Meeting with Japanese Delegation
February 7, 2005

JLab SRF R&D Programs

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Participation in the Japan-US ILC Collaboration

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Outline

- Developing world consensus
- JLab SRF Nuclear Physics mission
- JLab SRF programs:
  - Research initiatives
  - Development activities
- Opportunities for collaboration

Developing World Consensus

- Accelerating gradients > 40 MV/m seem achievable
- Routine production of even 28 MV/m is not secure
- R&D program directions:
  1. Immediately and aggressively pursue opportunities for developing reliable processes and procedures that result in cavities and cryomodules that perform routinely with $E_{acc} \geq 35$MV/m. Involve industry and transfer technology as rapidly as possible.
  2. Continue development of new cavity shapes that enable higher gradients

JLab SRF Nuclear Physics Missions

- **Completion of 12 GeV cryomodule prototype, *Renascence*:**
  - **$E_{acc} \geq 20$ MV/m;**
  - **$Q_0 \geq 8 \times 10^9$;**
  - **cw @ 1497 MHz**
- **Setting up to reprocess existing CEBAF cryomodules (first module becomes available May 31, 2005):**
  - **$E_{acc} \geq 12.5$ MV/m;**
  - **$Q_0 \geq 5 \times 10^9$**
- **Meeting these commitments and the research program will require processing of many cavities**

We intend to use this flow of cavities through our processing infrastructure to better understand and improve processes and procedures.

JLab Research Directions

- Modified cavity geometries for lower loss and higher gradient
- Improved surface processes:
  - Electropolish
  - Low temperature baking
  - Large grain Nb sheets
  - Spun & hydroformed cavities (collaborations)
  - Nb-clad copper cavities
  - Laser and electron beam glazing
- Surface science studies in support of improving surface processing
- Improved HOM damping
- Simplified input and output coupling geometries

JLab Development Efforts

- Improving understanding and efficiency of high-pressure, ultra-pure, water rinsing
- Improving understanding of clean room conditions
- Improving assembly processes for reduced particulate generation and surface contamination
- Improving vacuum system cleanliness and control
- Superconducting joints and bellows
- …

Topics for Discussion

- **Areas of overlapping interest with KEK and ILC-Asia**