

ICFA and GDE/ILC

E.Elsen
DESY

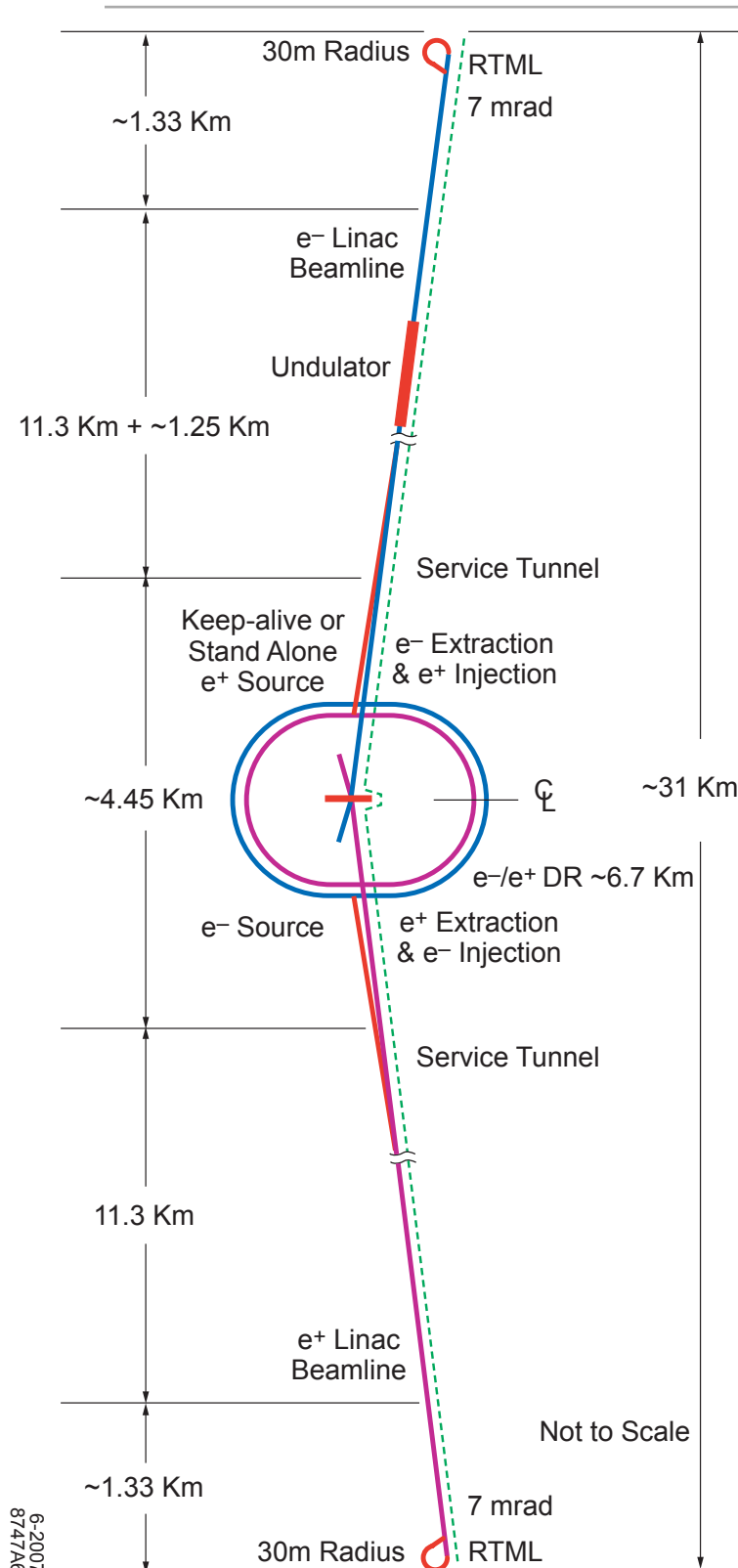


- ICFA
- ILC & GDE
+ ILCSC
- CLIC

ICFA Meeting 15 August 2007

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- Approval of ILC **Reference Design Report** (submitted August 15, 2007)
 - ILCSC chair changes October 25, 07
 - Shin-ichi Kurokawa → Enzo Iarocci
 - FALC
 - ICFA provided Particle physics roadmap for FALC annual report
 - ICFA involvement in neutrinos
 - Draft statement being prepared by D Karlen, K Meier, N Roe
 - Open Access Publishing
 - Europe has committed to this approach which is endorsed by ICFA
 - InterAction – Outreach
 - Activities carried by all major laboratories
 - ICFA Panels
 - Instrumentation Panel
 - Beam Dynamics Panel
 - HB2008
 - IPAC 3 year cycle
 - International Accelerator School for Linear Colliders again very successful
 - Interregional Connectivity
 - several transatlantic links for LHC
 - 10 Gb/s → 100 Gb/s in 2010-12
 - Next ICFA meetings
 - DESY, Feb 12, 2008
 - Philadelphia, July 30- Aug 5 (during ICHEP08)

ILC Developments – since Snowmass '05

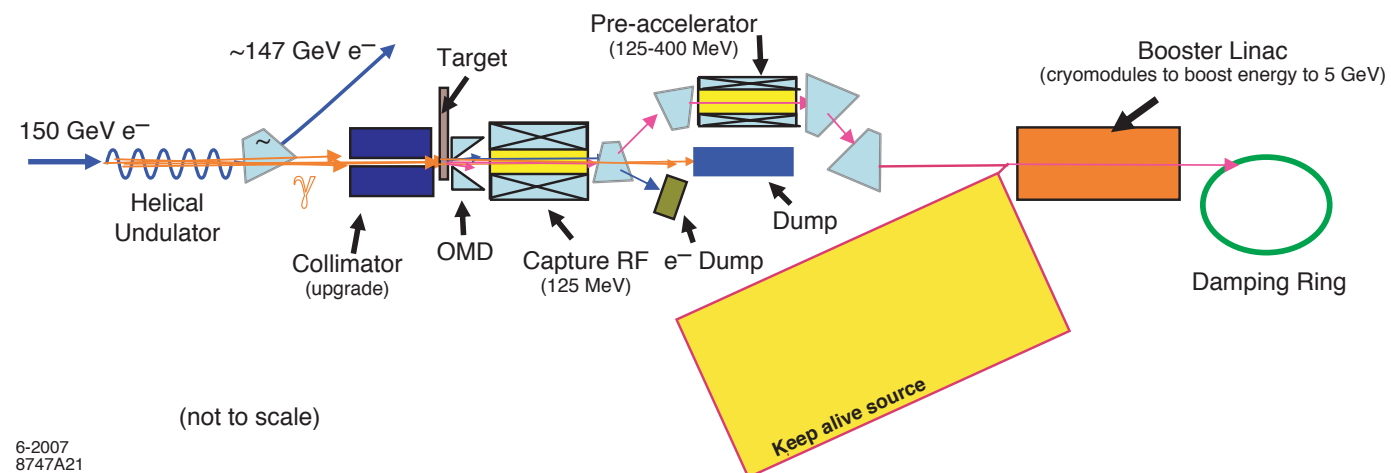


- Reference Design Report
 - Central campus
 - IR for 2 detectors in push-pull configuration
 - Both damping rings in central tunnel of 6.5 km
 - Single e^+ ring (e-cloud effect)
- Designs are still generic
 - deep site
 - shallow sites not yet evaluated (planned)
 - cost benefits from existing site infrastructures not explored
- Cost evaluation

