Summary of Main Linac SCRF-part

H. Hayano, 11202008

Nov.17 (Mon)	8:30 - 10:00	UIC Forum Main Hall C	cavity (S0)		
		8:30-8:55		H. Padamsee	Summary of TTC(Dehli) cavity discussion
		8:55-9:15		R. Geng	New 9 cell results at Jlab
		9:15-9:30		H. Hayano	STF-EP,VT commissioning using AES001
		9:30-9:45	webex	R. Geng, L. Lilje	Status of alternative cavities
		9:45-10:00		pos-doc (R. Geng)	Optical inspection update and material study at Jlab
	10:30 - 12:00	UIC Forum Main Hall C	cavity (S0)		
		10:30-10:45	webex	S. Aderhold	Optical Inspection update (Z130) at DESY
		10:45-11:00		K. Watanabe	Optical Inspection update at KEK
		11:00-11:15		T. Saeki	Surface studies at KEK
		11:15-11:30		K. Watanabe	Mechanical grinding development
		11:30-12:00	webex	L. Lilje	discussion of Table for optical inspection & T-map
Nov.17 (Mon)	13:30 - 15:30	UIC Forum Main Hall C	S0, S1/S2		
		13:30-13:45		Lance Cooley	Summary of SRF Materials Workshop
		13:45-14:05		T. Arkan	Summary of TTC(Dehli) module test discussion
		14:05-14:25		S. Noguchi	Cavity package studies at STF
		14:25-14:45		N. Ohuchi	S1-Global status
		14:45-15:00		H. Hayano	Detail plan of S1-global installation and operation
		15:00-15:15		H. Hayano	S1-Global discussion
		15:15-15:30		Mike Kelly	Status and plans for the cavity processing facility at Argonne

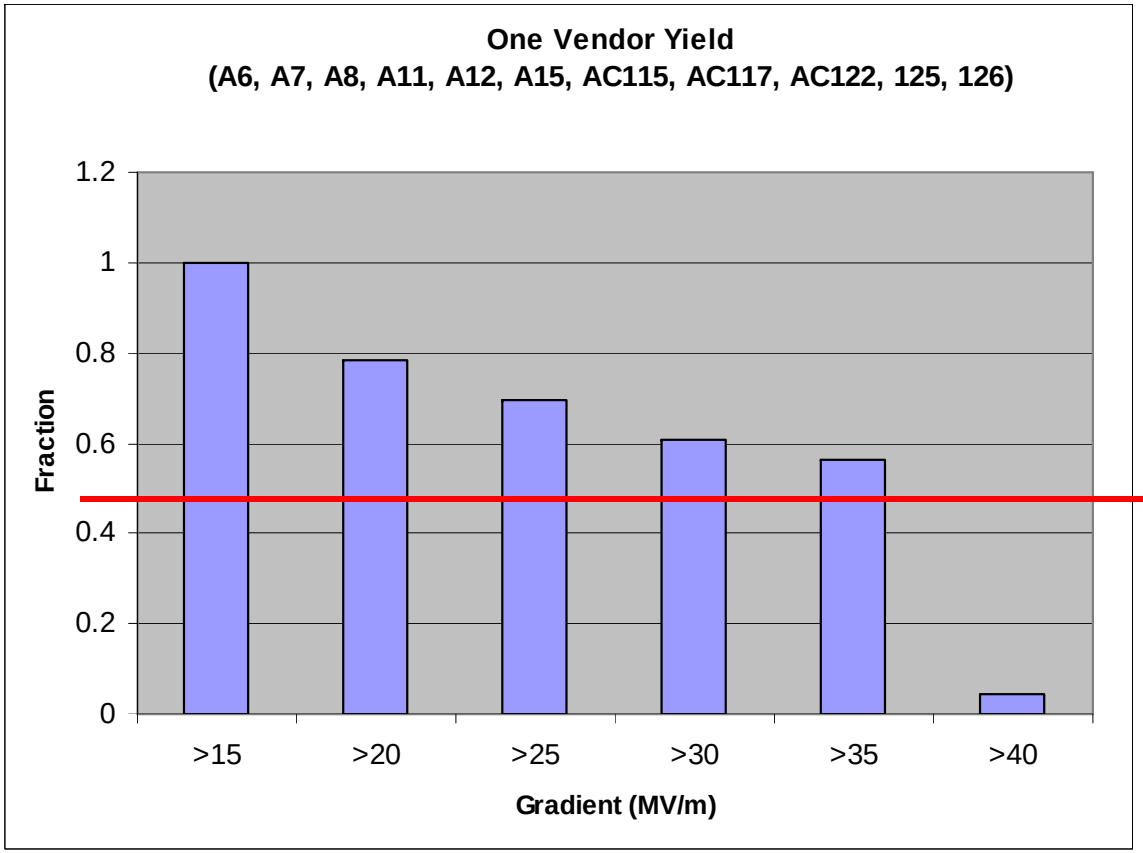
Nov.18 (Tue)	8:30 - 10:00	UIC Forum Meeting Room I	tuner (plug compatibility)		
		8:30-8:45		S. Noguchi	Plan of KEK tuner for STF phase 2
		8:45-9:00		C. Pagani	performance of blade tuner
		9:00-9:15		D. Mitchel	Plan of FNAL tuner
		9:15-10:00		A. Yamamoto	tuner discussion
	10:30 - 12:00	UIC Forum Meeting Room I	coupler (plug compatibility)		
		10:30-11:00			tuner discussion
		11:00-11:30		A. Yamamoto	coupler discussion
		11:30-12:00			coupler discussion
Nov.18 (Tue)	13:30 - 15:30	UIC Forum Meeting Room I	cryomodule/cryogenics		
		13:30-13:45		C. Pagani	Static and dynamic heat loads of Type III+ cryomodule
		13:45-14:10		T. Peterson	Recent ILC heat load estimates, CM1 instrumentation
		14:10-14:25		N. Ohuchi	Heat load study of cryomodule in STF
		14:25-14:40		N. Ohuchi	5K shield removal experiment at KEK
		14:40-15:30		T. Peterson, N. Ohuchi	heat load discussion
	16:00 - 18:00	UIC Forum Meeting Room I	cryomodule/cryogenics		
		16:00-16:30		D. Arenius	12 GeV upgrade cryogenics for Jlab
		16:30-16:50		T. Peterson, N. Ohuchi	ILC cryosystem discussion
		16:50-17:10	webex	H. Nakai	Material property study for high pressure code in KEK
		17:10-17:30		Tom Nicol	High pressure code for dressed niobium cavities in

Gradient summary
from TTC
(H. Padamsee)

Combined Yield of Jlab and DESY Tests Reported at TTC Delhi Meeting (October 2008)

