

WG3: Main Linac SCRF(cavity,cryomodule)

High-lighted discussion only

H. Hayano, C. Nantista, C. Pagani

March 30, 2010

March 28, Sunday

Cavity (gradient effort)

Summary of understanding of quench limit in 9-cell cavities using T-mapping and optical inspection

Latest 9-cell cavity testing results from FNAL

Recent cavity test results from KEK

New results on field emission suppression

Comparison EP processing parameters at KEK and JLAB

IHEP high gradient efforts on 1.3 GHz 9-cell cavity for ILC

Efforts on the R&D of SRF cavity at Peking University

Replica-method and local grinding repair

Review of plans for upcoming cavity processing and testing

Status report of Cornell activities

Status report of DESY activities

Update on global cavity database and yield evaluation

discussion

Yasuchika Yamamoto, Sebastian Aderhold

Joe Ozelis

Eiji Kako

Rongli Geng

Takayuki Saeki

Jie Gao

Ke-Xin Liu

Ken watanabe

Camille Ginsburg

Zack Convey

Eckhard Elsen

Yasuchika Yamamoto, Camille Ginsburg

Cavity Integration (Operational gradient re-evaluation, Test facilities)

Operational Gradient re-evaluation discussions

ILC Gradient R&D status and challenges

Gradient strategy proposal

discussion

Test facility status, tuner&coupler plug-compatibility discussions

Status of NML

Status of STF

R&D status in INFN Pisa

Plug-compatibility document

Rongli Geng

A. Yamamoto

Bob Kephart

Hitoshi Hayano

Carmine Elvezio Pagliarone

H. Hayano

**Joint with BDS
for 10Hz operation
at Low-energy**

March 29, Monday

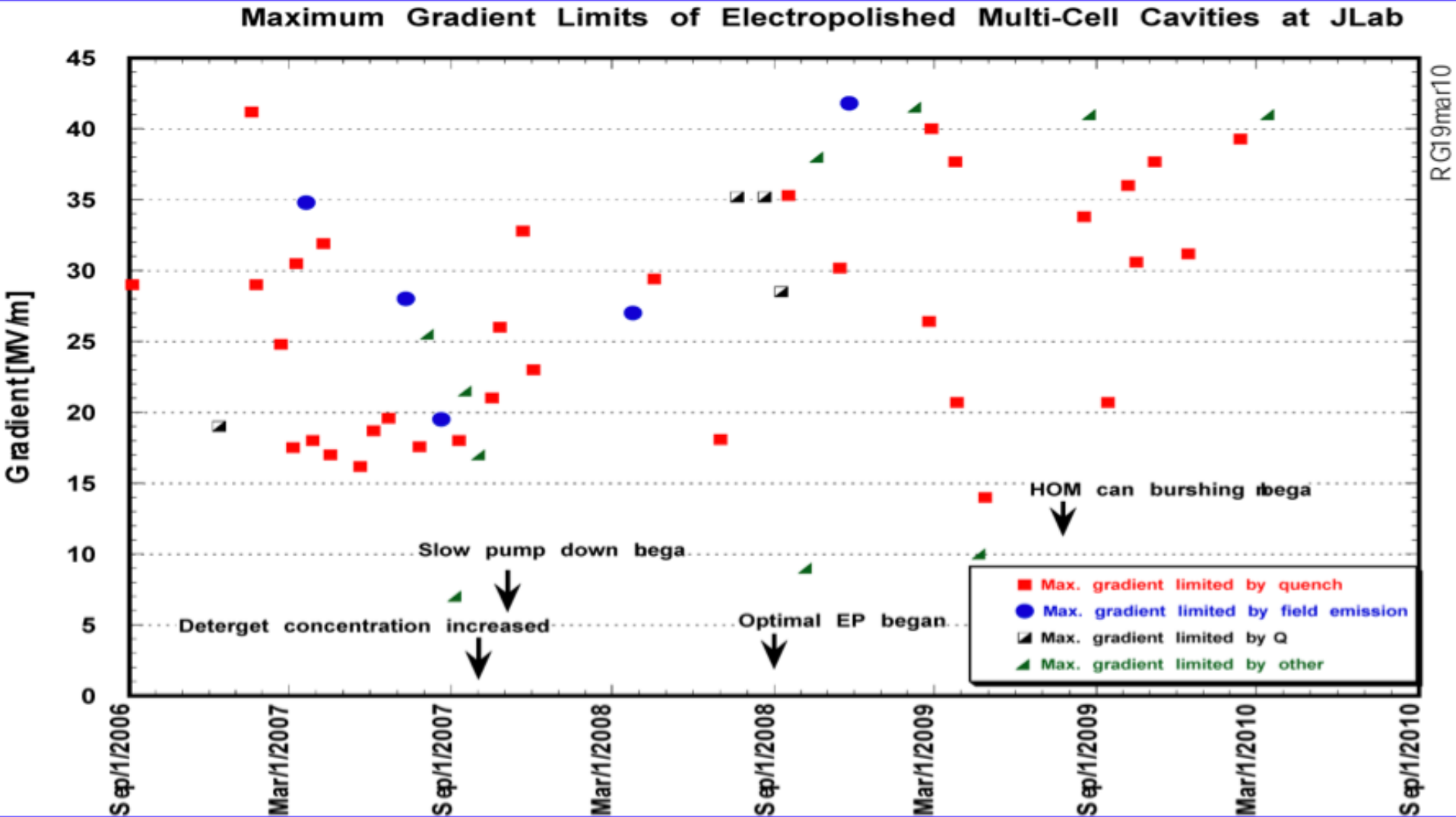
Cryomodule, Cryogenics (S1-Global experiment)