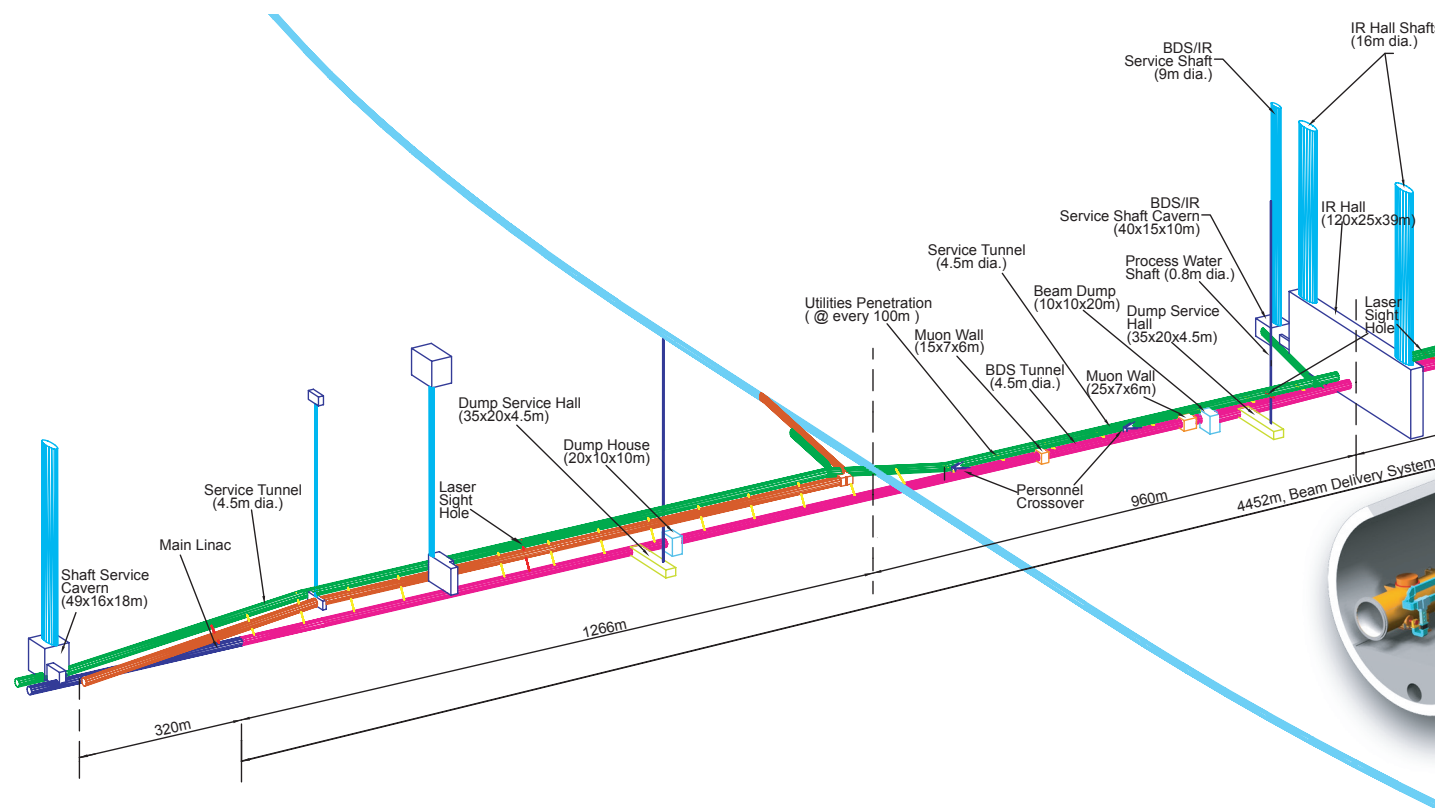
\$6.6 bn total = \$4.8 bn (shared) + \$1.8 bn (host)
- Engineering Design Phase 2007-2010
 - managed by M Ross, N Walker and A Yamamoto