For One Vendor

23 tests, 11 cavities



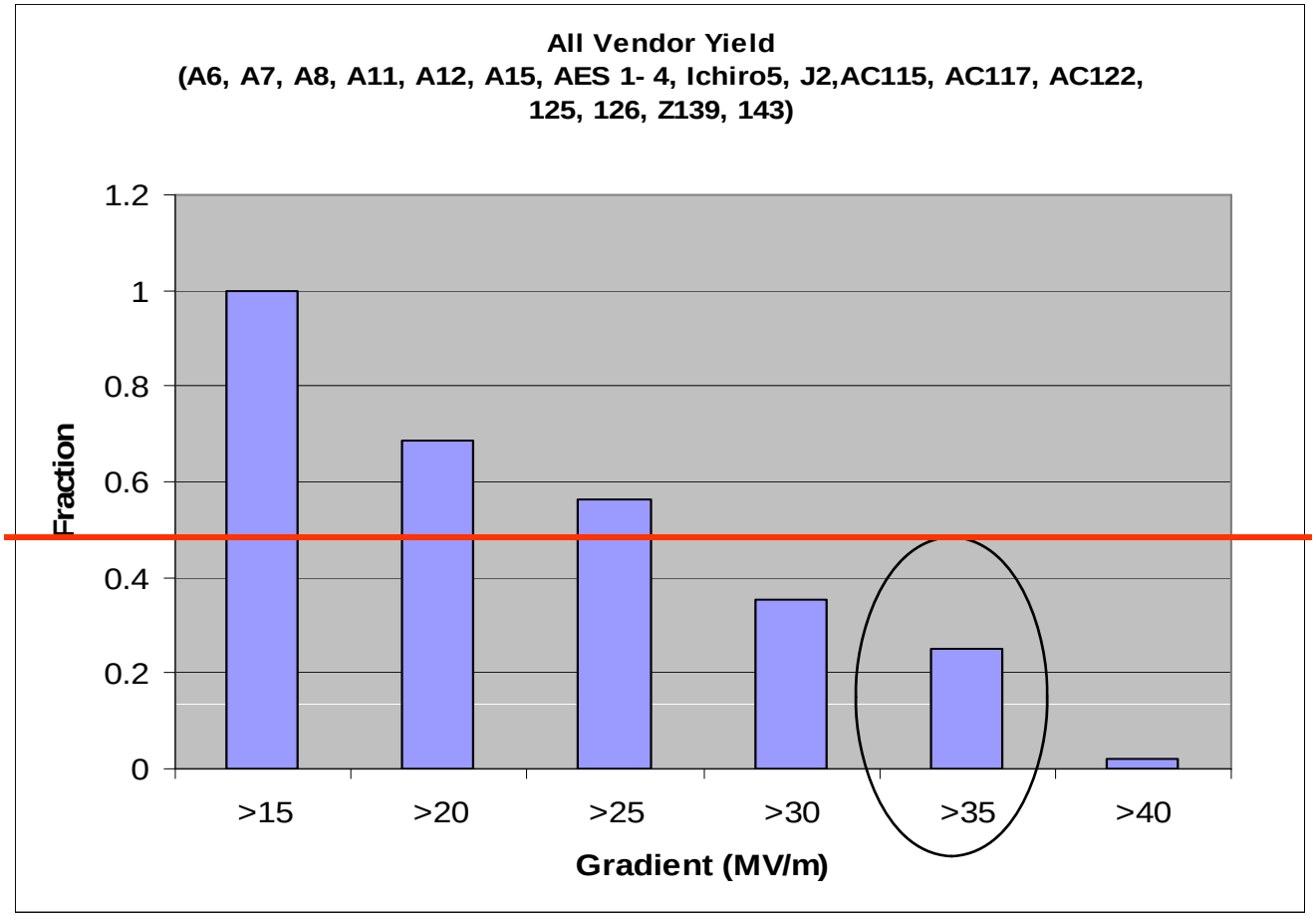
50% yield

Improvement of yield is due to field emission reduction by ethanol rinse (DESY), ultrasonic degreasing (JLab).

Gradient summary
from TTC
(H. Padamsee)

Multiple Vendor Yield

48 Tests, 19 cavities, including ACCEL, AES, Zanon, Ichiro, Jlab



Clearly there are many more variables to bring under control when dealing with many vendors.

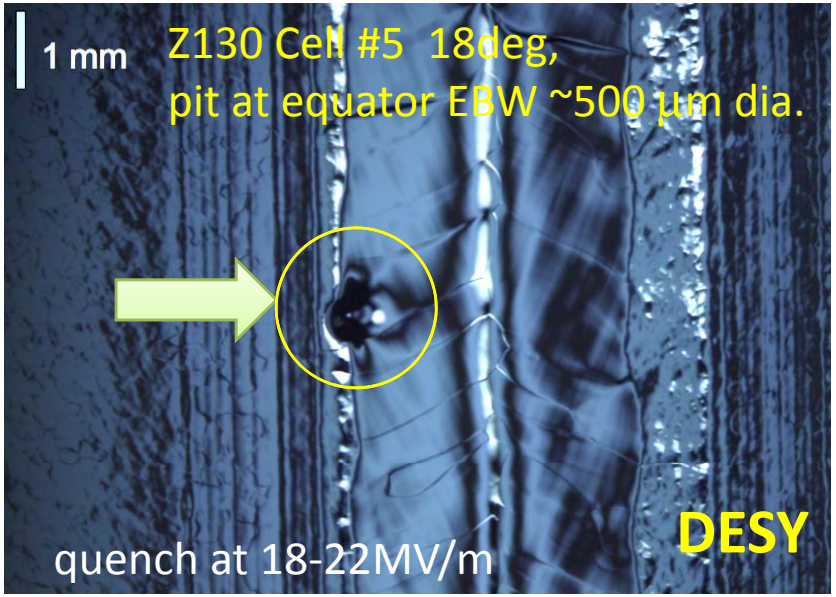
50%

Gradient summary
from TTC (H. Padamsee)

Important Progress since Last TTC Meeting.

- Sources for quench below 25 MV/m have been identified
- Thermometry first used to locate quench regions
- Followed by optical inspection.
- Quench sites are predominantly bumps and pits on the equator e-beam weld
- Or in the heat affected zone of that weld.
- Many pictures available

Picture example reported in this meeting are below;



Match of Optical inspection & T-map (L. Lilje)