S1-G Cryomodule assembly status	Norihito Ohuchi
S1-G Cavity assembly status	Eiji Kako
S1-G RF preparation	Shigeki Fukuda
Proposal of experiment schedule of S1-G cryomodule	Hitoshi Hayano
Cavity test plan	Eiji Kako
RF test plan	Shinichiro Michizono
Cryomodule thermal test plan	Norihito Ohuchi

Industrialization (preparation of industrialization for cavity, cryomodule)

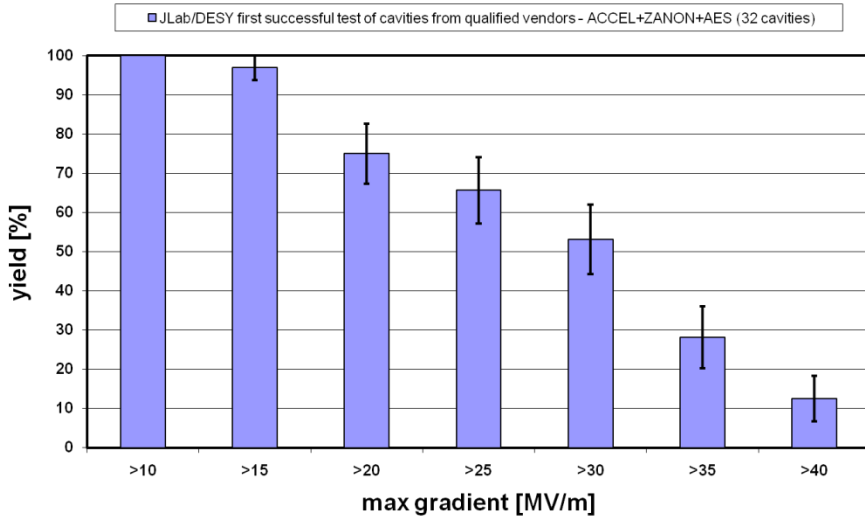
FNAL industrialization study status	Bob Kephart
KEK industrialization study status	H. Hayano
Status of XFEL module assembly facility at Saclay	Olivier Napoly
For IPAC industrialization session	Jim Kerby

