ILC Cavity and Cryomodule (S0-S1-S2) R&D in USA

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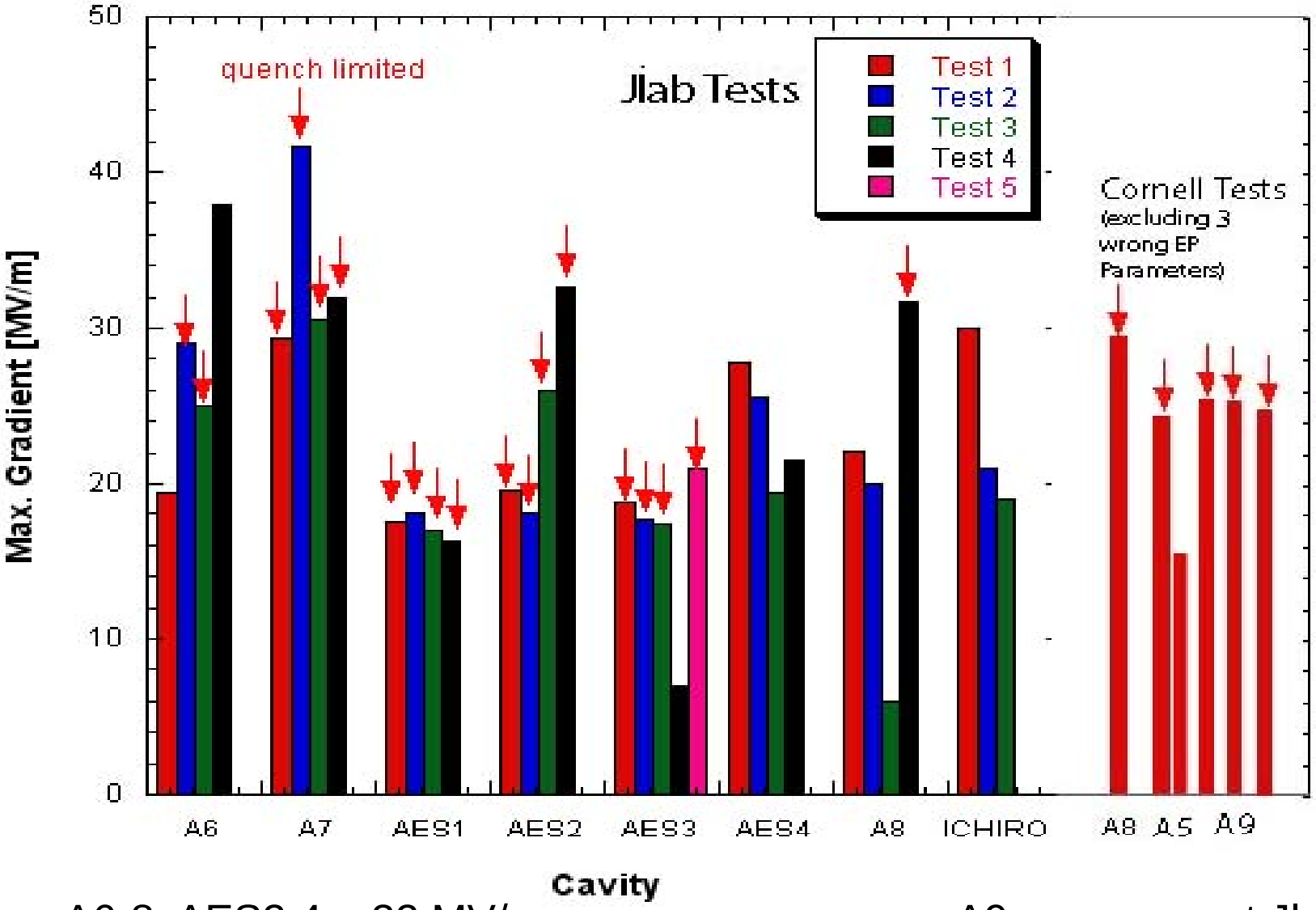
High Gradient Cavity Activities

