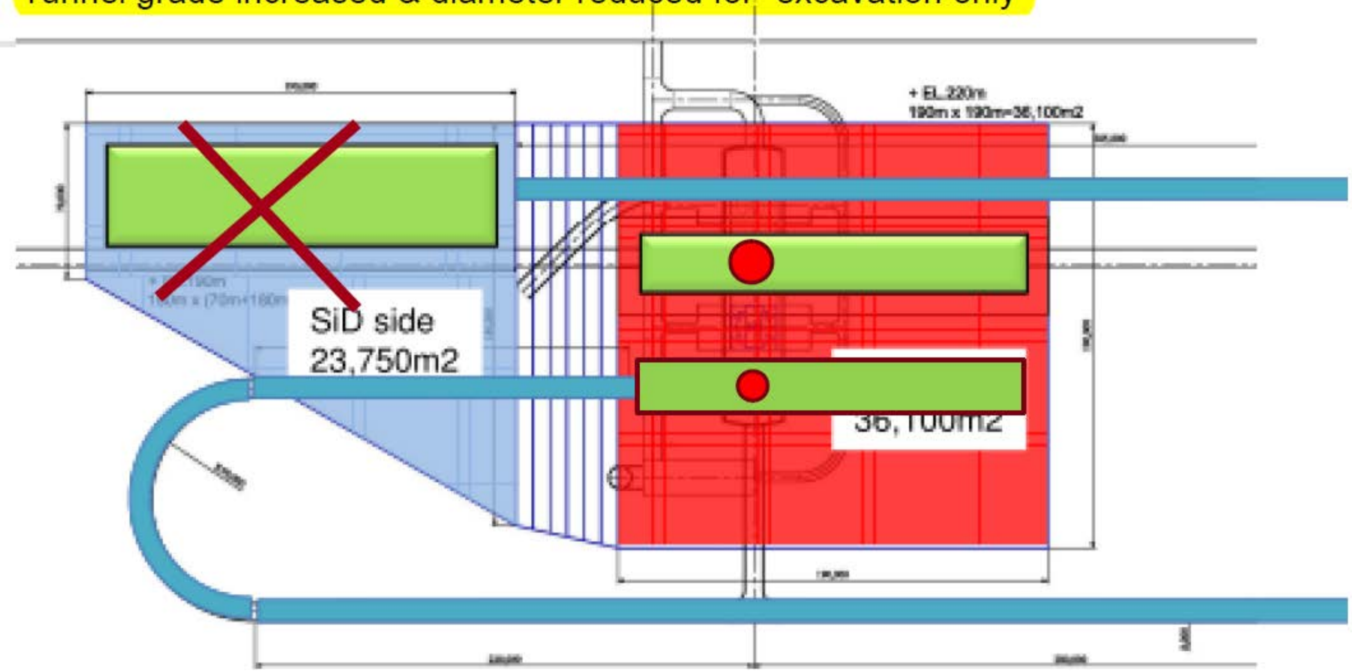
- Commissioning
  - Expected initial beam size
  - Luminosity measurement by piar monitor
  - Commissioning scenario
  - Conclusion
    - Can be done with one of the detectors sitting at IP
- ATF2
  - ~55nm reached
  - Progress in quick tuning
- Optics
  - Possible longer L*, same L* for 2 detectors?
  - "Traditional" optics vs. Local Chromaticity Compensation
  - Beam loss in extraction line
- CFS for experimental hall
  - Hybrid (access tunnel + vertical shaft) design in April meeting at Tokyo Univ.
  - Concern expressed from SiD team