Maximum Gradient in EP Multi-Cell Cavities

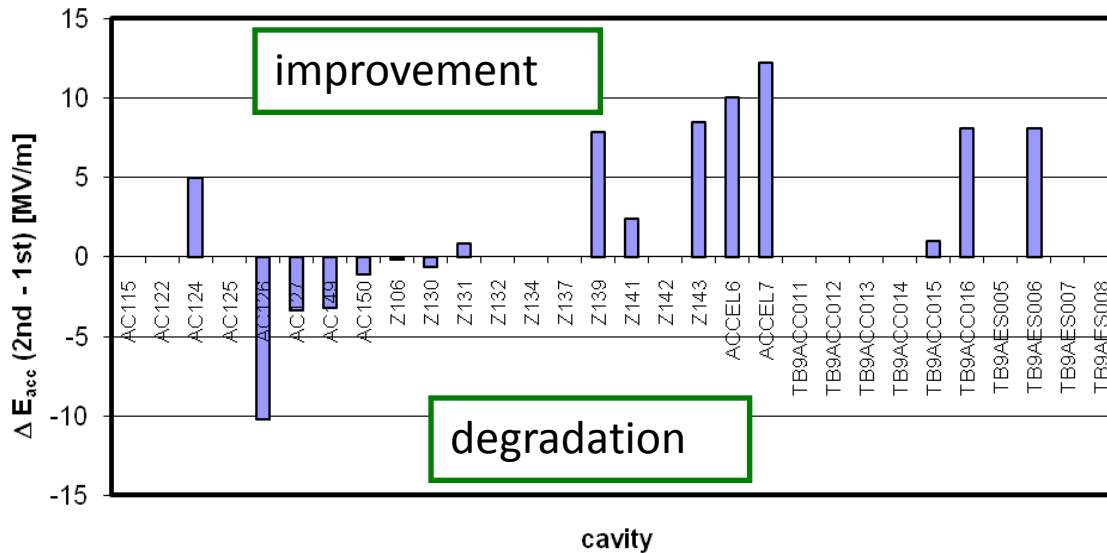
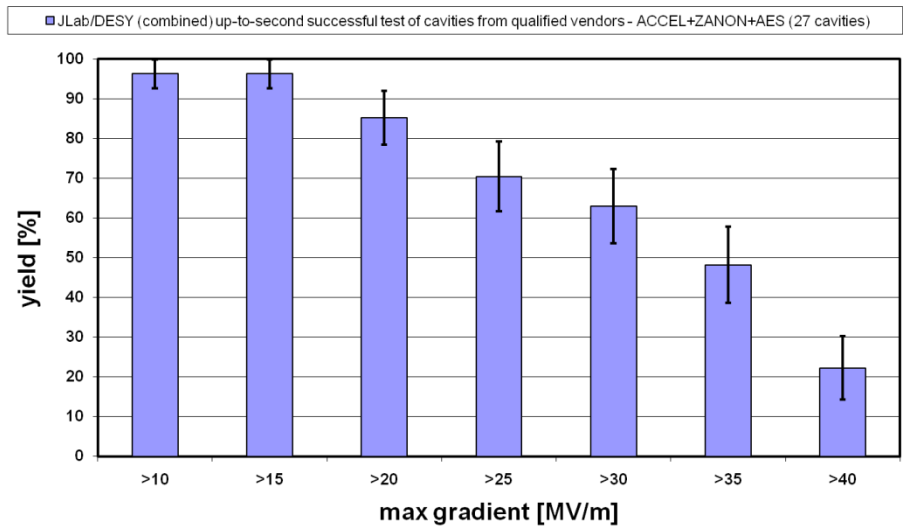


Compare 1st and 2nd pass yields

Electropolished 9-cell cavities



Electropolished 9-cell cavities



Yield as a Function of Time (one way of looking at it...)

	yield for [%]			
	>25 MV/m		>35 MV/m	
	1st pass	2nd pass	1st pass	2nd pass
ALCPG-Albuquerque 1.Oct.2009	63+-10	67+-10	23+-9	33+-10
AAP-Oxford 6.Jan.2010	63+-9	64+-10	27+-8	44+-10
LCWS-Beijing 28.Mar.2010	66+-8	70+-9	28+-8	48+-10

NB: errors are very strongly correlated

Within the very limited additional statistics accumulated over the last six months there appears to be improvement in the yield



A Proposal for Cavity Gradient

- Appropriate balance should be re-considered b/w
 - R&D stage and Project stage
 - Components and Accelerator System Operation
- A new guideline toward TDP-2 and TDR
 - R&D Goal for Cavity Gradient (unchanged) : 35 MV/m (@ 90 % yield)
 - Guideline for System Engineering to be updated:

$$\begin{aligned} - G_{\text{Cavity}} &> G_{\text{Cryomodule}} > G_{\text{ILC-operation}} \\ - <35 \text{ MV/m}> &: <33 \text{ MV/m}> : <31.5 \text{ MV/m}> \end{aligned}$$

- Our homework
 - **How much gradient spread to be allowed?**
 - To be optimized within 10 – 20 % in balance of RF distribution efficiency
 - **Can we justify the above operational margins?**
 - ~ 5 % in Cavity (itself) operational margin in cryomodule operation
 - To prevent excessive field/field-emission/cryogenics-load and quench
 - ~ 5 % in LLRF/HLRF and beam tune-ability and operational margin or overhead
 - We shall learn FLASH/NML/STF progress in TDP-2