- **Cavity inventory:**
  - **Fermilab in collaboration with Jlab, Cornell and ANL has 5 high gradient cavities already processed.**
  - **Fermilab has 26 (ILC length, 9-cell) cavities on order. 20 from ACCEL and 6 from AES. They will start arriving in March 08.**
- **In FY08, with remaining US-ILC funds Fermilab is going to restart 1.3 GHz cavity processing in spring 08.**
  - **We are planning ~15 cycles total using the cavities coming from ACCEL and will be used to populate CM2.**
  - **These processing will use S0 recipe but will not be "Tight Loop"**
- **US proposes a plan of about 60 processing and testing cycles for FY09 in support of S0 (40 R&D) and CM (20) fabrication.**
- **FY10 and beyond is proposed at this level in support of the High Gradient R&D.**

9-cell Test Results



Average A6-8, AES2,4 = 32 MV/m

A9 reprocess at Jlab

High Gradient Cryomodule Plans

- **Fermilab has ordered all the parts for the CM2 except He vessel.**
  - **This will be Type-III+ Cryomodule. Goal is to make a S1 Cryomodule.**
  - **We are going to use already existing 5 high gradient cavities plus 3 from the batch we will process in 08 and early 09.**
  - **Cold Mass and Tuners are being fabricated under Fermilab-INFN MOU**
  - **All hardware except He vessels will be here by end of summer 08.**
- **Two (9-cell, 1.3 GHz) cavities will be dressed and Horizontally tested in FY08.**
- **Build CM2 in FY09.**
- **Order cold mass parts for CM3 in FY09.**
  - **We already have cavities (not processed),**
  - **Couplers.**
  - **CM hardware (He Vessel, Tuner etc.) are being fabricated under the Fermilab-India laboratories collaboration.**
- **Build CM3 in FY10**

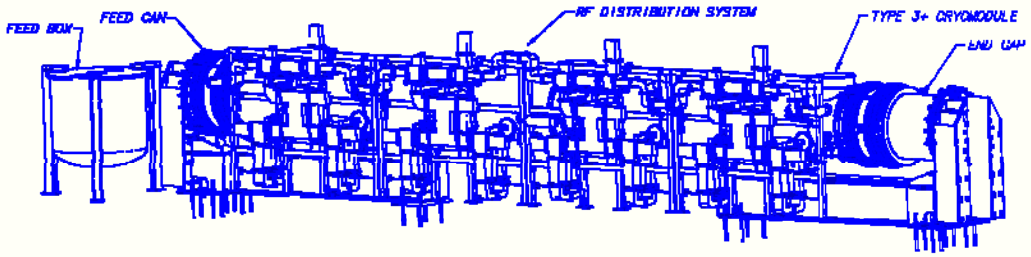
S1 Global

- **US will provide 2 cavities for the S1 Global program.**
  - **These will be from the current batch of ILC cavities to meet the schedule.**
    - **Standard TESLA Shape cavity just the symmetric end tubes.**
  - **Fermilab could make it available to KEK without processing late FY08.**
  - **If it is needed to be processed and tested in US these two cavities could be available by end of FY09.**
  - **In our current funding guidelines (FY09) we do not have funds allocated to dress these two cavities.**
    - **We would have an internal US discussion.**
      - **Should have a plan by the Fermilab meeting.**