ILC Design as in RDR

e^+ source

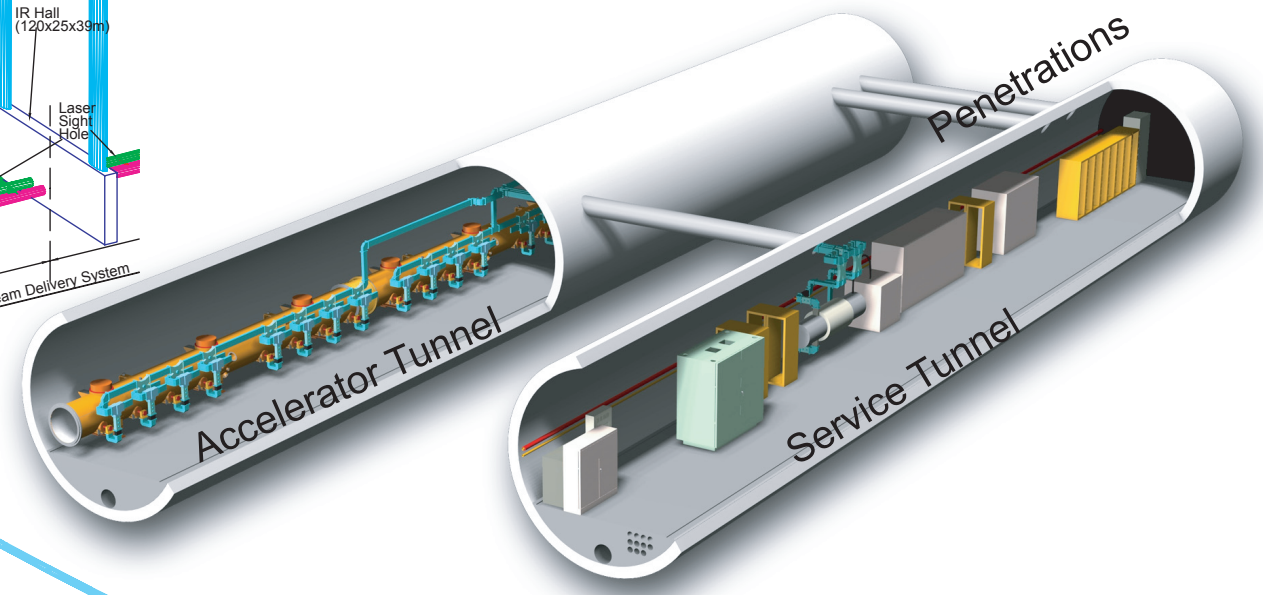


Beam Delivery



2 Tunnels

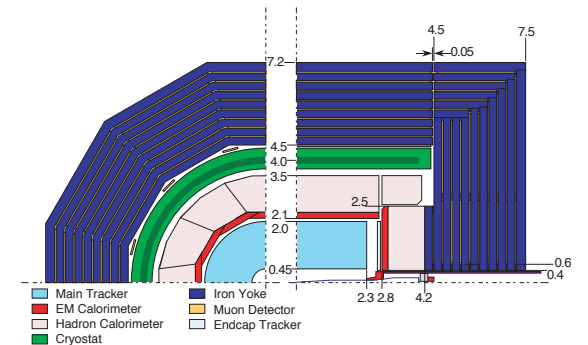
- safety
 - availability
- will be able to learn from XFEL



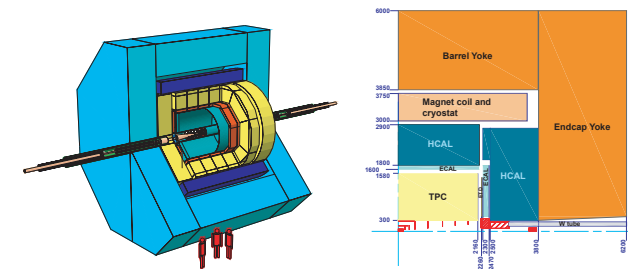
ILC Detectors

- Currently 4 concepts
 - LDC and GLD merge to ILD and will prepare common Lol study
 - two Lols expected
 - does not pre-empt decision on detectors
- Huge effort for detector optimisation – including test beam programme – under way
 - CALICE (ECAL & HCAL)
 - TPC
 - SiD
- Funding
 - European groups are leading the effort by far
 - US concentrating on SiD

