

Current Activities at LANL

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ILC SRF R&D Meeting (Telecom.), 1 June 2006

LA-UR-06-3799

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Support for the ILC Electro-Polishing (EP) System and Process Development

- Contract with FNAL was awarded in April 2006
- Scope of work
 - Document the specifications for the EP parameters and other important issues on EP
 - Represent FNAL for the EP of ILC cavities at JLab
 - Assist design and fabrication of new EP facilities in the US and elsewhere

Visited JLab (April 2006), KEK (May 2006) and Nomura Plating Company (May 2006)

- JLab (April 4-6, 2006)
 - They have two 9-cell TESLA cavities from DESY
 - Preparation for the EP system nearly complete using one of the 9-cell cavities
 - RF cold test with one 9-cell cavity was about to start. They will test this cavity without EP about 10 times to confirm the data reproducibility of the process after the EP.
 - The photos and videos taken during my visit are posted at <http://ilc-dms.fnal.gov/Members/tajima/lab-activities/jlab/> in the “April 2006 Activities” folder and “Week: 3 April 2006” subfolder.

KEK Visit on 8 May 2006

- Invited to the ILC Asia WG5 bi-weekly meeting run by Kenji Saito.
- Few people might know the web site for this meeting presentations. (They are making a good effort to write presentations in English!!)

<http://lcdev.kek.jp/ILC-AsiaWG/WG5notes/>

- **There have been 38 meetings so far and there are interesting presentations.**
- **Bookmark it to keep track of KEK activities and results.**

Nomura Plating Company Visit on 9 May 2006

- Kenji Saito and I drove from KEK to the company. It took us about 1 hour 40 minutes.
- Discussions on the EP at JLab and on the DESY single-cell cavity results. Both DESY and KEK results show no Q disease on single-cell cavities.
- We looked at the EP facility and other facilities. The EP facility is about 25 years old. I signed a document that requires that I do not take any photo, sketch, notes and do not disclose any technical detail that I saw during the facility visit.

Relationship between Nomura Plating Company and JLab EP operations

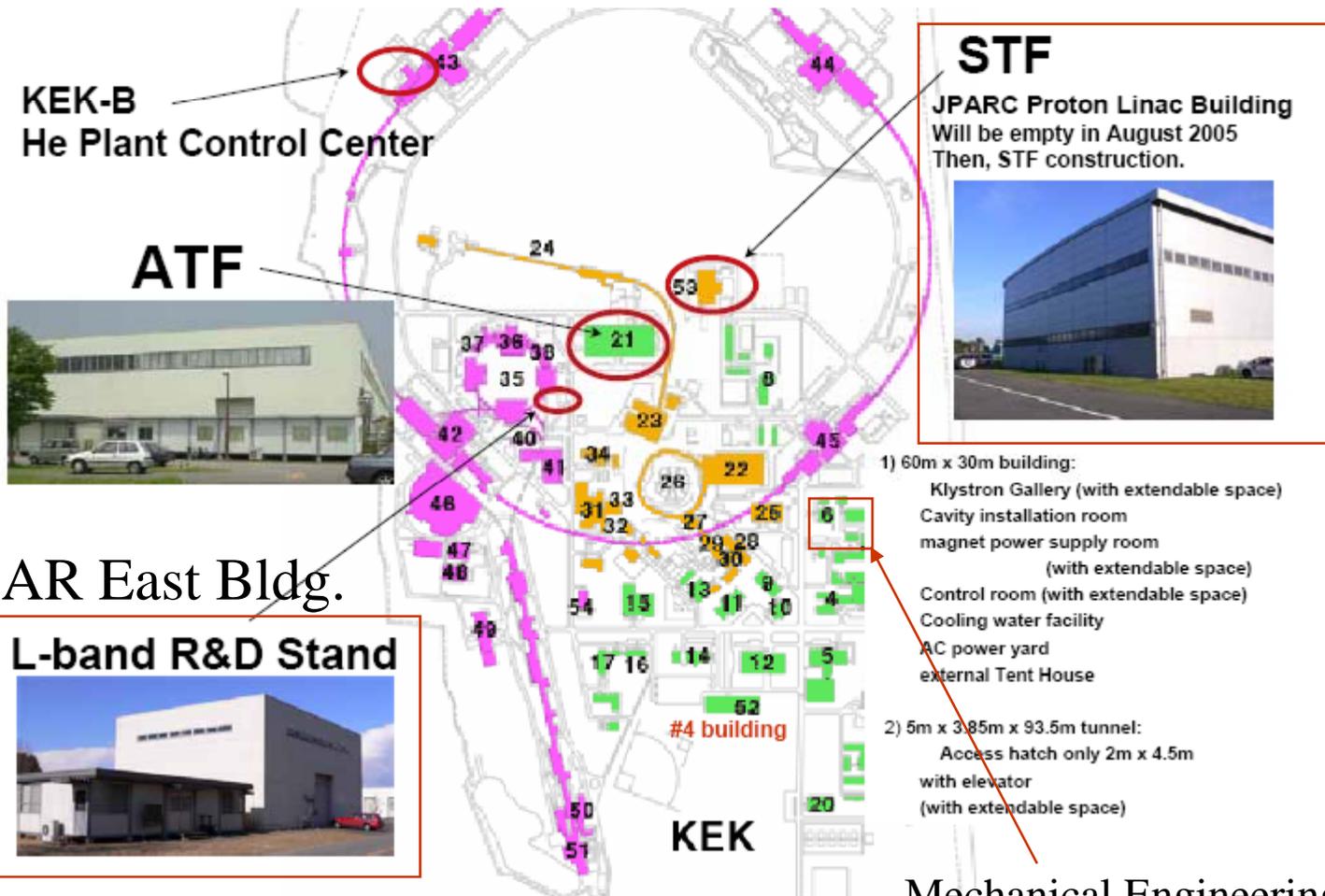
- John Mammosser stayed at KEK for one month a few years ago, visited Nomura and learned EP operation from KEK and Nomura Plating Company.
- JLab purchased some parts from Nomura Plating Company such as end groups made of Teflon.
- The present understanding of the transfer of technical know-how's is that the techniques that John learned while he was at KEK can be used at JLab. The present technology, if any, will not be transferred without consent from KEK and Nomura except that any information in published documents can be used.

