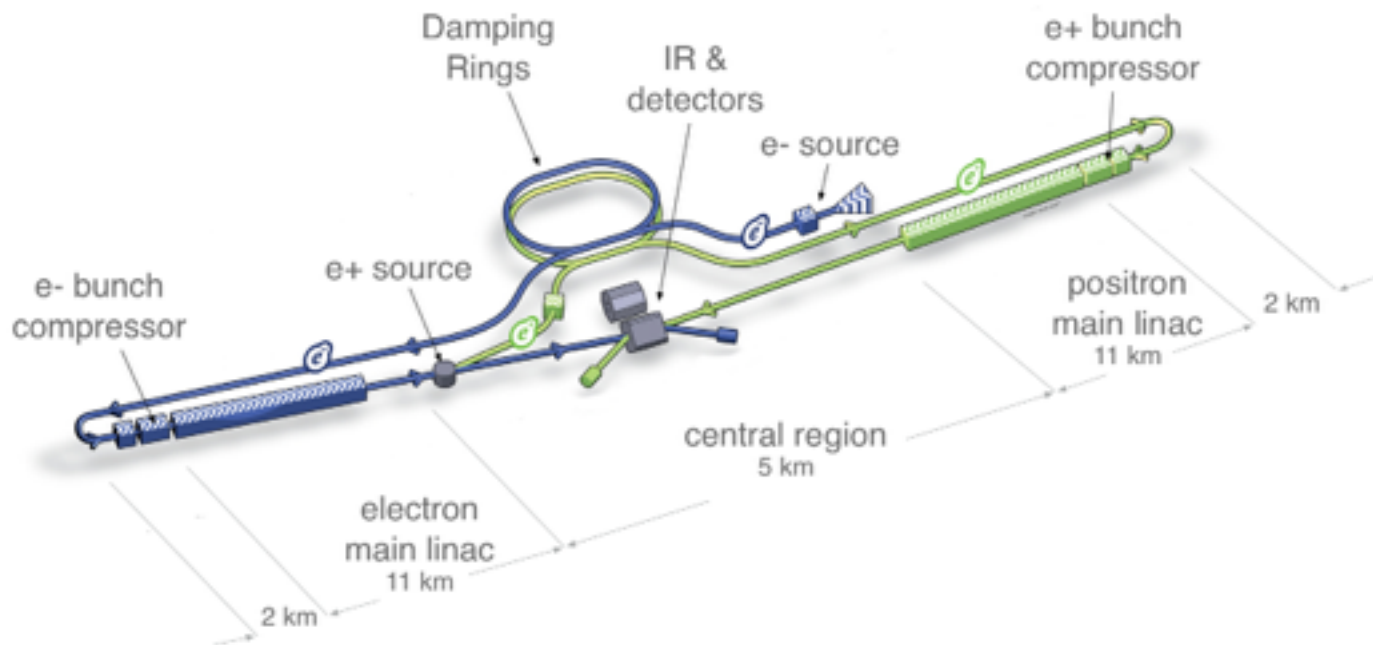




SPAFOA Capitol Hill Briefing December 2013

Harry Weerts

International Linear Collider - progress & status





Japan – The proposal

JAHEP statement Oct 2012

In March 2012, the Japan Association of High Energy Physicists (JAHEP) accepted the recommendations of the Subcommittee on Future Projects of High Energy Physics⁽¹⁾ and adopted them as JAHEP's basic strategy for future projects. In July 2012, a new particle consistent with a Higgs Boson was discovered at LHC, while in December 2012 the Technical Design Report of the International Linear Collider (ILC) will be completed by a worldwide collaboration.

On the basis of these developments and following the subcommittee's recommendation on ILC, JAHEP proposes that ILC be constructed in Japan as a global project with the agreement of and participation by the international community in the following scenario:

(1) Physics studies shall start with a precision study of the "Higgs Boson", and then evolve into studies of the top quark, "dark matter" particles, and Higgs self-couplings, by upgrading the accelerator. A more specific scenario is as follows:

- (A) A Higgs factory with a center-of-mass energy of approximately 250 GeV shall be constructed as a first phase.
- (B) The machine shall be upgraded in stages up to a center-of-mass energy of ~500 GeV, which is the baseline energy of the overall project.
- (C) Technical extendability to a 1 TeV region shall be secured.



Science Council

MEXT asked SCJ to evaluate ILC on four points

- 1) **Scientific significance** of the research using ILC, and the positioning of ILC project in the context of **particle physics**.
- 2) Positioning of ILC Project in the context of **overall scientific activity in Japan**.
- 3) Significance of hosting ILC for Japanese **people and society**.
- 4) **Current state of preparation and necessary conditions** for the implementation of ILC project, including securement of budget and manpower for construction and operation of ILC.



Press conference Oct 1

KAVLI
IPMU

BERKELEY CENTER FOR
THEORETICAL PHYSICS

The deliberation at the Science Council of Japan concluded that “we endorse the scientific significance of the ILC project within particle physics” but added “there are uncertainties and risk factors concerning the project organization within Japan and the availability of researchers from other countries.” The second point was “we recommend intensive investigation and discussions on various issues for 2 to 3 years to make the decision on execution of the ILC project.” Third, “SCJ is willing to help the government for the final decision by making recommendations from the academic view point.” This report was submitted to MEXT yesterday.

Given this report, MEXT will gather information needed for the decision on execution of the ILC project working together with researchers, and investigate and discuss issues pointed out by the SCJ. The final decision will come after that.