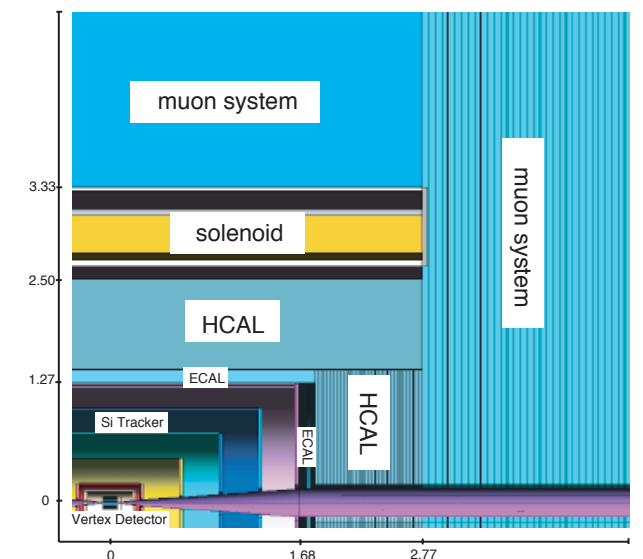
GLD



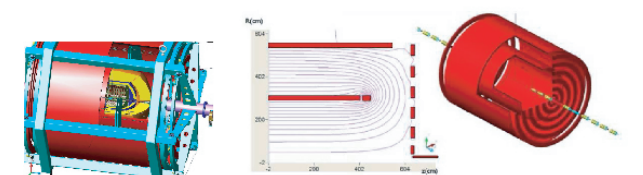
LDC



SiD

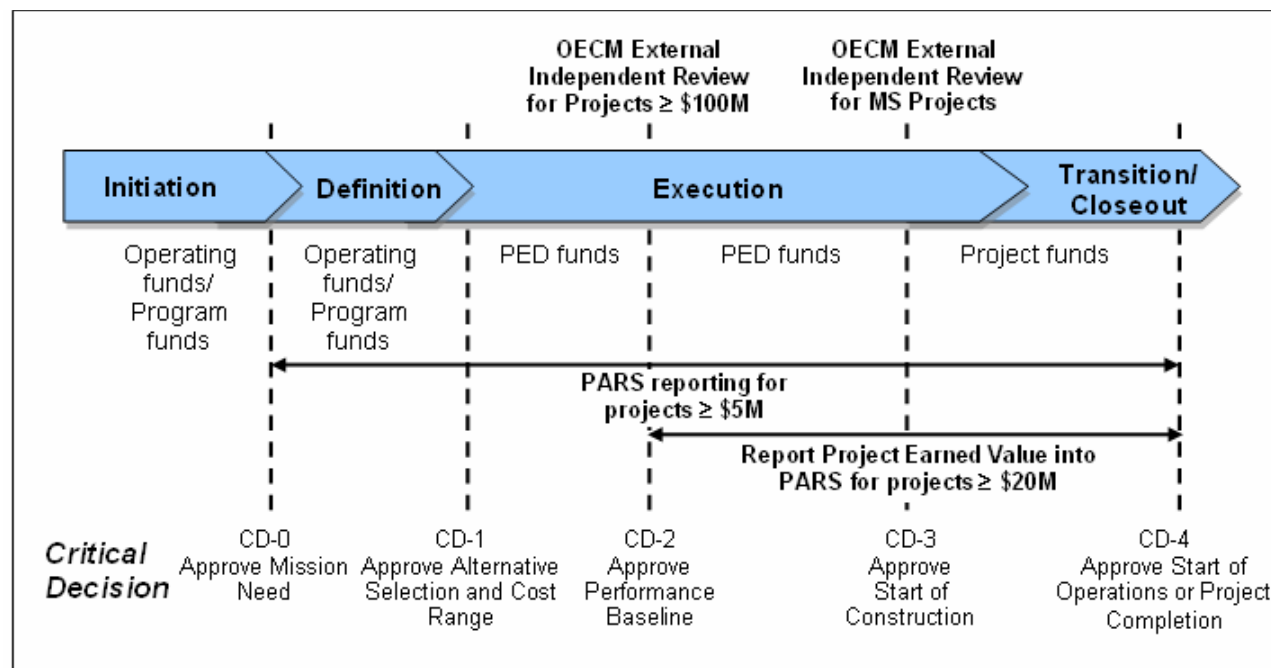


4th



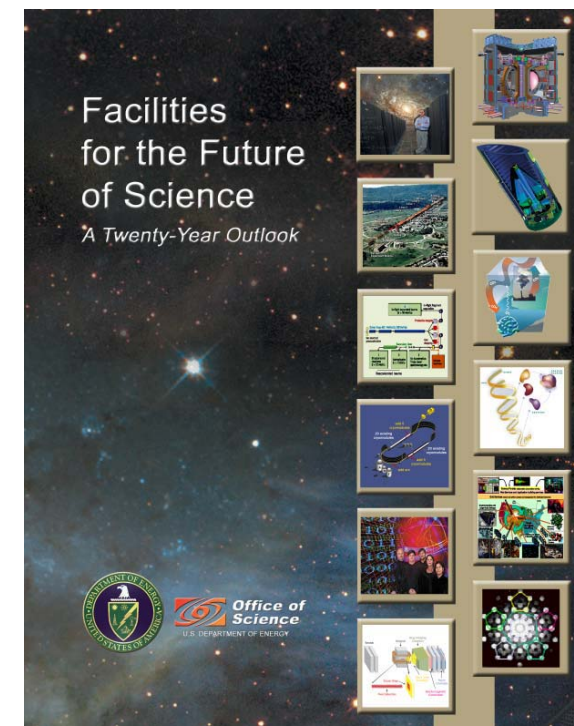
Ray Orbach on Design & Timelines

- The US engagement for the ILC has to be compliant to order 413.3 of the DOE
- **Critical Decisions CD0-CD4**



- Realisation likely to take many years
- Matching efforts from the other regions should be visible to justify US engagement

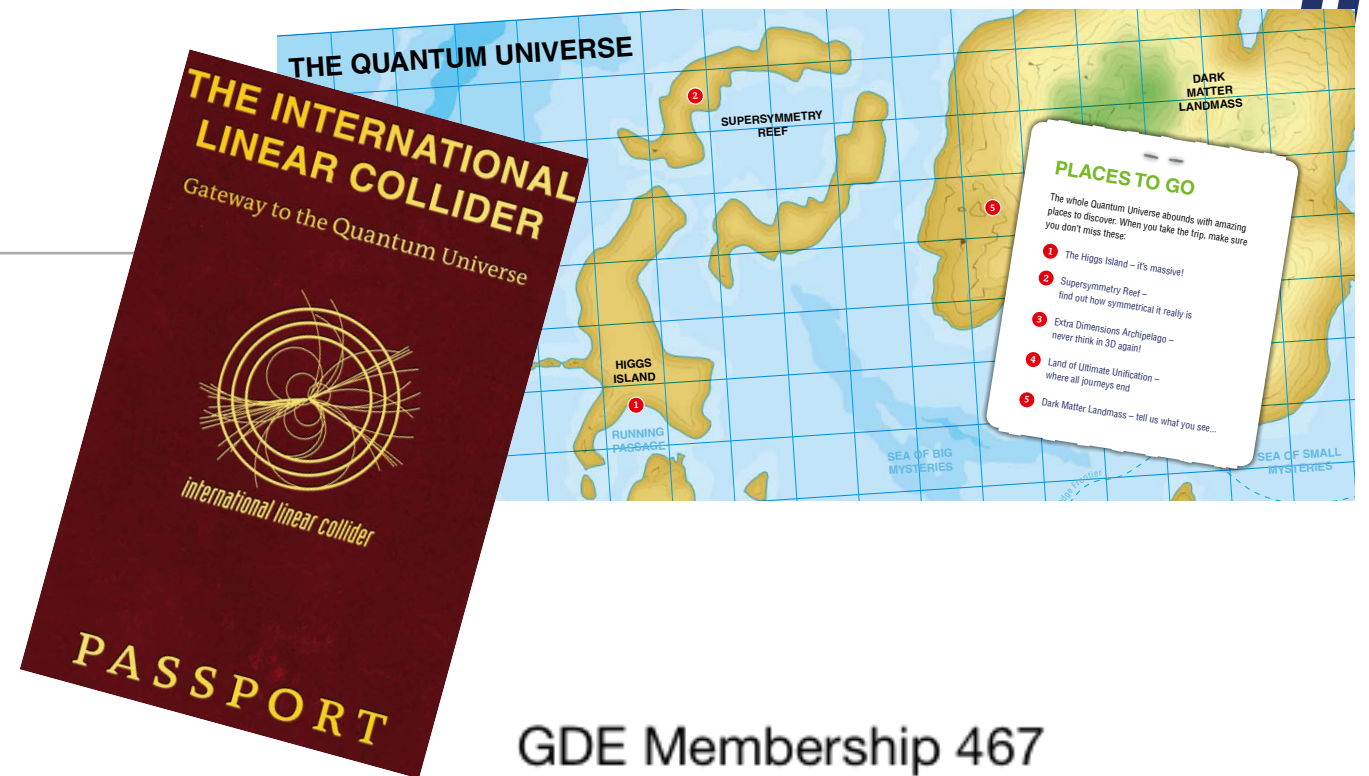
- **Twenty Year outlook on HEP** Progress report does not recognise the achievements of RDR etc.