KEK Facilities

H. Hayano, "STF Plan Overview," LCPAC, 25 Feb. 2006

Visited Facilities

Location of Test Facilities



AR East Building for ILC SRF Cavity Development

- This building houses a clean room, 2 Centrifugal Barrel Polishing (CBP) machines (one for 1-cell, the other for 9-cell), vertical test stands, vertical cryostats, pre-tuning instrument and a test control room.
- A horizontal cryostat for cold testing a tuner that Higashi-san has developed was located temporarily.



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Centrifugal Barrel Polishing (CBP) Machine



A movie showing how it operates can be downloaded at <http://ilc-dms.fnal.gov/Members/tajima/lab-activities/kek/DSCN1962.MOV/download>

- Polishing speed ~5 microns/h [1].
- This has been part of the standard KEK recipe for high gradient cavities.

Reference

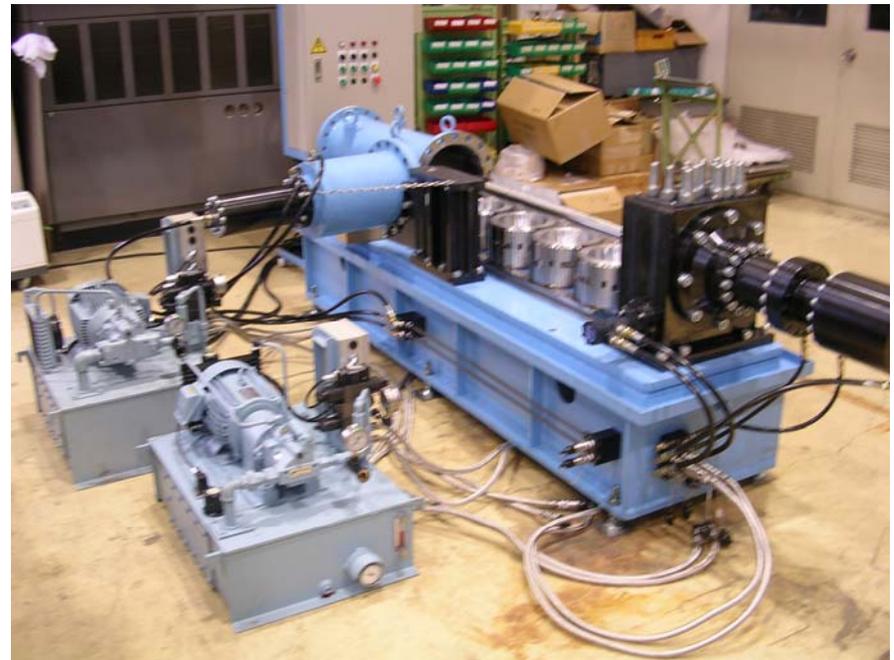
- [1] Higuchi, T. et al., "Centrifugal Barrel Polishing of Lband Niobium Cavities," Proc. 10th Workshop on RF Superconductivity, Tsukuba, pp. 431-432 (2001).

KEK Facility Visit: Mechanical Engineering Center – Nb/Cu Seamless Cavity Development



A 3 mm Cu/1 mm Nb bonded pipe undergoes necking and hydro-forming.