SiD request to study alternate variant , by Tom

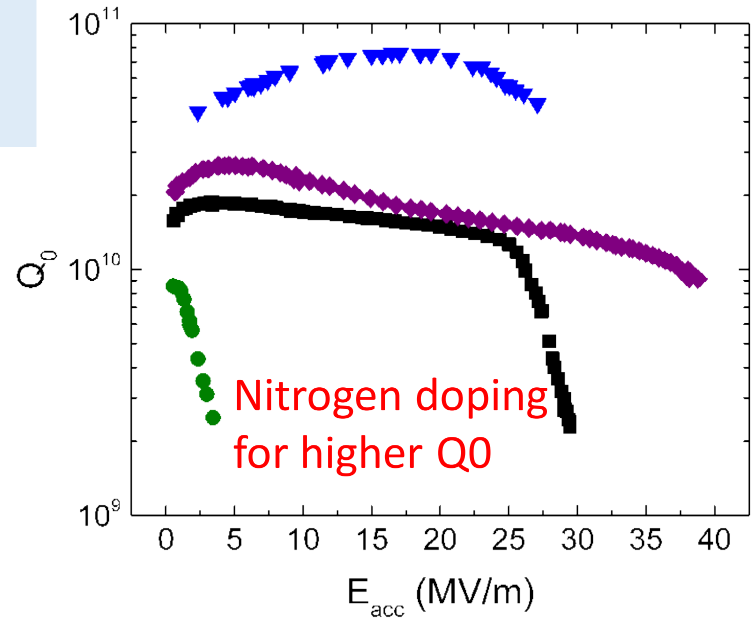
SLAC

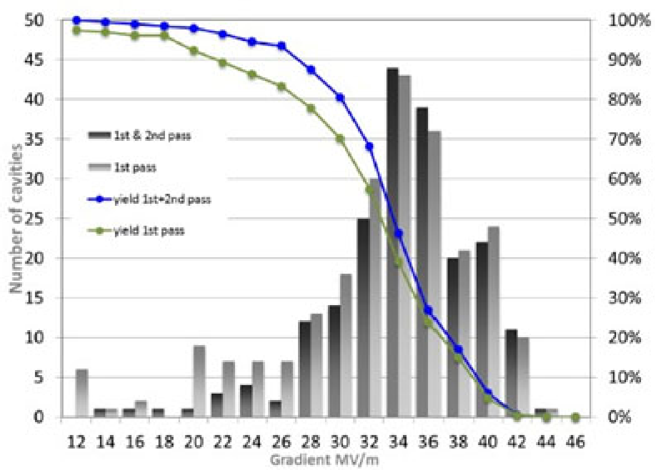
Parallel hall at same grade with second 6-8m access shaft over SiD “garage”
Tunnel grade increased & diameter reduced for “excavation only”



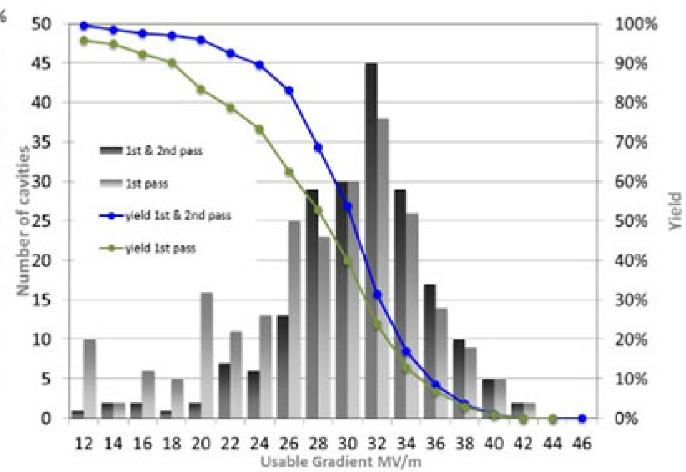
SCRF

- Higher Q0 study at FNAL
- Cavity yield at XFEL
  - 85% out of 207 cavities
  - Average of usable gradient (29.3 +– 5.1) MV/m
- LCLSII plan
  - Production start FY16





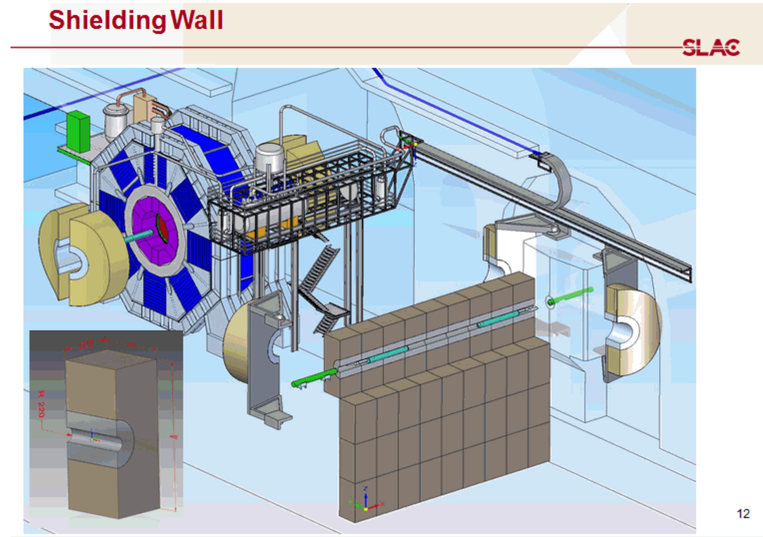
Average **maximum** gradient:
(32.8 ± 4.9) MV/m

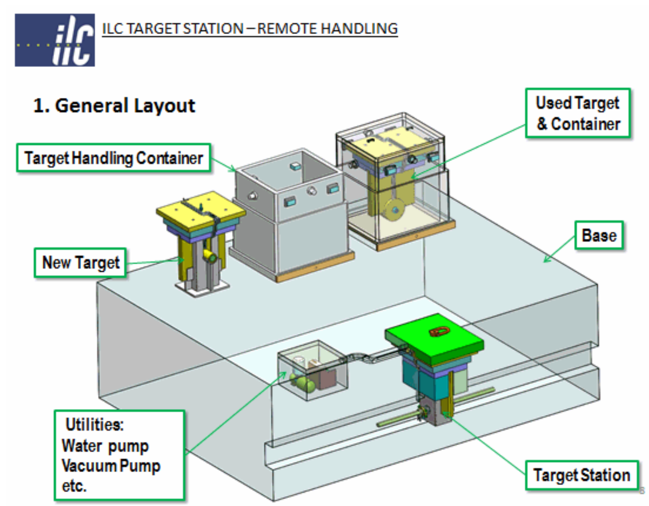


Average **usable** gradient:
(29.3 ± 5.1) MV/m

CFS

- Main linac shielding
  - "Maximum credible accident"
  - Thickness of concrete wall
  - Japanese regulation
- Cryogenics
- Commissioning
- Detector Hall
- Positron
  - Target storage
  - Conventional source
  - Auxiliary source





The next step

- SCJ has requested a study of the scientific and economic impact of ILC.
- MEXT has set up a committee of “wise men”.
- LCC will provide information through KEK DG
- Scientific case
- Materials cost estimate.
- Manpower
- Anything else they request

Lyn Evans, Closing