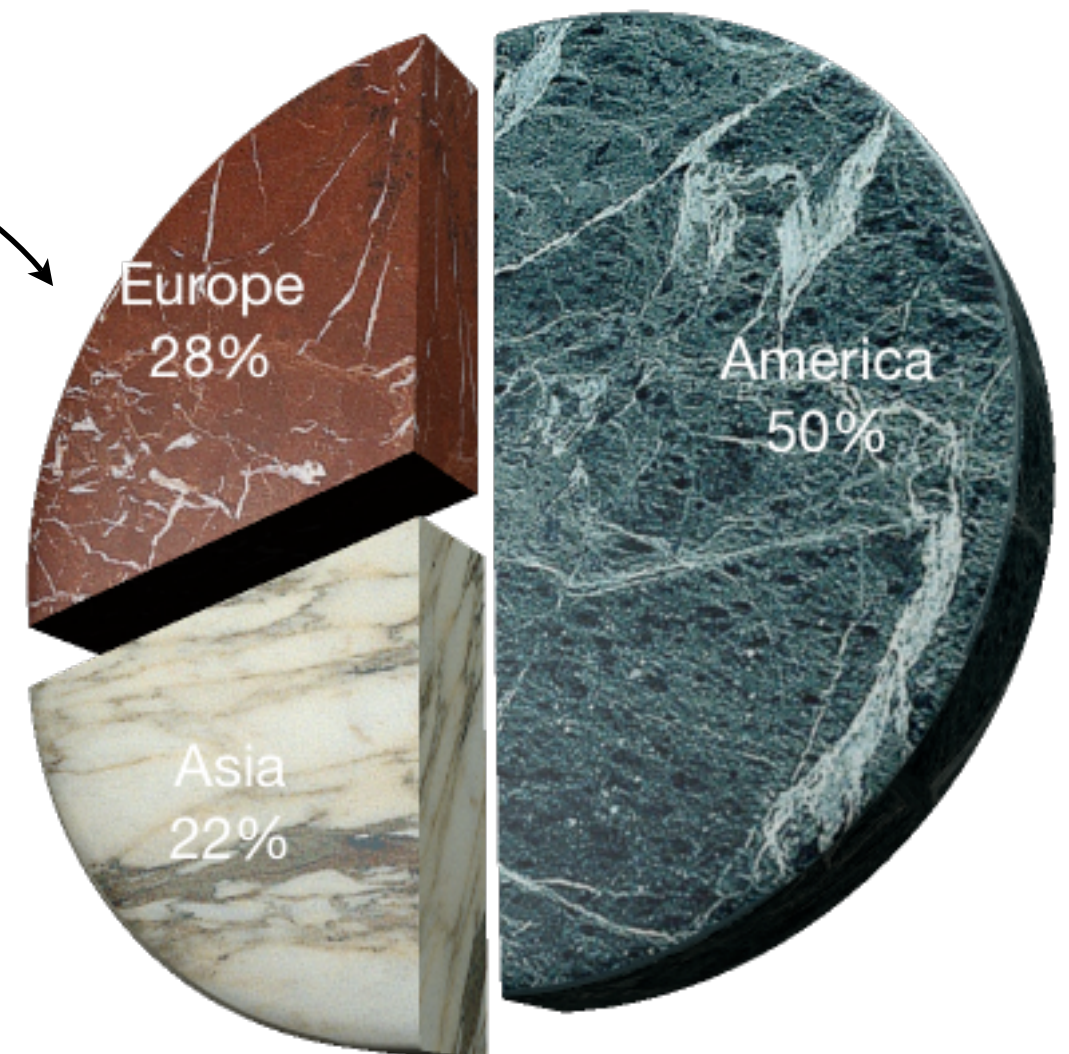
- US want to follow a more formal approach
 - The ~\$60M annual US expenditure for ILC R&D is being taken serious
- **Europe and Asia have to respond**

ILCSC Meeting

- Report by GDE Director
 - RDR has been published
 - Gateway to the Quantum Universe
 - www.linearcollider.org/gateway
- Global Design Effort (GDE)
 - Revised membership (467)
 - American dominance
 - Europe: Unavailability of CERN
 - Asia: Relying on industry involvement
 - Internal Accelerator Advisory Panel
 - Work Package & Deliverables
 - for FALC, ILCSC and PAC
 - Governance
 - requires action from ILCSC!
 - Regional Directors – Funding Agencies



GDE Membership 467



ILCSC cont'd

- Engineering Design Phase 2007-10
 - compatible with start of construction in 2012
 - Work Packages are set-up along functional lines, i.e. e^+ source, DR etc.
 - *Plug compatible designs*
 - Global R&D plan is in place
 - overview in December 2007
 - schedule due in March 2008
 - most important single R&D topic: highest gradient SCRF (~7% cost)
- World Wide Study for detector
 - Research Director has been nominated with an approved *Charge*
 - WWS will organise global meetings.
- LDC and GLD have formed a common study group ILD.
- Research Director (S Yamada)
 - in contact with WWS co-chairs and with concept representatives until Lol have been identified.
 - Two Lol's will be selected if there is more than one
 - Detectors have to be complementary.
 - IDAG members (15 ± 3 members) to be selected
 - HEP Physicists
 - detector/software experts
 - accelerator experts
 - phenomenologists/theorists

ILCSC cont'd

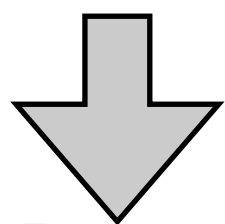
external

- **Physics Advisory Committee (PAC)**
 - accelerator (6 members) & detectors (3 members)
 - ILCSC chair & secretary, acting as PAC secr.
- Work will be organised through **Memoranda of Understanding (MoU)**
 - GDE ↔ institutes
- **FALC Resource Group**
 - to provide funds for central management
- **ILC Siting & Governance**
 - DUBNA site
 - P Oddone, A Suzuki & A Wagner form subcommittee on governance

- Regional Reports
 - Europe
 - FP7 funding
 - Asia
 - Meeting in Beijing October 2007
 - Americas
 - Order 413.3 and its impact on ILC
 - Project X
- Next Meetings
 - 11 Feb 2008

EC FP7 supports ILC

Top-down selection



• Preparatory Phase (≥ 2008)

- ILC-HiGrade
 - Financing
 - Siting
 - Governance
- ≥ 24 fully dressed cavities
- Start ~February 2008

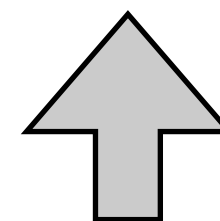


5 M€,
4 years

- Infrastructures (≥ 2009)
 - UK dominated Topics
 - Damping rings
 - Positron Source
 - Beam Delivery
- SRF
 - Electropolishing
 - single crystal
 - ...
- other LC related topics in particular also CLIC specific