Expansion of NML Facility

B. Kephart



New Cryoplant & CM Test Facility

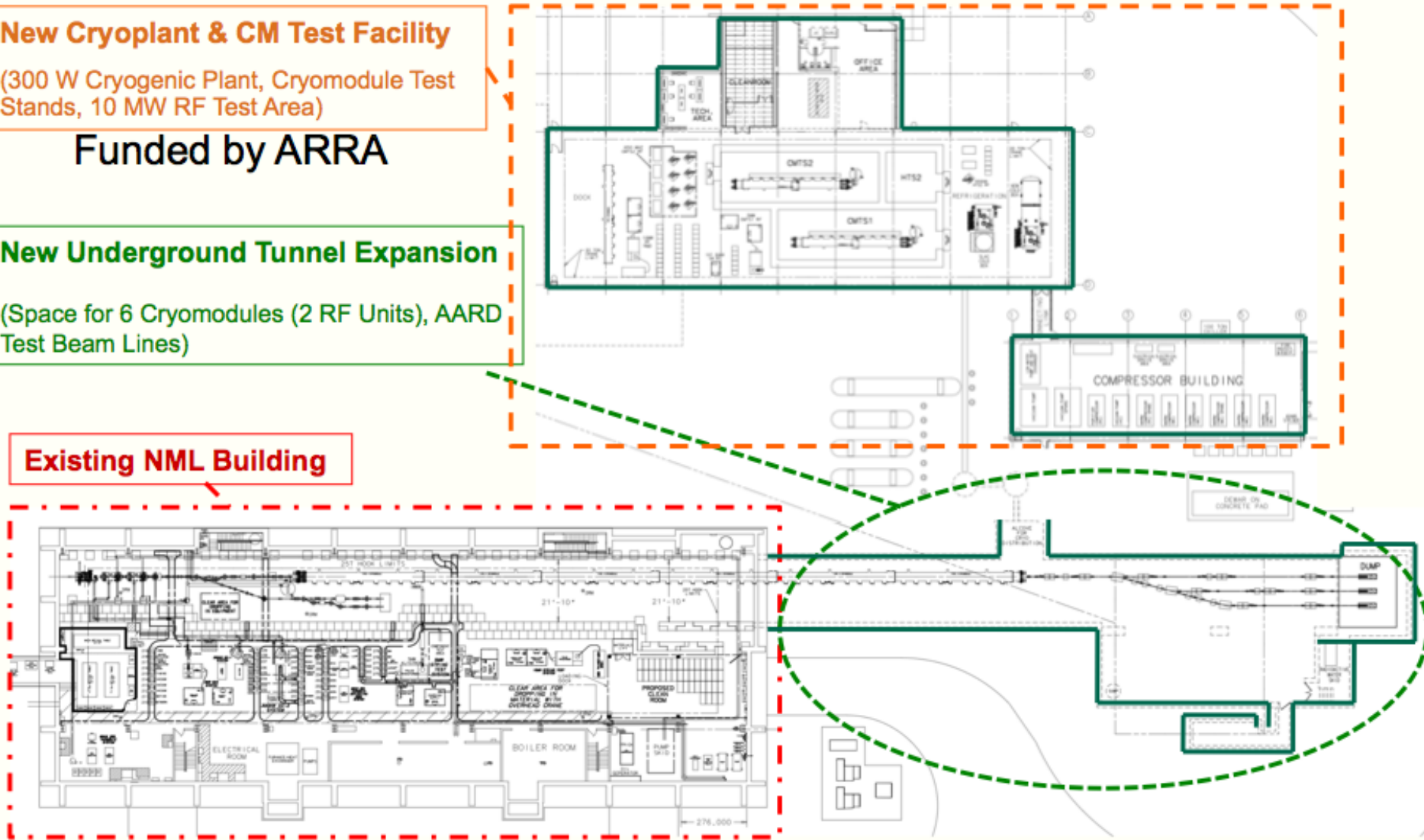
(300 W Cryogenic Plant, Cryomodule Test Stands, 10 MW RF Test Area)

Funded by ARRA

New Underground Tunnel Expansion

(Space for 6 Cryomodules (2 RF Units), AARD Test Beam Lines)