ILC Timeline
Proposed by LCC

- **2013 - 2016**
 - Negotiations among governments
 - Accelerator detailed design, R&Ds for cost-effective production, site study, CFS designs etc.
 - Prepare for the international lab.
- **2016 – 2018**
 - ‘Green-sign’ for the ILC construction to be given (in early 2016)
 - International agreement reached to go ahead with the ILC
 - Formation of the ILC lab.
 - Preparation for biddings etc.
- **2018**
 - Construction start (9 yrs)
- **2027**
 - Construction (500 GeV) complete, (and commissioning start)
(250 GeV is slightly shorter)

Taking into account recommendations from SCJ for “time for negotiations”.



Japan – Site selection

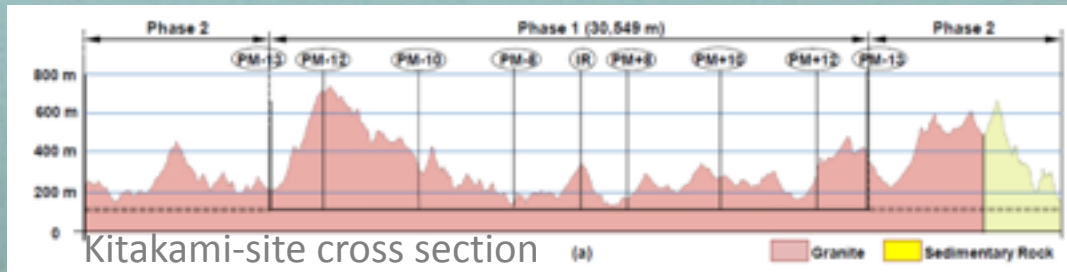


Completed in September 2013

- Japanese Mountainous Sites -



Site Specific Design



From November 2013
workshop:

Need to establish the IP and linac orientation
Then the access points and IR infrastructure
Then linac length and timing

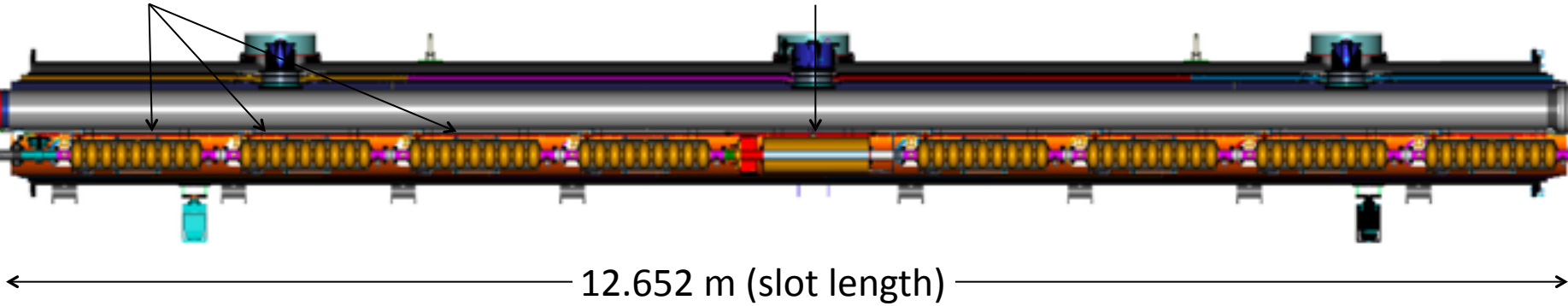
The Cryomodule

cavities (8)

SC quad package

Type-B module

Type-A has 9 cavities and no quadrupole



Needed for Phase I (250GeV):

Cryomodules	Cavities
900	8000

If one assumes production sites in Asia, Europe and USA, then 1/3 of this might be from USA

LCLS II: 35 cryomodules



Global expressions of support

From the **EU** strategy report (after operate and upgrade the LHC)

“There is a strong scientific case for an electron-positron collider, complementary to the LHC, that can study the properties of the Higgs boson and other particles with unprecedented precision and whose energy can be upgraded. The Technical Design Report of the International Linear Collider (ILC) has been completed, with large European participation. The initiative from the Japanese particle physics community to host the ILC in Japan is most welcome, and European groups are eager to participate. *Europe looks forward to a proposal from Japan to discuss a possible participation.*”

“On Sept. 3, **Asia-Pacific** High Energy Physics Panel (AsiaHEP) and Asian Committee for Future Accelerators (ACFA) have jointly issued a statement that the International Linear Collider (ILC) is the most promising electron positron collider to achieve the objectives of next-generation physics. “



US – HEP strategy (P5)

Just started – [complete April 2014](#)

Charge: Deliverables (3)

- *“...articulate...the approximate overall level of support that is needed in the HEP core research and advanced technology R&D programs to achieve these opportunities in the various scenarios.”*
- *“...provide a detailed perspective on whether and how the pursuit of possible major international partnerships (such as LHC upgrades, Japanese-hosted ILC, LBNE, etc.) might fit into the program...in each of the scenarios.”*



US – Participation

The US was prominent in the global R&D program which ran from 2007 -> 2012.

These activities resulted in significant DOE investment in developing SRF infrastructure at Fermilab/Argonne and to a lesser extent JLAB.

High gradient cavity R&D was started at the labs and from there to US industry via tech transfer

A total of 60+ cavities were purchased during this time and AES was certified for ILC production

US labs were active in the accelerator design as well as other hardware R&D (SLAC, JLAB, BNL, ANL, LLNL & Cornell)

The R&D program was completed in 2012 and since then ILC work in the US has effectively ceased – wait and see strategy



US – Participation

There is obviously no decision on the go-ahead for a construction project in Japan and whether the US will participate.

Should the US decide to collaborate on a phased-ILC then it is likely that cryomodules would form a significant part of a US contribution.

A 250 GeV machine would require ~900 cryomodules and since the global capacity for cryomodule production is limited then I would guess that the US would produce >200 elements.

Making some assumptions about the construction schedule then production would start towards the end of this decade. This dovetails well with LCLS II.