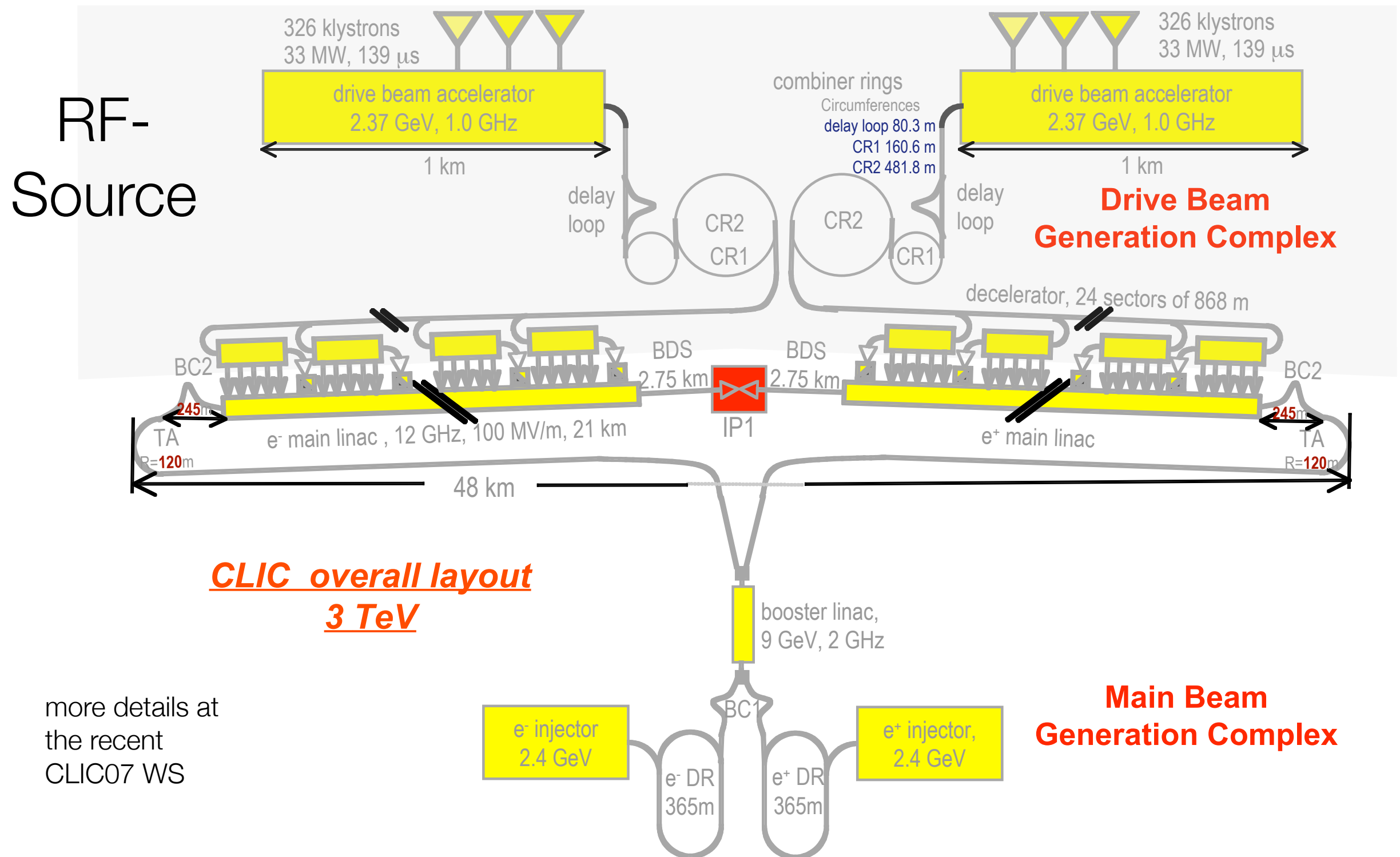
"continuation" of
EUROTeV

?



Bottom-up selection

CLIC – New layout for 3 TeV machine



CLIC went X-band

- Change of nominal parameters in early 2007 to address breakdown rates (and overall cost optimisation)

- 30 GHz \Rightarrow 12 GHz
- 150 MV/m \Rightarrow 100 MV/m
- CLIC \Rightarrow "X-CLIC"

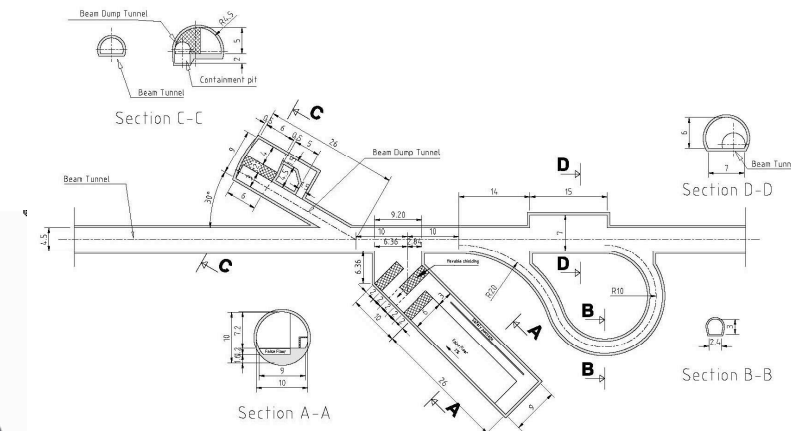
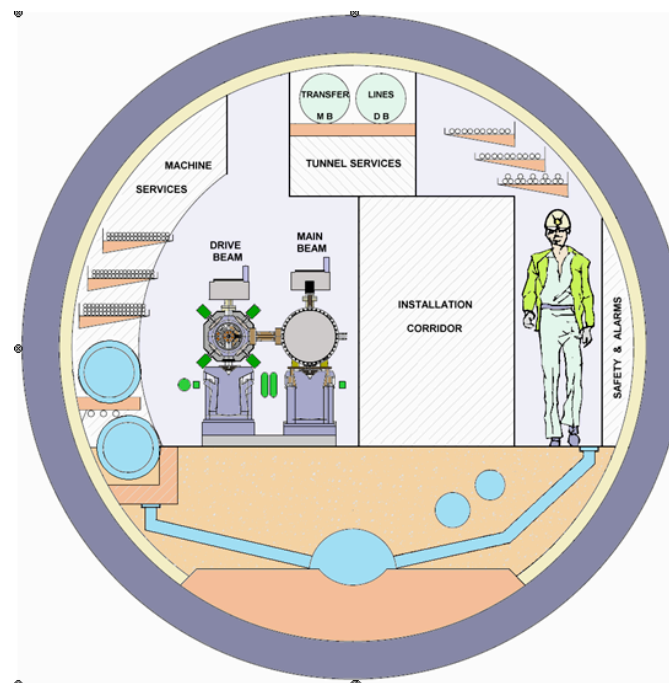
- CLIC Features

- $E_{CM} = 0.5 \dots 3 \text{ TeV}$
- $L = \text{few} \times 10^{34} \text{ cm}^{-2}\text{s}^{-1}$