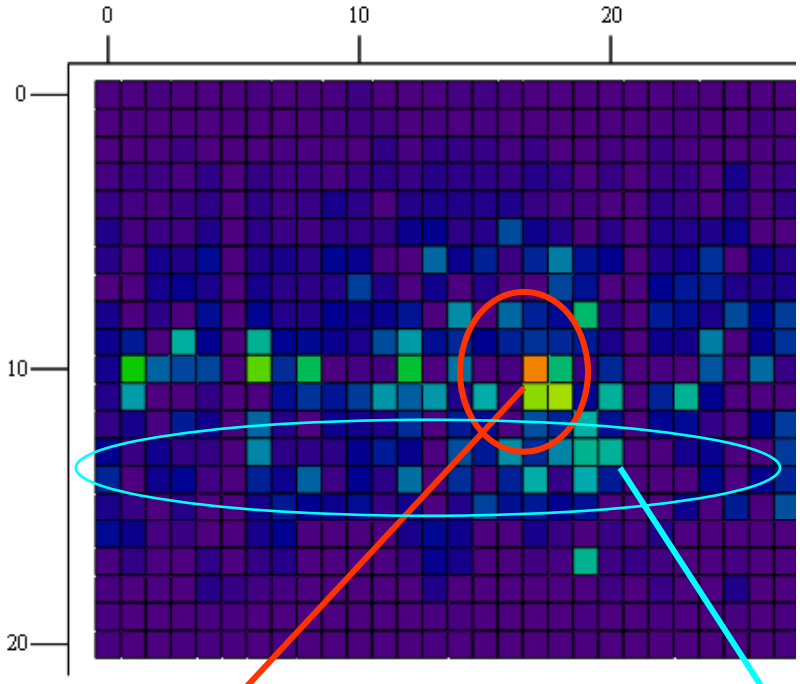
Preliminary Summary

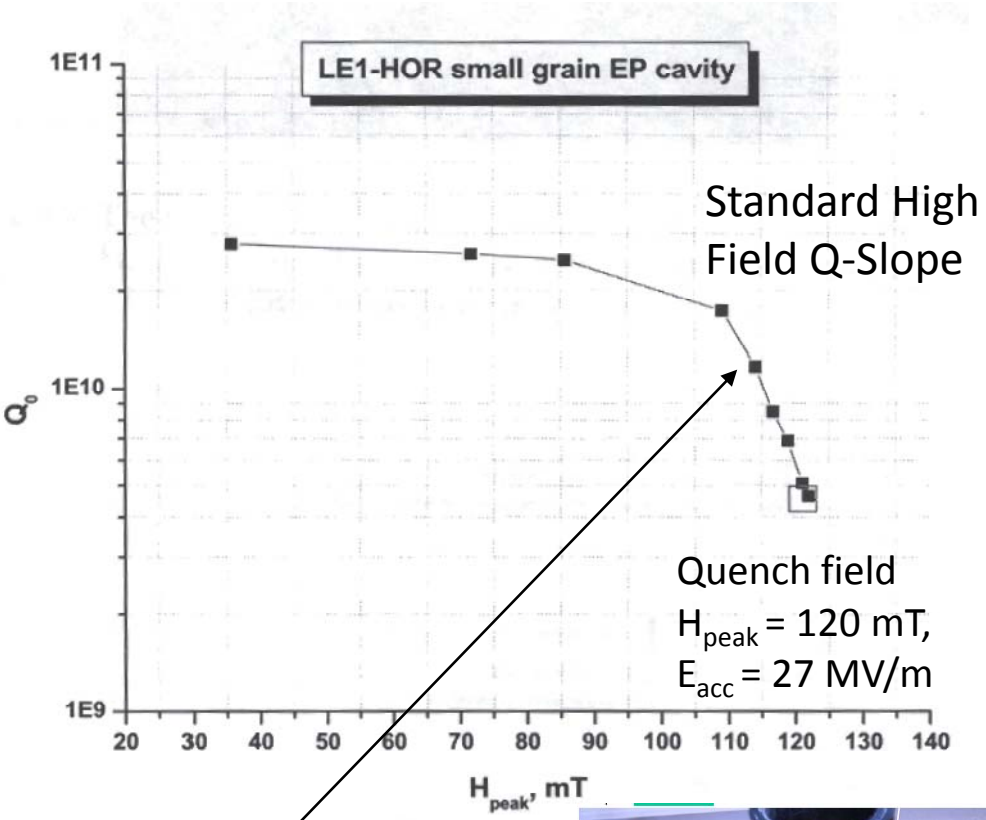
- Number of cavities inspected
  - **21** **nine-cells**
  - **4** **single-cells**
  - **3** **other**
- T-map ***and*** optical inspection available on
  - **13** **Cavities**
    - Other Cavities have
      - incoming inspection only
      - no t-mapping yet
- Correlation T-map – Optical inspection
  - **7** **Yes**
    - Various types of defects have been found
  - **3** **Field emission**
    - Scratches found in other locations
  - **3** **No direct match**
    - Still surface defects have been found
    - Partially additional surface treatment after last t-map

54% are match

Gradient summary
from TTC (H. Padamsee)

Temperature Map & Q vs E



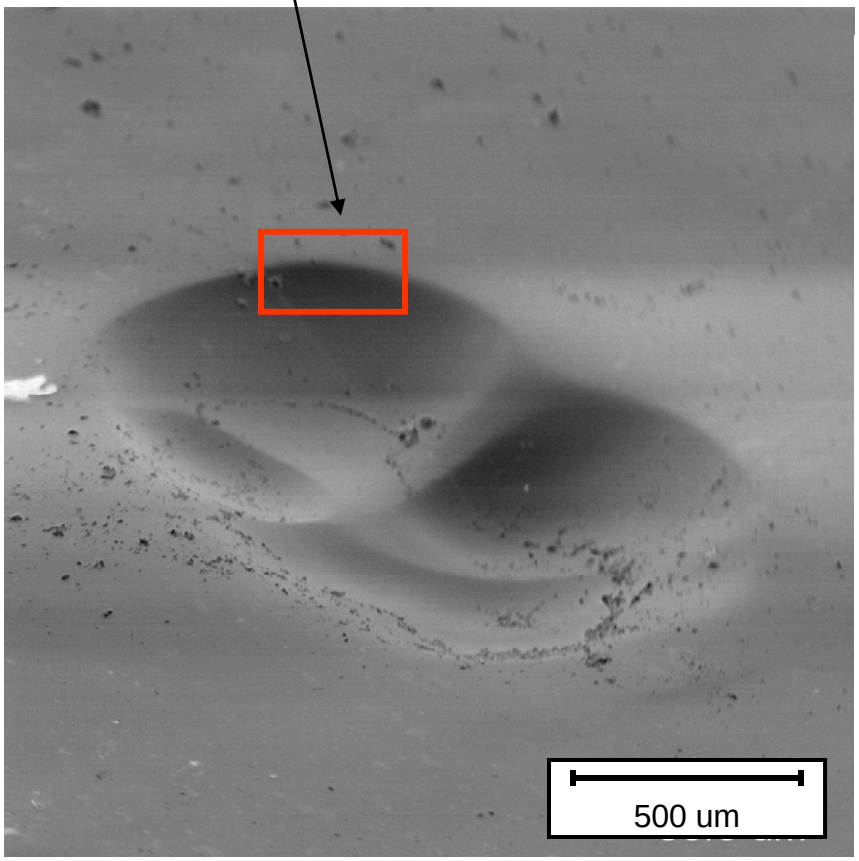


- General heating due to high field Q-slope
- Defect heating at pit at field BELOW quench
- Cavity prepared by EP and flash BCP (no bake)

Gradient summary
from TTC (H. Padamsee)

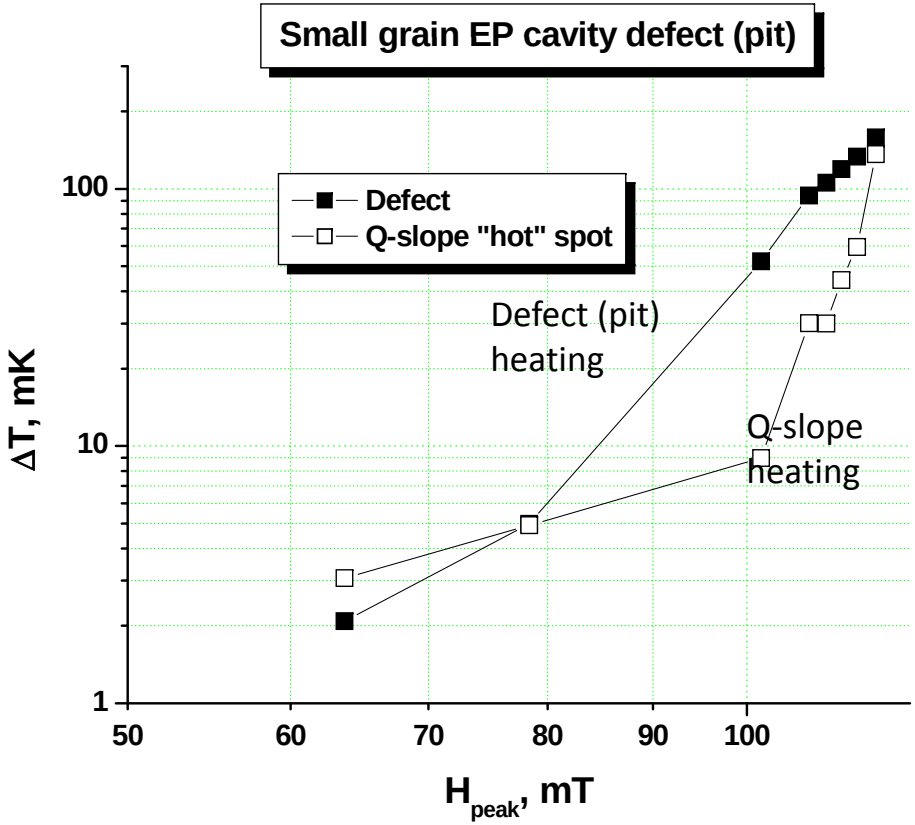
Defect Heating Surpasses Q-slope Heating Above 800 Gauss