A new hydro-forming machine was installed on 1 May 2006



A new dedicated vacuum furnace for the cavity heat treatment



Work zone length: 3 m

Work zone diameter: 0.5 m

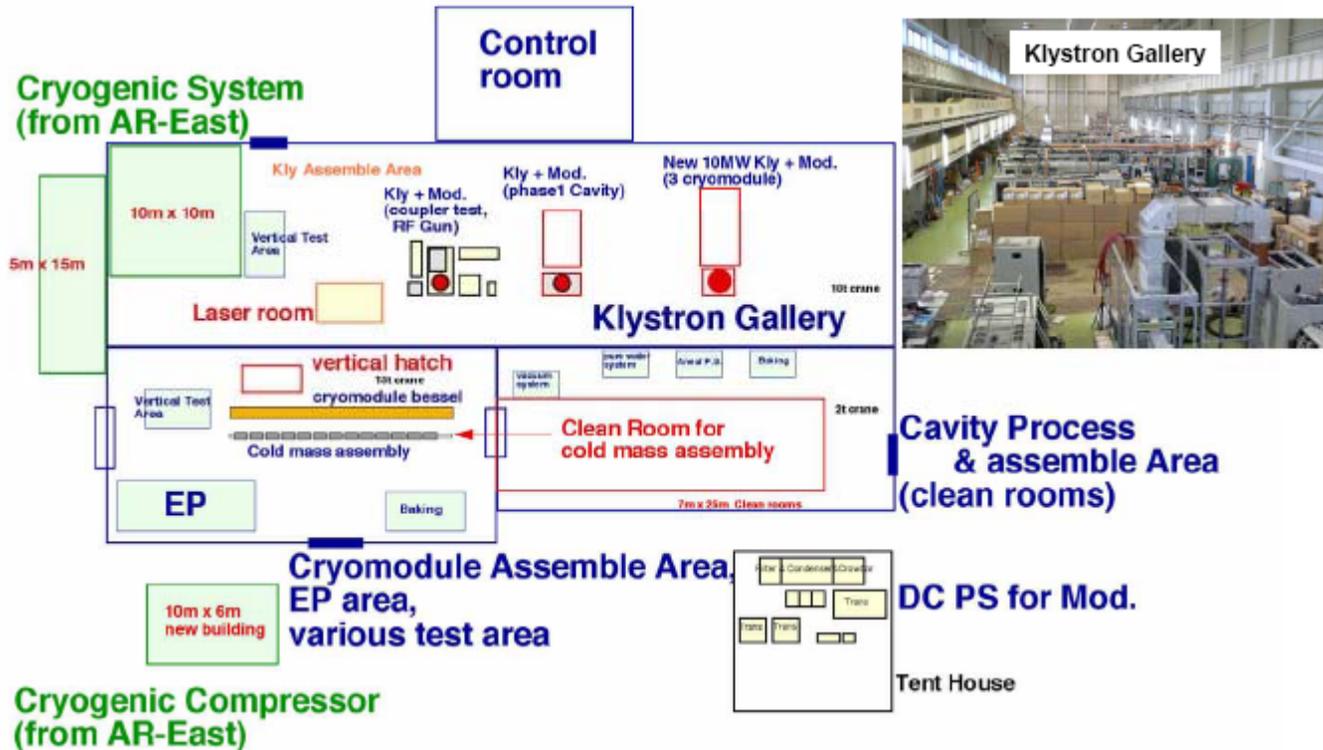
Maximum Temperature: 800 °C

Vacuum during heat treatment: $\sim 2 \times 10^6$ Torr

Superconducting RF Test Facility

Comprehensive Test Facility dedicated to ILC SC-RF R&D

STF Building plane view



V3.0 Hitoshi Hayano, 02/20/2005

H. Hayano, "STF Plan Overview," LCPAC, 25 Feb. 2006

Superconducting RF Test Facility (STF)

<http://lcdev.kek.jp/STF/>

- The clean room has been completed
- High-pressure water rinsing equipment will be completed by July 2006
- An Electro-Polishing system will be installed by March 2007. According to Kenji,
 - The conceptual and detailed design have been done by KEK in collaboration with Nomura. The conceptual design is complete. (This cannot be open to public.)
 - Plan: Open for bid in June 2006 and contract award in September 2006.
 - The planned through put is 1-2 EP's a week.
 - Based on the experience with this system, they will consider a system for the future large scale operations.

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Completed Clean Room in STF



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STF Tunnel for the Installation of Cryomodules



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A Hole on the Ceiling of the Tunnel for Transporting Cryomodules from the Ground Floor



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Other Activities at LANL: Proposing to re-start the SRF cavity tests in FY07 (Facilities are in a stand-by state)

2600 ft² class-100 Clean room, 10-ft high

Ultra-pure water with 2000 G/day and 1500 G storage tank

38" cryostat inserts

Vertical cryostats with movable radiation shield

High-pressure rinse in a clean room.

Pumps for cryostats

Control, tuning

140 ft.

100 ft.