- and Issues

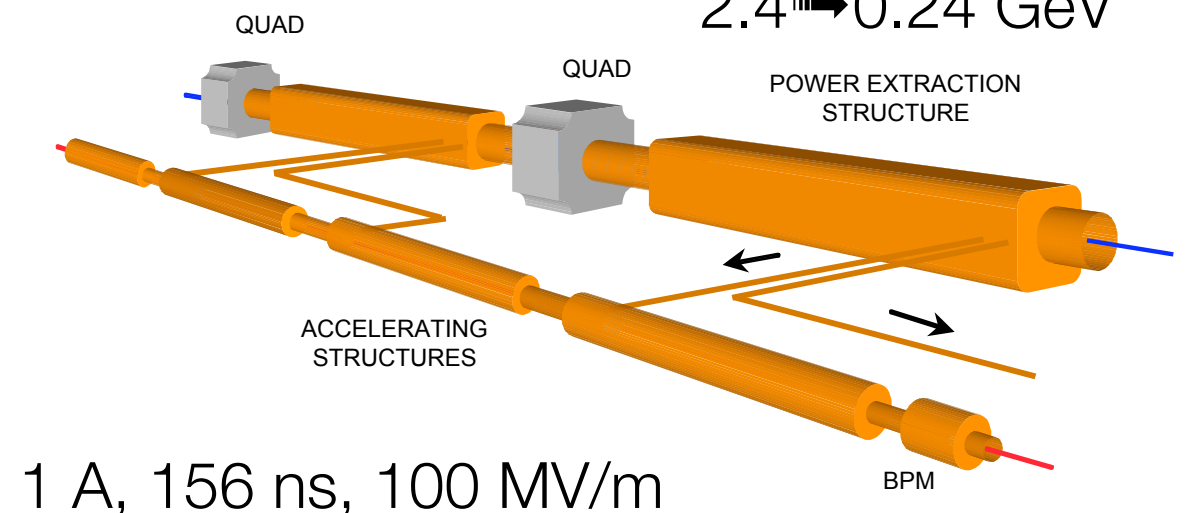
- Gradient of $> 100 \text{ MV/m}$
- 2 beam acceleration
- nm stabilisation

single tunnel,
 $\varnothing 4.5 \text{ m}$, ...



... with many returns

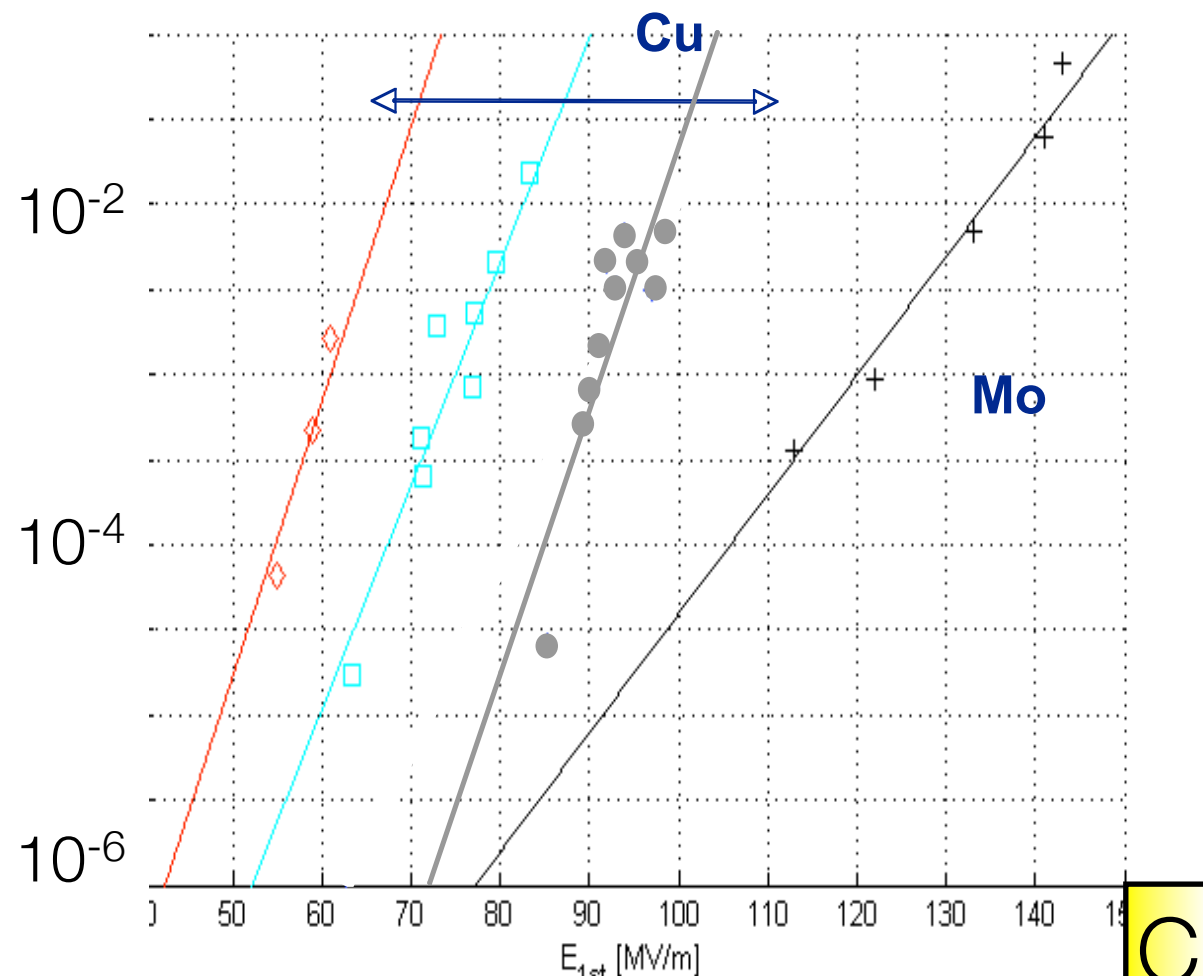
95 A, 240 ns,
 $2.4 \Rightarrow 0.24 \text{ GeV}$