Possible region of high field enhancement and quench may be only 10 µm



SEM back-scattered image

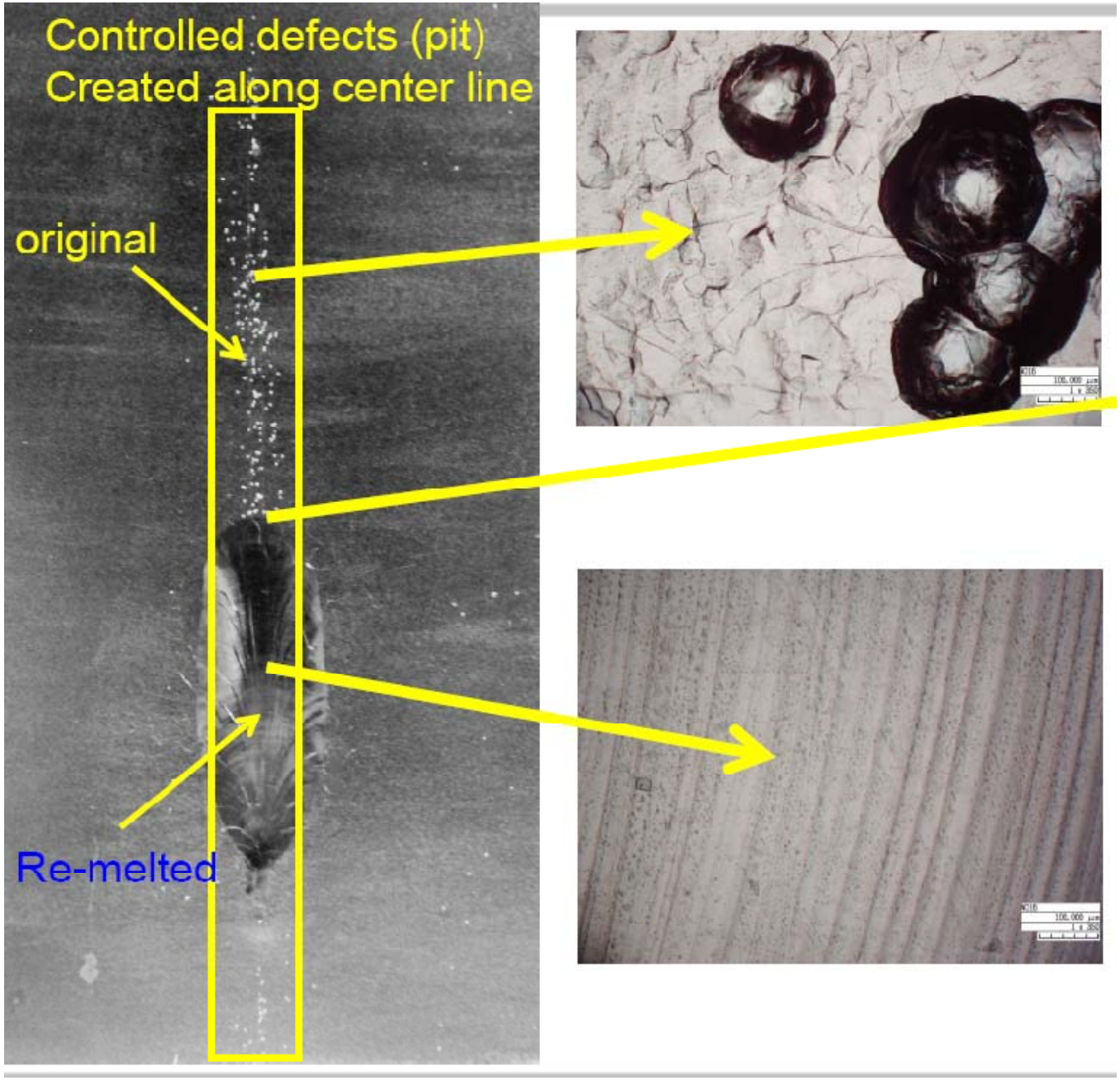
Individual thermometer responses



Gradient summary
from TTC (H. Padamsee)

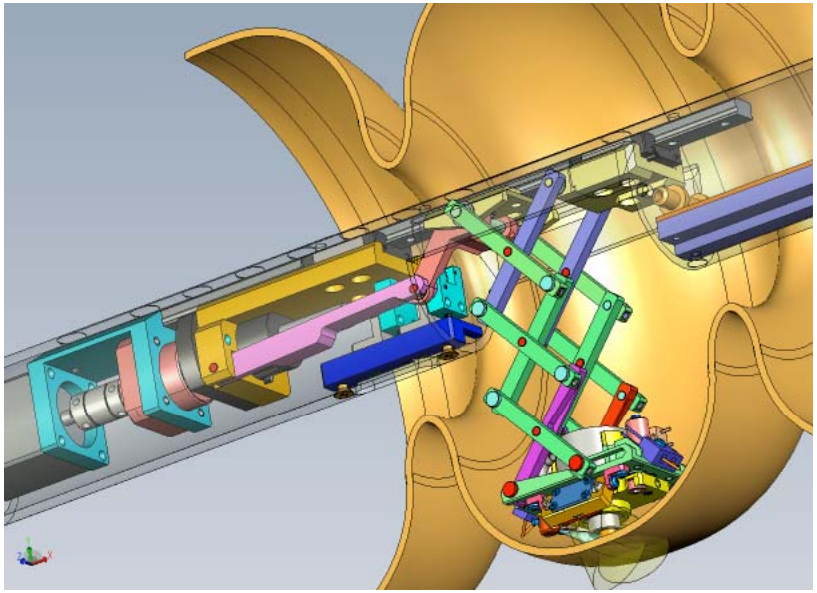
Jlab

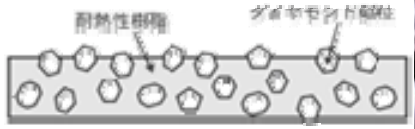
- E-beam melting to repair pits
- Try this on a single cell ?