Existing NML Building

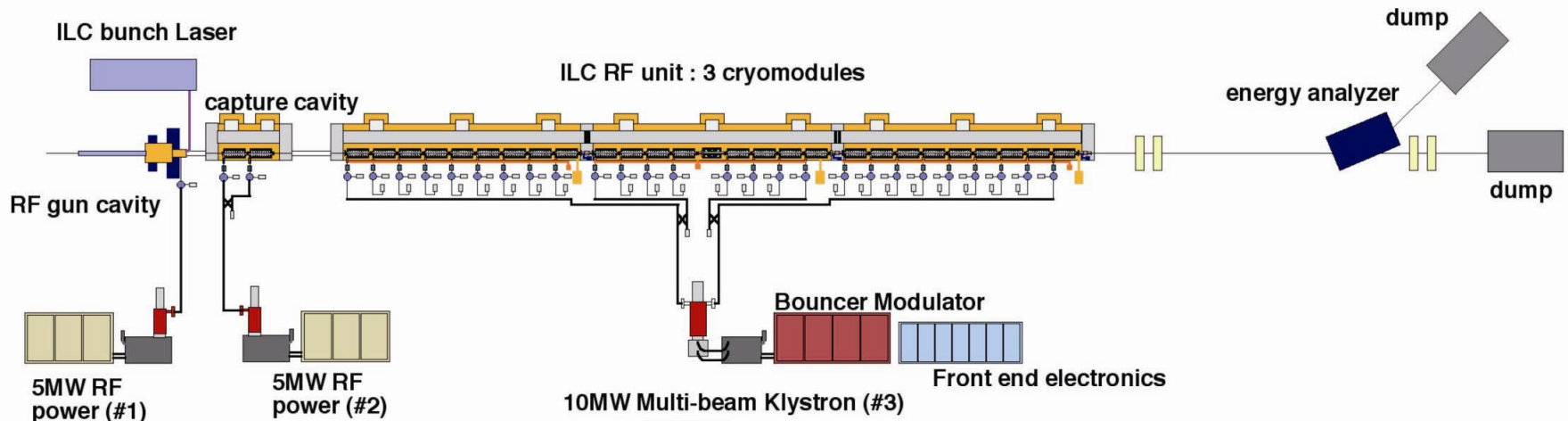


March, 2010

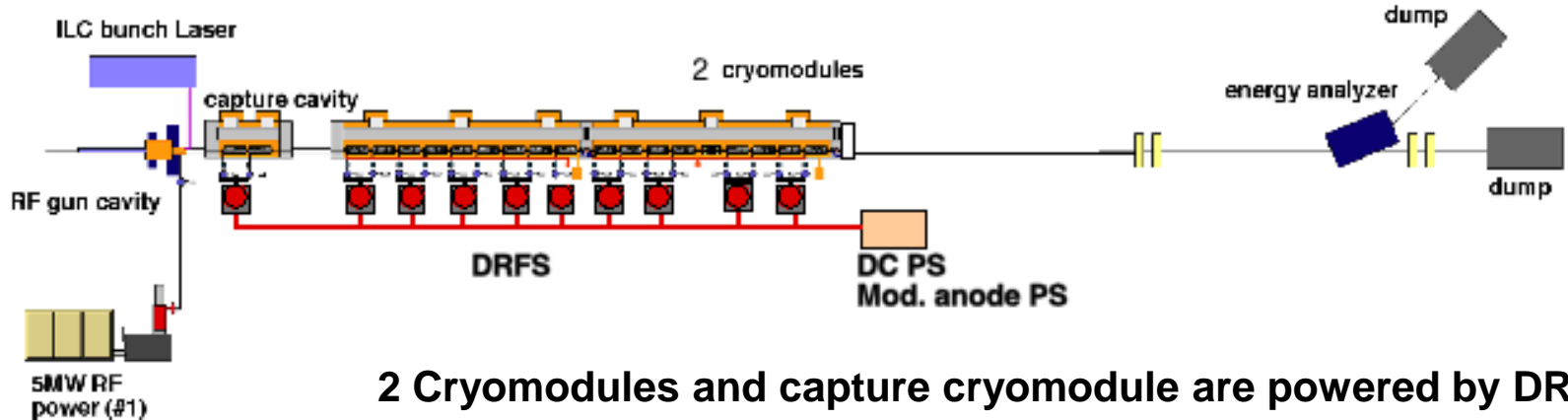
LCWS 10

STF phase2.0 accelerator: discussion for change is on going

STF Accelerator Plan



STF Phase 2 Plan



2 Cryomodules and capture cryomodule are powered by DRFS.

17th, January
2010'



Patrick Schilling (DESY)

Marco Battistoni (FNAL)

Brian Smith (FNAL)