Cryomodule and RF Unit Test

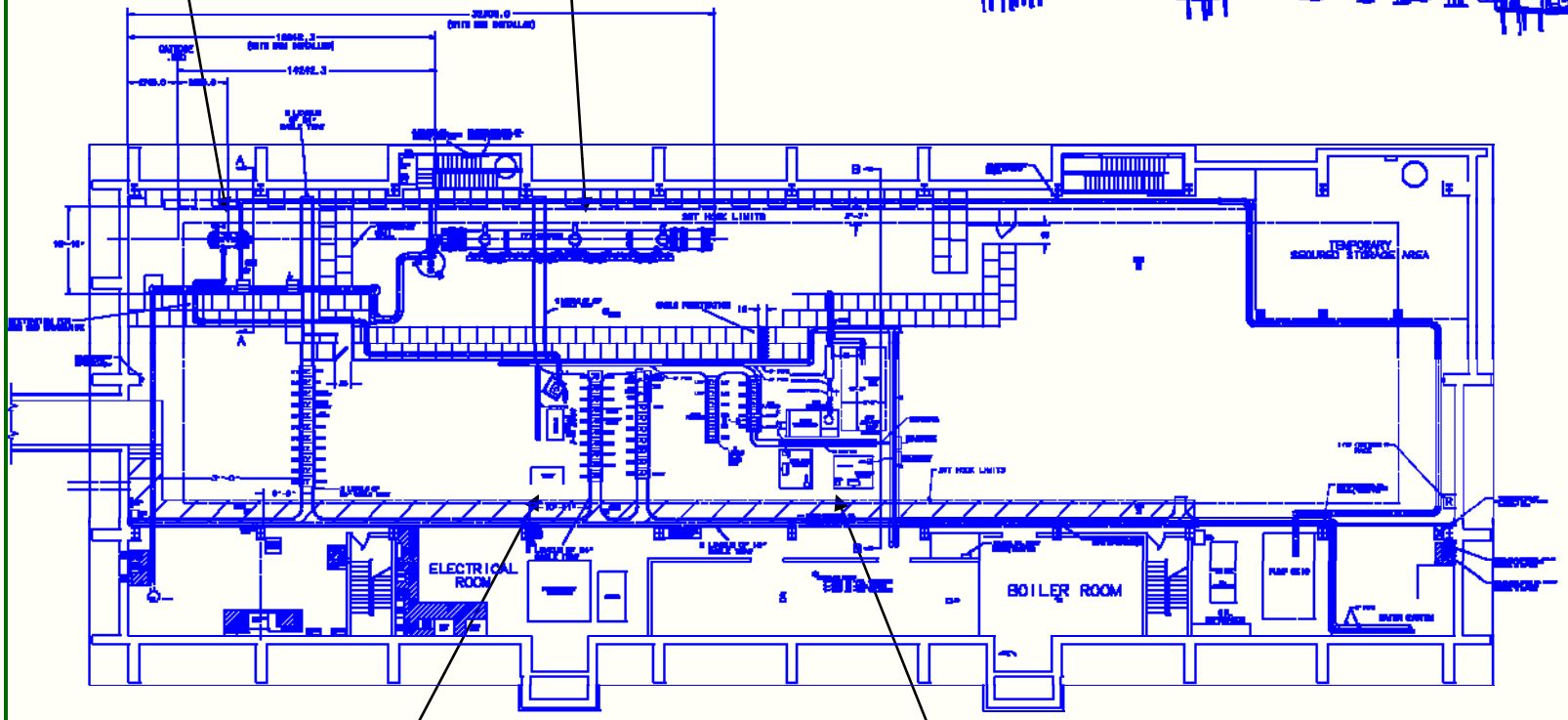
- **ILCTA_NML will test 3 Cryomodule with beam.**
  - **Goals are much reduced to allow RF Unit beam test earliest date.**
    - **Hooks will be in place for ILC beam test later if desired.**
- **Status**
  - **DESY Cryomodule CM1 is ready.**
    - **We are preparing the safety and other necessary document to start cool down at ILCTA_NML at Fermilab.**
  - **A 10 MW Klystron is at SLAC. (US-Japan Collaboration)**
  - **Modulator (Fermiab) and RF distributions (SLAC) are under fabrication.**
- **Proposed Plan**
  - **Cool down the Capture cavity 2 and CM1 in CY08.**
    - **RF power FY09 using the 5 MW Klystron**
  - **High Gradient (>30 MV/m) CM2 should be deliver to ILCTA_NML by end of CY09.**
  - **Deliver the first Type-IV CM to ILCTA_NML in 2010-11.**

New Phase-1 Layout of ILCTA_NML



Capture Cavity 2 (CC2)