KEK (K. Watanabe)

KEK Grinding machine



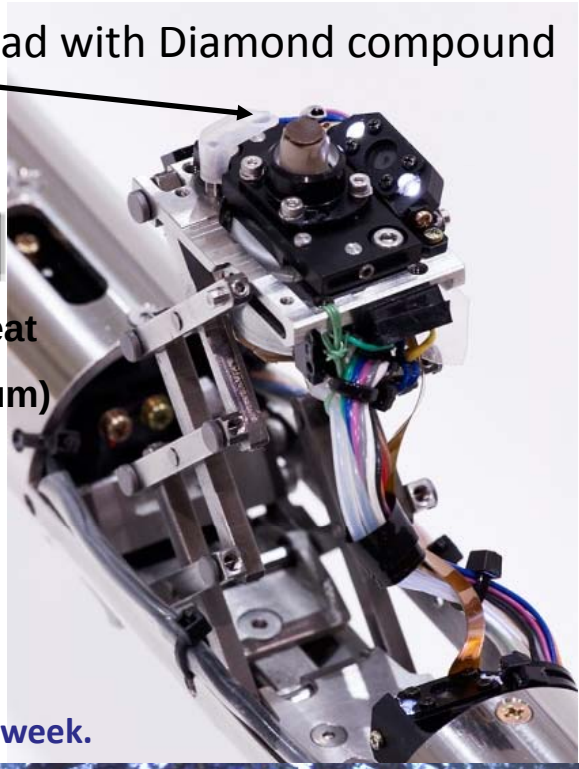


Diamond compound seat

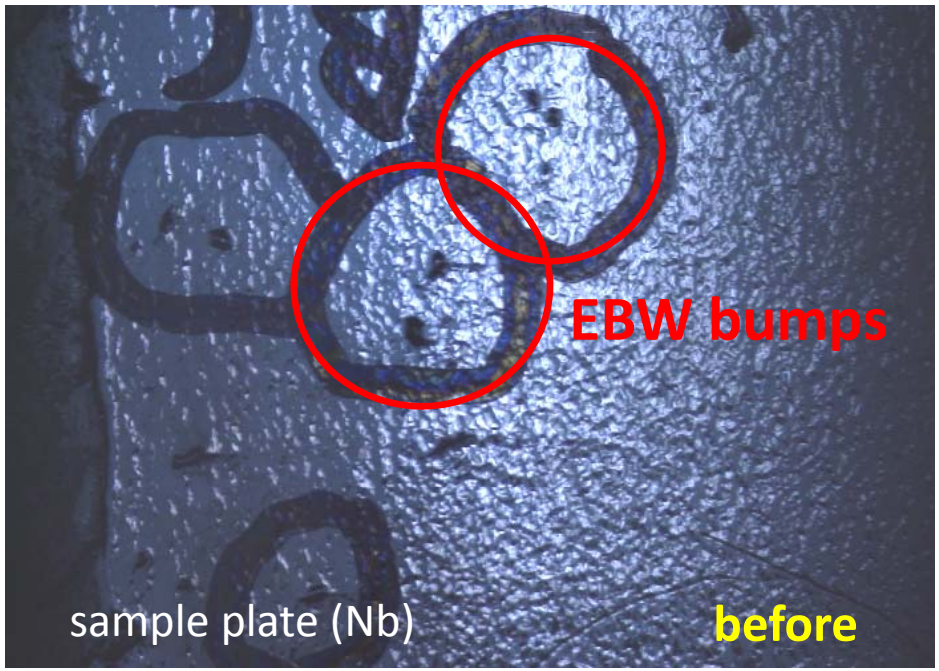
#400 (size = 40 ~ 60 um)

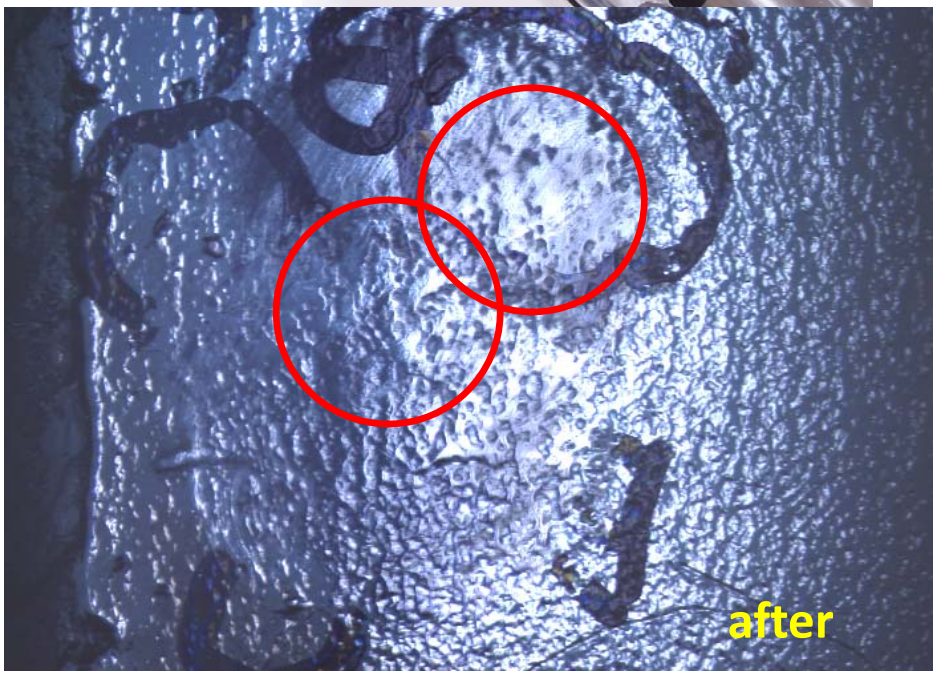
as for 1st test

Grinder Head with Diamond compound seat



Grinding machine was delivered in last week.





Cryomodule summary
from TTC (T. Arkan)

Cryomodule (TTC meeting)

XFEL Cryomodule R&D;

cavity preparation test for min. cost, min step.
module transport test.
tunnel mock-up.
HPV code test for Module 3*

CEA Saclay plan for module assembly (Thales)