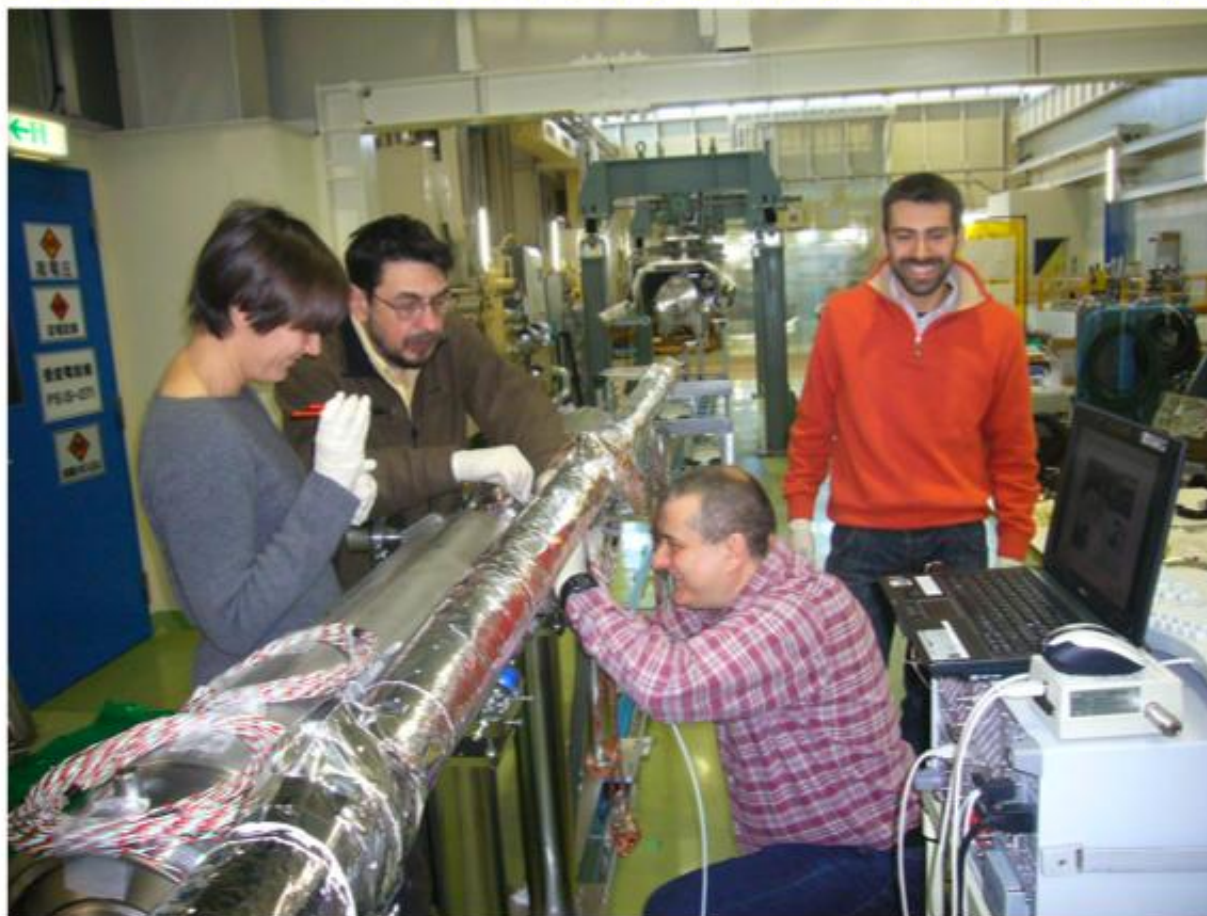
Shuichi Noguchi (KEK)

Tug Arkan (FNAL)

Manuela Schmoekel (DESY)

Eiji Kako (KEK)

2010'
08th, Feb



Carlo Pagani (INFN)

Rocco Pararella (INFN)

Serena Barbanotti (FNAL)

Angelo Bosotti (INFN)



March 19th , 2010'

Denis Kostin (DESY)

Cavity, cryomodule: WG Summary

- 1. World-wide gradient R&D are reviewed.
Gradient performance improved by many effort of Jlab, and other Lab.
15% yield improvement of 2-nd pass, in 6 month.**
- 2. Proposal of cryomodule gradient spec. 33MV/m.**
- 3. Test facilities: Good prospect of FNAL-NML, under replanning in KEK-STF.**
- 4. S1-Global cryomodule assembly is on schedule by international collaboration.**
- 5. Industrialization effort in FNAL, KEK, Saclay are presented.**