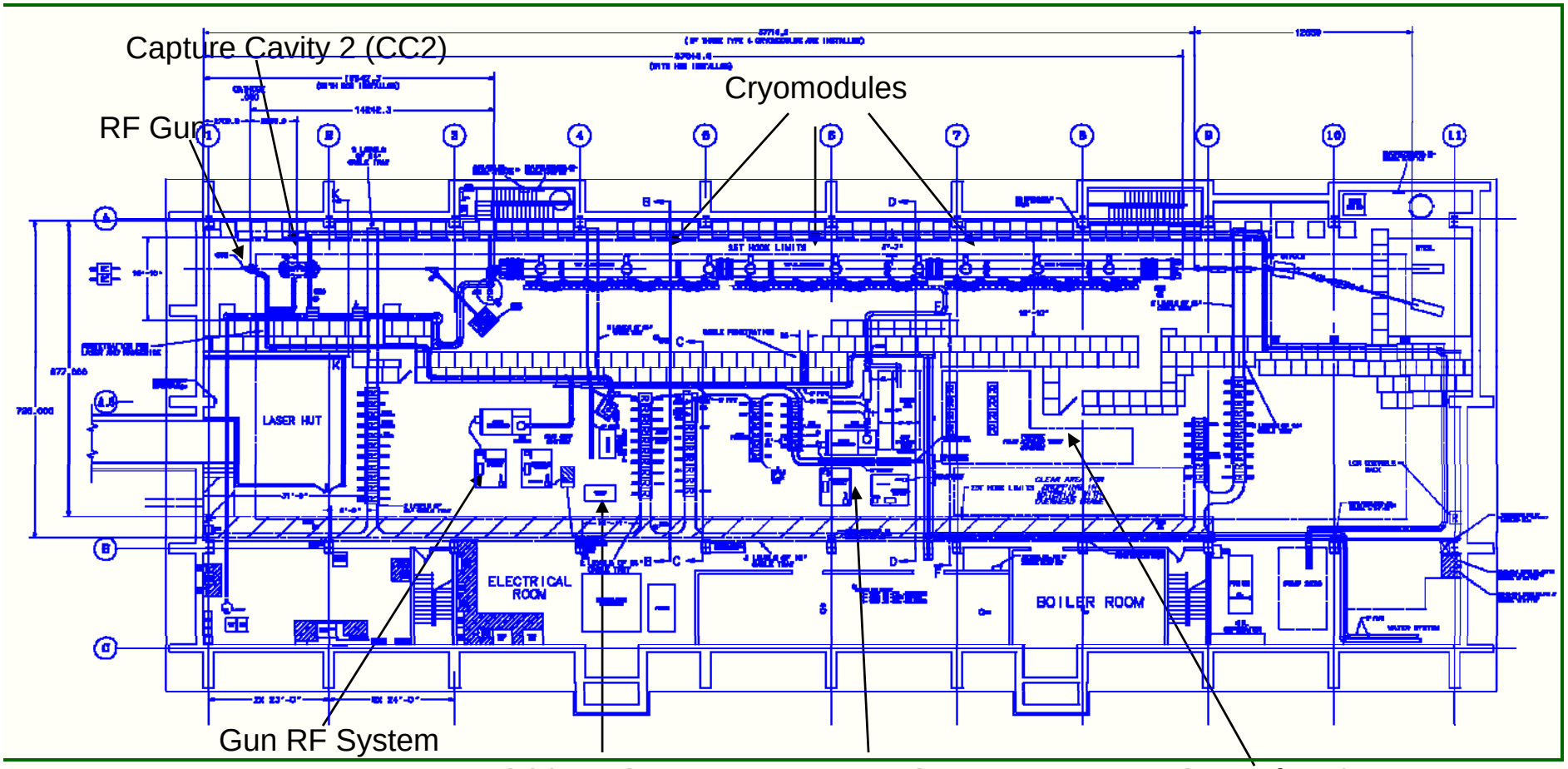
Cryomodule-1 (CM1) (Type III+)



CC2 RF System

5 MW RF System for CM1

New Overall Layout of ILCTA_NML



Current Picture of NML

FY08 Plans

- **Continue Working Towards Phase-1 Goals**
  - **Complete Infrastructure to Cooldown, RF Power, and operate Capture Cavity-2 (CC2)**
    - **Vacuum, RF, Cryo, Interlocks, LLRF, Controls, etc.**
  - **Move CC2 to NML when infrastructure is ready**
  - **Commission Cryogenic System using CC2 and begin operation of CC2**
  - **Complete RF Infrastructure for Cryomodule-1 (CM1) - RF Power System (5 MW) and Distribution (SLAC)**
  - **Move CM1 to NML and Install**
  - **Prepare Cryogenic Infrastructure for CM1**

FY09 Plans

- **Complete Phase-1 Goals**
  - Cryogenic and RF system for CM1 Operational
  - Cooldown and RF Test CM1
- **Begin Work Towards Phase-2**
  - Begin Procurement of Injector (gun, magnets, etc.) and Test Beamline (dumps, magnets, etc.)
  - Delivery and Installation of CM2

Summary

- US plan for ILC Cavity and Cryomodule remains same as projected during the RDR phase with the following exception
  - We have considerably reduced the number of Cavities we will fabricate, process and test.
  - We have reduced the number of CM to ~1/yr.
- We would continue to develop infrastructure to test 1 RF Unit with electron beam (not ILC beam)
- We would continue to develop infrastructure for
  - Cavity processing and testing
  - Cryomodule fabrication and testing
- Our goal is to be ready for “a” project by 2012