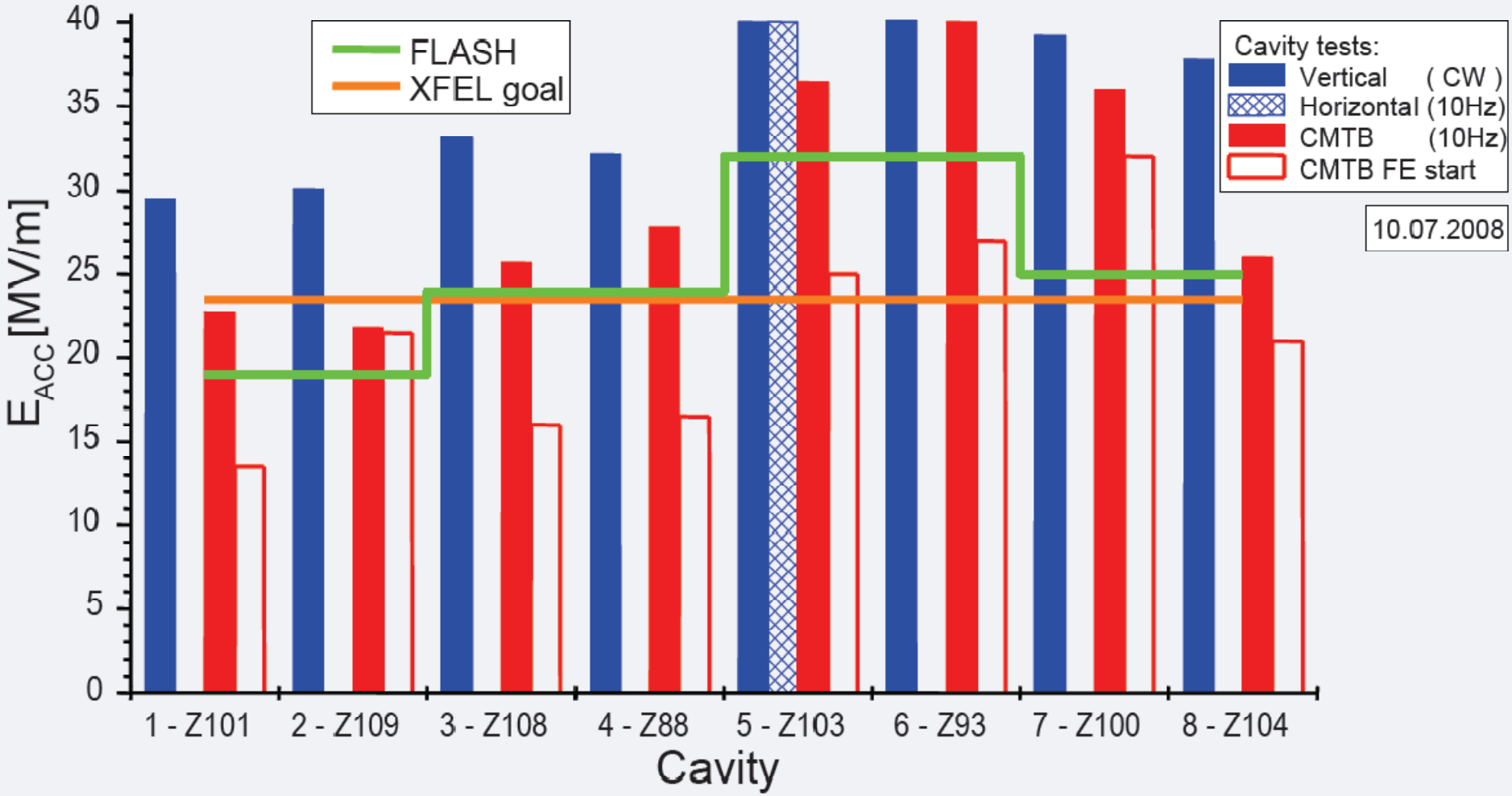
FNAL CM1 assembly and installation.

Gradient summary
from TTC (H. Padamsee)

S1 Results TTC Highlights

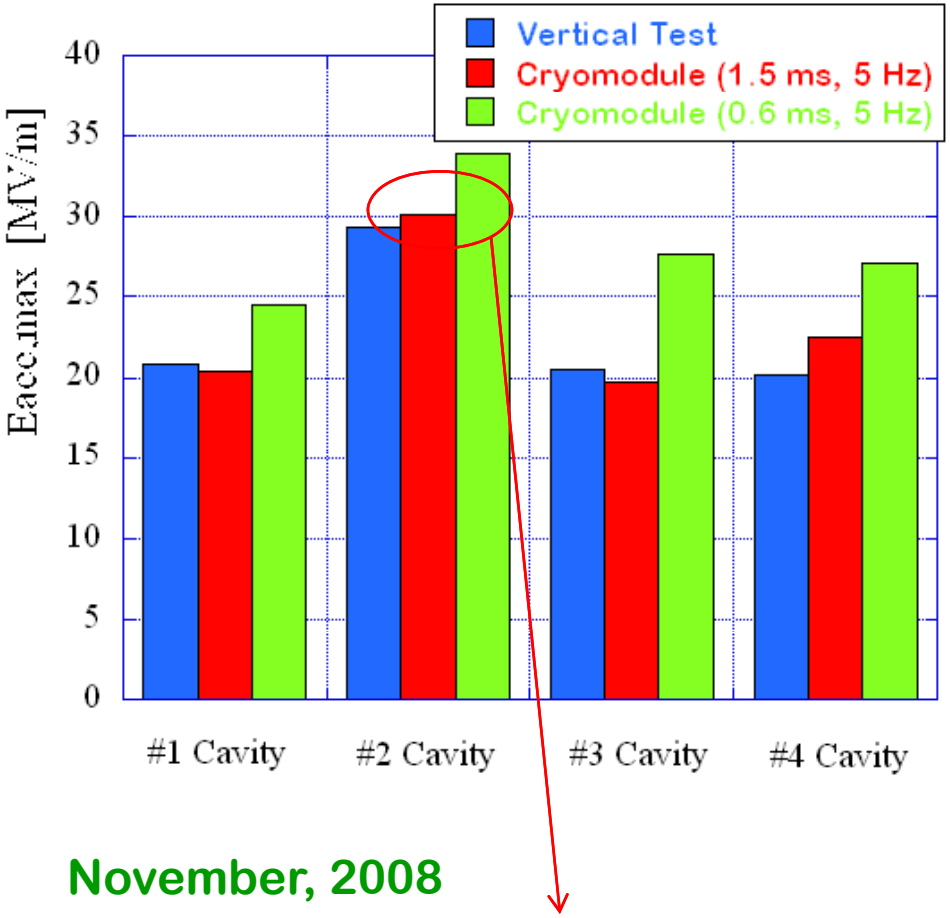
Module #8 test results

out-sourced module assembly (two groups), cavity venting is suspicious.



STF results (S. Noguchi)

KEK 4-cavity module test



Ave. Eacc,max (V.T)
= 22.7 MV/m

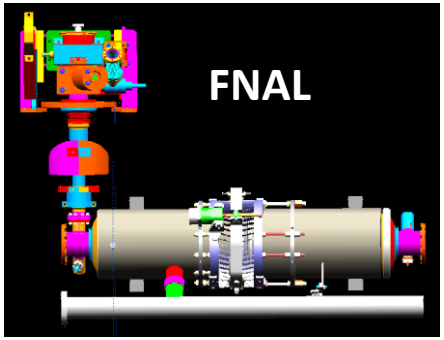
Ave. Eacc,max (Cryo.)
= 23.2 MV/m

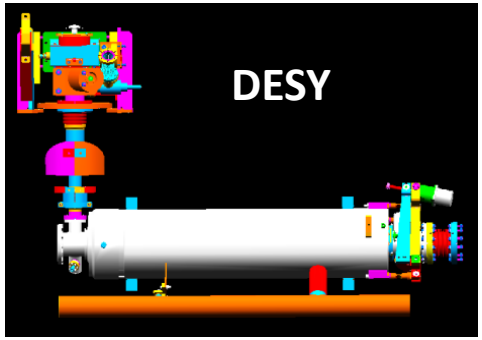
November, 2008

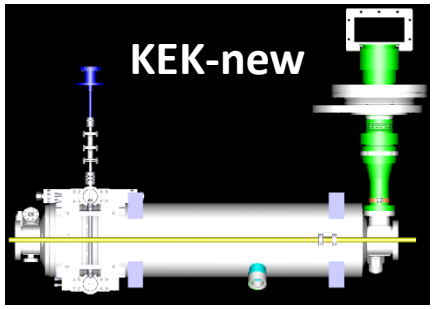
reached to 32MV/m operation
in this week.