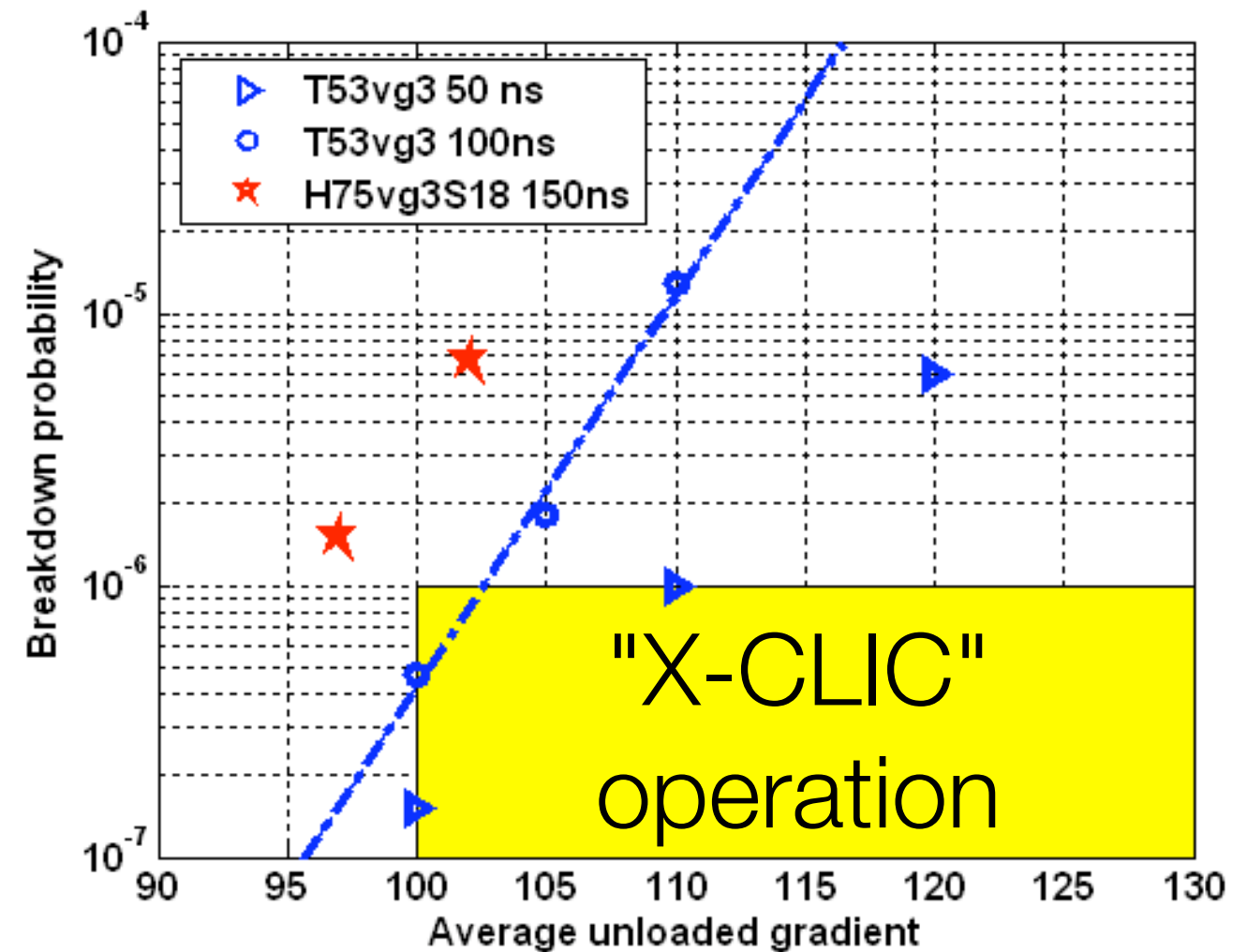
1 A, 156 ns, 100 MV/m

CLIC Gradient – Material breakdown

CTF3 @ 30 GHz

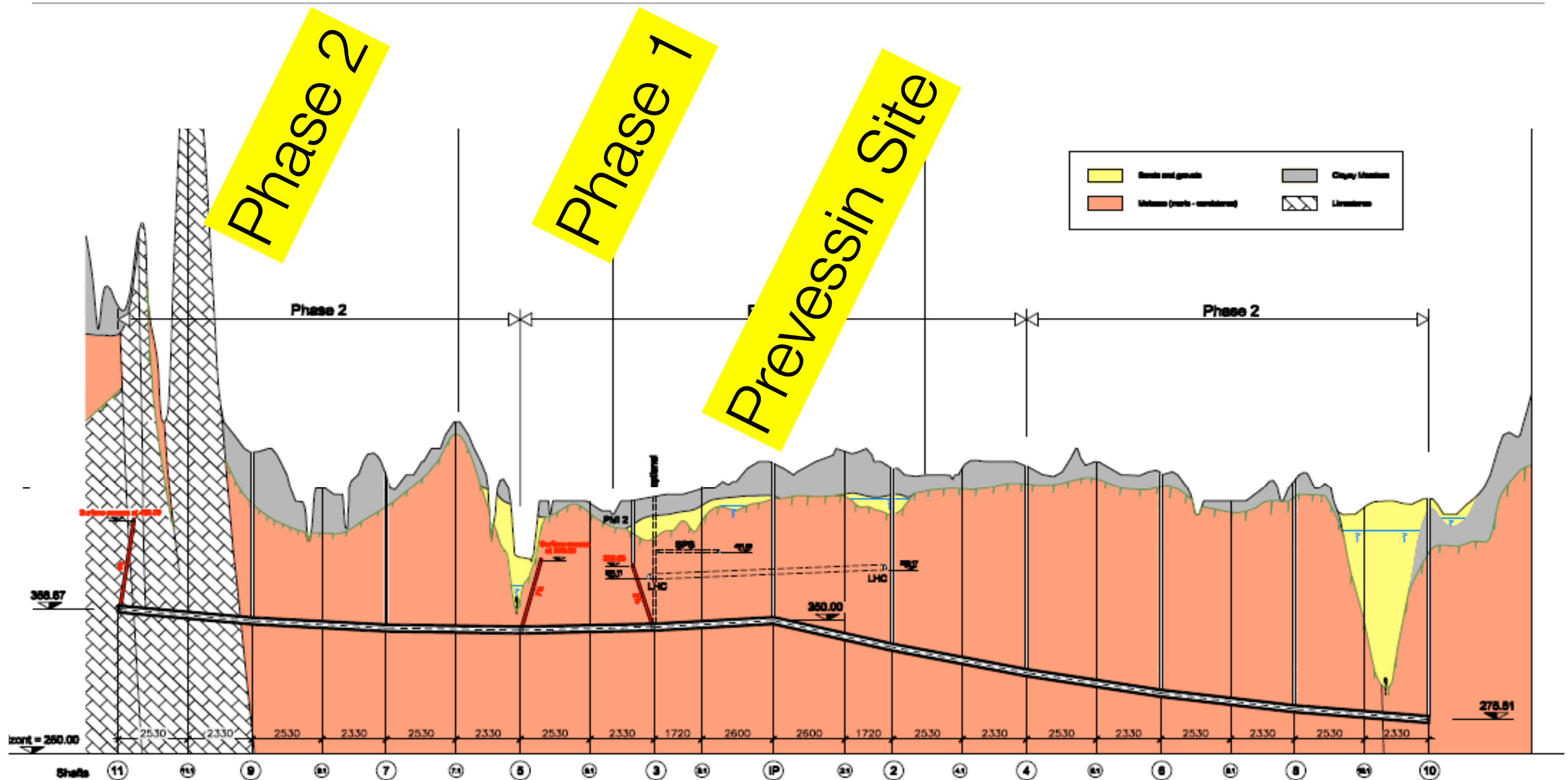


SLAC @ 11.4 GHz



Demonstration in
undamped structure

CLIC – Site: Laser straight



- CERN site 100-150 m below ground

- CERN site found to be favourable; factor ~10 quieter than DESY

Summary

- Strong global effort underway in designing the ILC
- A more formal project management has been put in place
- US DOE is urging European and Asian commitments to be demonstrated; first step upcoming FALC meeting
 - XFEL synergy
 - Project funds (FP7 etc.)
- CLIC is exploring designs for TeV machines based on X-band technology