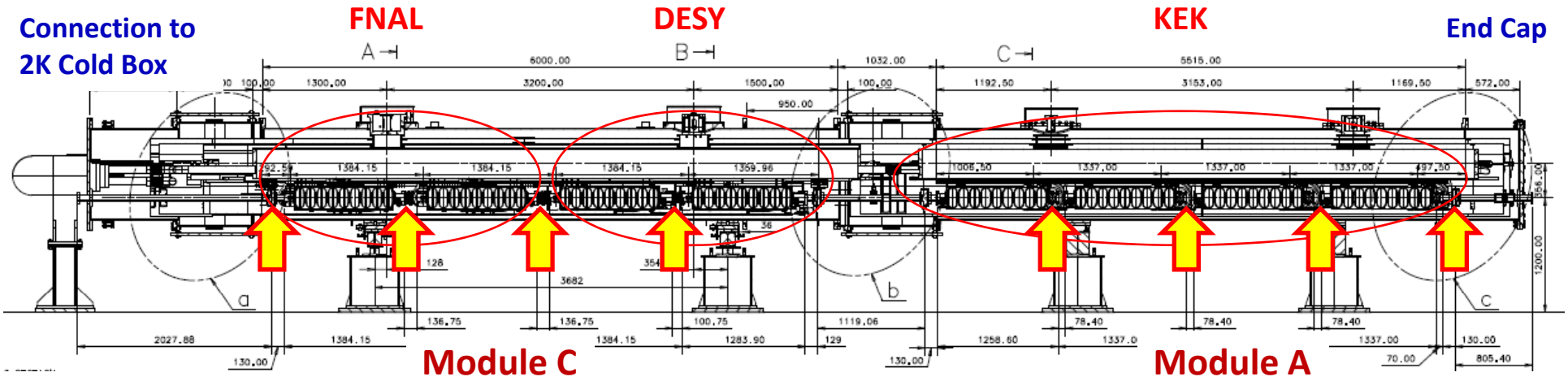
S1G plan (N. Ohuchi)

S1-Global Cryomodule design









- Module C: 2 FNAL cavities and 2 DESY cavities, Module A: 4 KEK Tesla-like cavities
- The total length=14978mm
  - Module-C = 6000 mm, Module-A = 5515 mm

S1G agreement document
(A. Yamamoto)

A Preliminary Draft proposed – 2008/11/16, and

to be discussed in the SCRF-WG session in ILC-08

To understand what is S1-Global;

description of contribution detail, experiment detail, time-lines,… are made to:

Agreement for S1 global Program

Draft C: 2008/11/16

Preamble

This is an agreement (proposed) among High Energy Physics Research Organization (KEK, Tsukuba, Japan), Deutsches Elektronen-Synchrotron (DESY, Hamburg, Germany), Fermi National Accelerator Laboratory (FNAL, Batavia, USA), SLAC National Accelerator Laboratory (SLAC, Stanford, USA), Istituto Nazionale di Fisica Nucleare (INFN, Milano, Italy) and Global Design Efforts (GDE) for the International Linear Collider, concerning the collaborative work on construction and operation (in 2008-2010) of two units of horizontal cryostats which house up to total eight 9-cell cavities at KEK. This work is done in the context of technical development coordinated by GDE for the International Linear Collider. The collaborative work covered by this MoU is called the "S1-global" collaboration. The institutions and the organization above (KEK, DESY, FNAL, SLAC, INFN and GDE) are henceforth called "the parties". This agreement defines the outlines of the goal, mission, timeline and work sharing during execution of the S1-global by the parties. This agreement is devised in the framework of ILCSC MoU, and in part by higher-level agreements on academic exchanges among participating parties.

Plug compatibility document
(A. Yamamoto)

Plug Compatibility

description of concept, interfaces, specification profiles,…

Interface points were agreed.
Specification tables were fixed so far, to be included in the document.

ILC-GDE Project Managers,

Marc ROSS, Nick WALKER, and Akira YAMAMOTO

17.11.08 , and updated 17.11.08

Introduction

The concept of "Plug Compatible" design was first proposed for the SCRF cryomodule in 2007. Since then significant progress has been made in defining the technical aspects of achieving modularity of sub-component design, primarily by identifying and specifying well-defined engineering interfaces and sub-component specifications. While the focus has been on the technical and engineering aspects, the scope of discussions on plug compatibility has expanded to include many issues that go beyond the current R&D phase, ultimately touching on globally distributed mass-production models and the role plug compatibility might play in 'in-kind' contribution scenarios to the construction project itself. These evolving concepts – although still relative immature – have been reported by the Project Management at several recent meetings and workshops. This has lead to questions and concerns from the community, in particular concerning the exact details of the role of plug compatibility in the various phases of the project. Many of the questions require detailed answers and raise valid issues. By its nature, plug compatibility remains "work-in-progress" and will require effort over the next year to clarify the critical points; this is especially true when discussing the longer term roles in industrialisation and mass-production models, which ultimately touch on project governance models, all of which are important components of the Project Implementation Plan (a key Technical Design Phase deliverable).

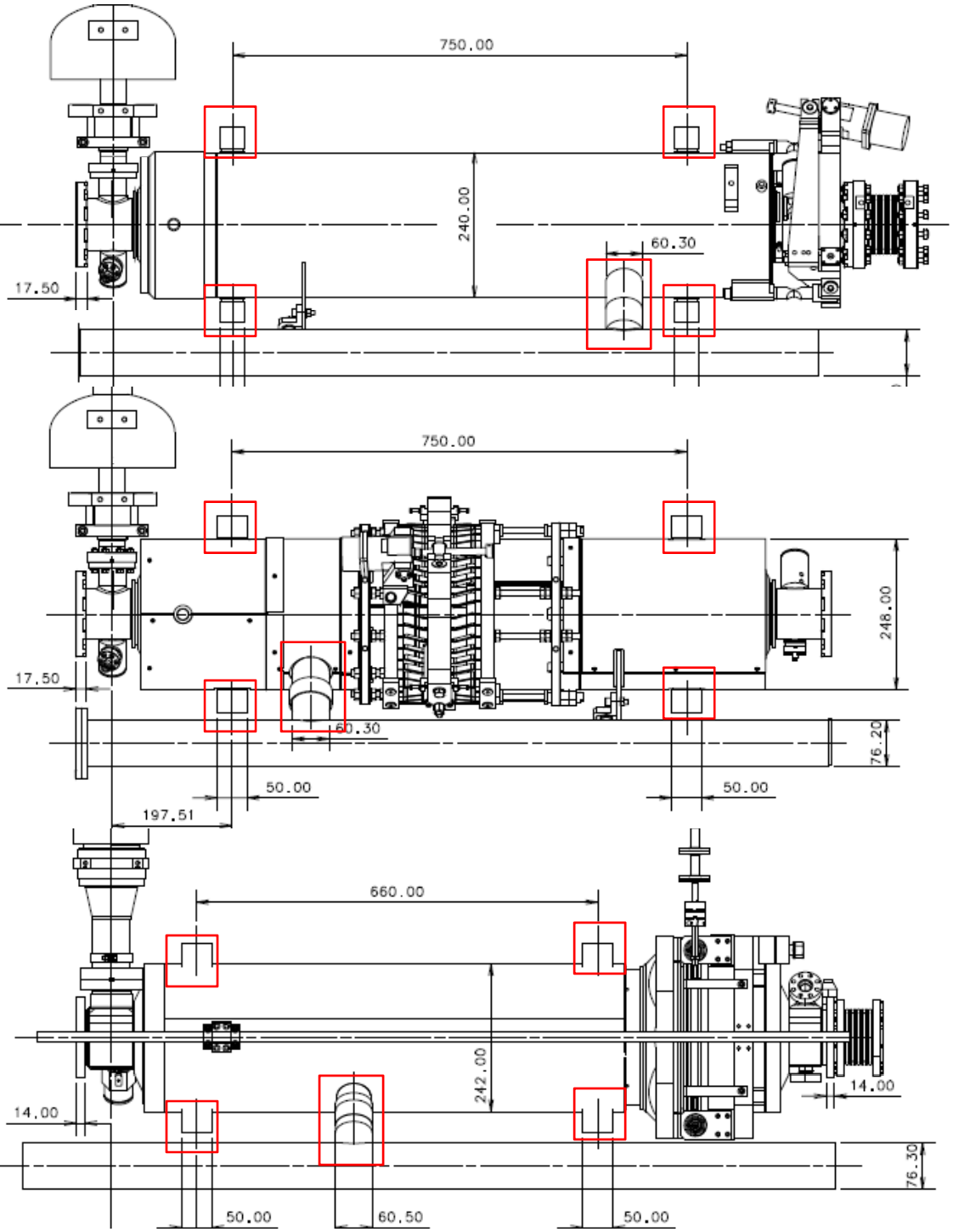
Cavity Package Interfaces at S1-Global

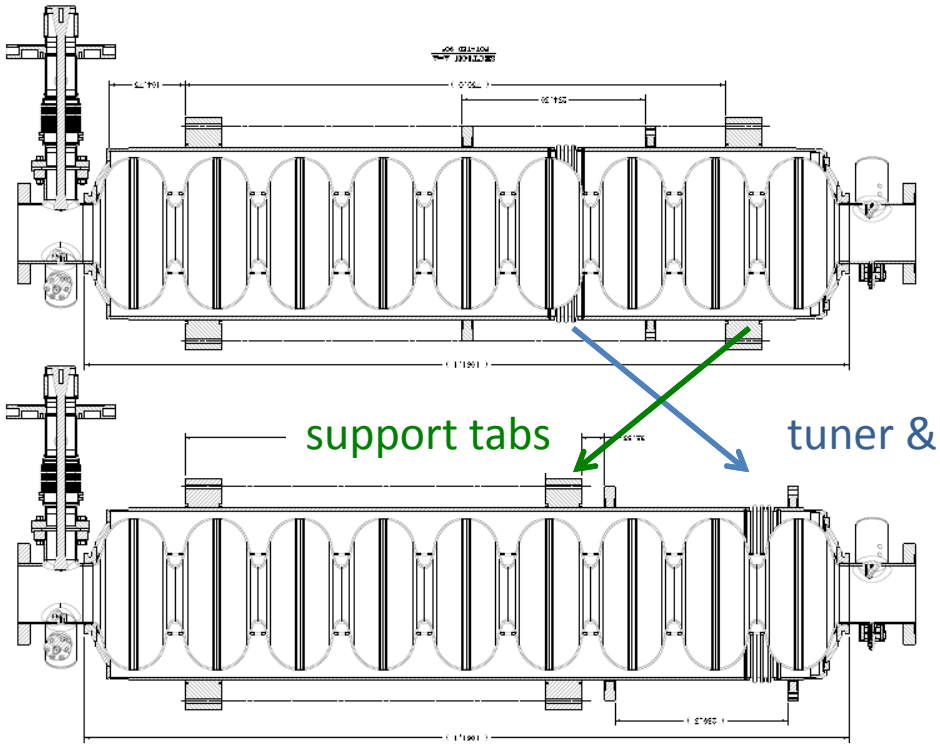
DESY-XFEL

Cavity-Jackets of three groups

FNAL-present

KEK-new





FNAL-present

FNAL-proposed

Discussion was made for;

Tuner performance (backlash, stroke, etc):

by C. Pagani, S. Noguchi, D. Mitchel

vessel support position, vessel bellows position,

and plug-compatibility of cavity package.

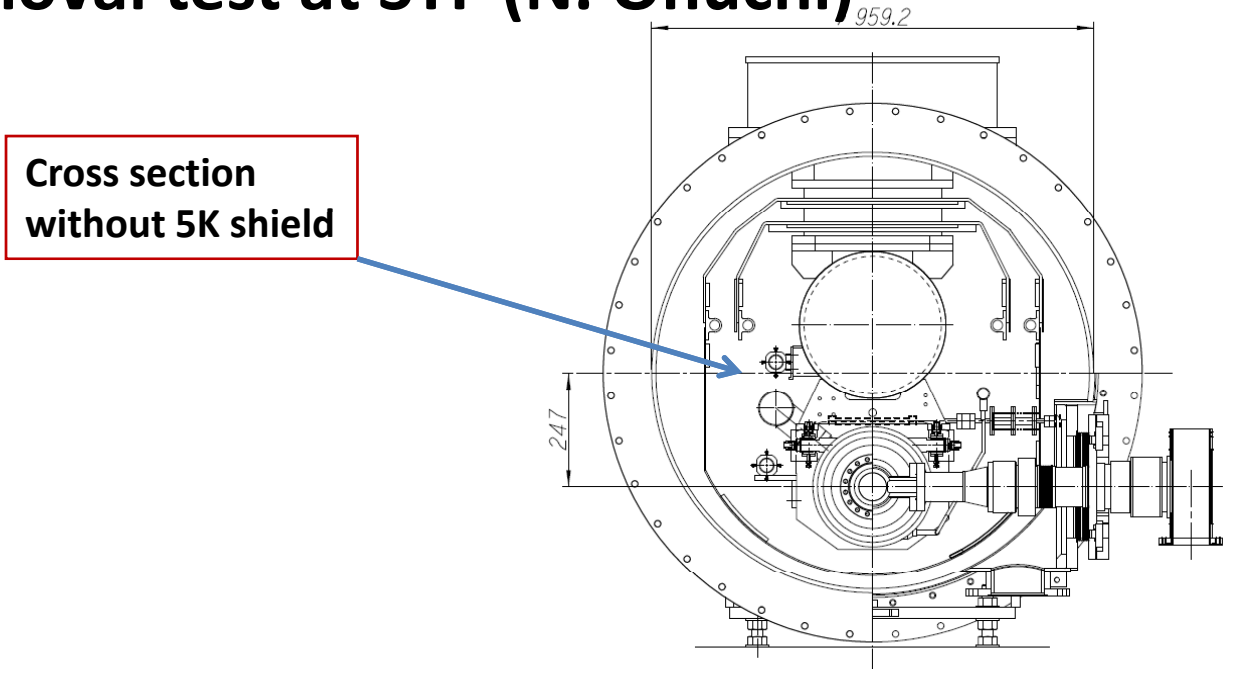
performance calculation and test is required

for the design change both for FNAL tuner, KEK tuner.

Heat load and HPV code

(1) RDR heat load was updated for coupler numbers and support numbers (T. Peterson).

(2) 5K shield removal test at STF (N. Ohuchi)



(3) JLab upgrade (D. Arenius), HPV code (T. Nicol), material test (H. Nakai), were reported.
Discussion will continue by weekly meeting.

Summary of major discussion

(1)Gradient limitation by Pits and Bumps

more data points (inspection picture & T-map)
good correlation between T-map & optical inspection.
development of repair tools.

(2) Plug compatibilities

discussion on tuner, vessel support position
and input coupler port diameter.