

# **Update on S0 Work in the Americas Region**

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**17 June 2008**

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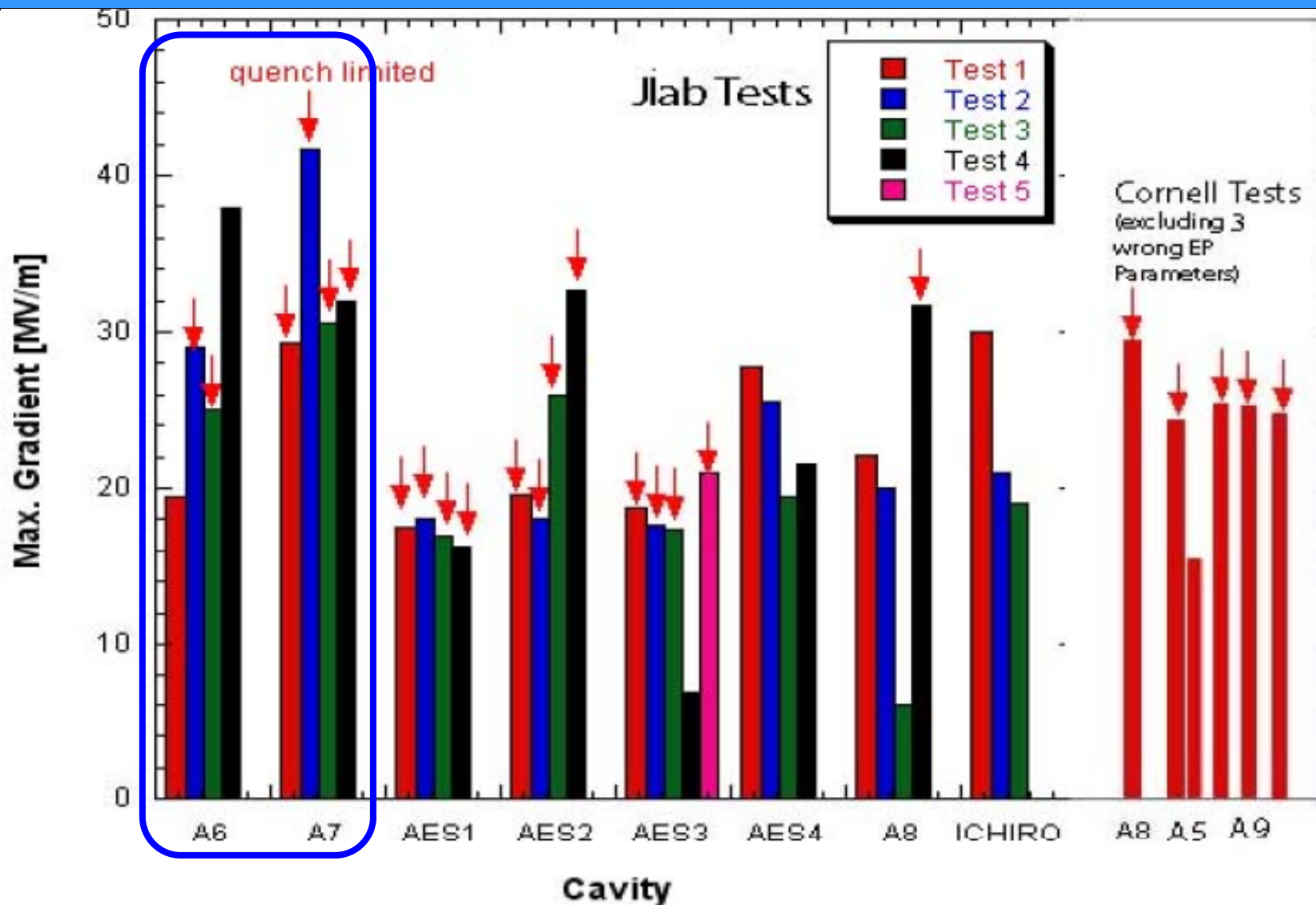
- **Accel6 tested at Fermilab June 13**
  - **Achieved 39 MV/m!**
- **Accel7 tested at Jefferson Lab June 4th**
  - **Achieved ~22 MV/m; apparently limited by EP process**
- **Third new Accel cavity (A11) delivered to Jefferson Lab after incoming QA at Fermilab**
  - **A12 tested; A15 received bulk EP**
- **Roark/Niowave collaboration delivered 6 single-cell 1.3 GHz cavities June 12**
- **Will conduct next EP at Argonne with single-cell AES cavity**
  - **Performance >25 MV/m with BCP processing at Cornell**
  - **Use this cavity to test and optimize EP process**
- **AES3 remains at Los Alamos for testing of T-Mapping system**
  - **Tajima reported first T-Map data acquired June 12**
  - **Some heating observed; hopes to acquire more data this week**



## A6 processing and handling at JLab before sending to FNAL for test (Rongli Geng)



- 4 cycles of EP/VT. Total removal ~ 250  $\mu\text{m}$ . Final performance 38 MV/m, field emission limited.
- Stored on shelf over a year since final test.
- Started handling/processing May 1, 08 for vertical test at FNAL.
- Field flatness tuned to 97.6% (was 91.2%). Pi-mode frequency 1297.513 MHz at RT. Feeding bead/wire vertically to minimize iris contact.
- Both RF antennas from FNAL shortened by for better Qext. Input antenna Qext1 =  $5.5\text{E}9$  ( $3.4\text{E}9$  as received) after copper cylinder shortened by 2mm (limit set by FNAL); Field probe antenna Qext2 =  $6.3\text{E}11$  ( $8.5\text{E}10$  as received) after Nb needle shortened by 2mm.
- Nb needle was BCP1:1:2 etched 1min at RT; copper cylinder was chemically polished; both feedthroughs ultrasonically cleaned.
- A6 ultrasonic cleaned (2% micro-90), high pressure water rinsed, clean room assembled, slow pump down, leak checked.

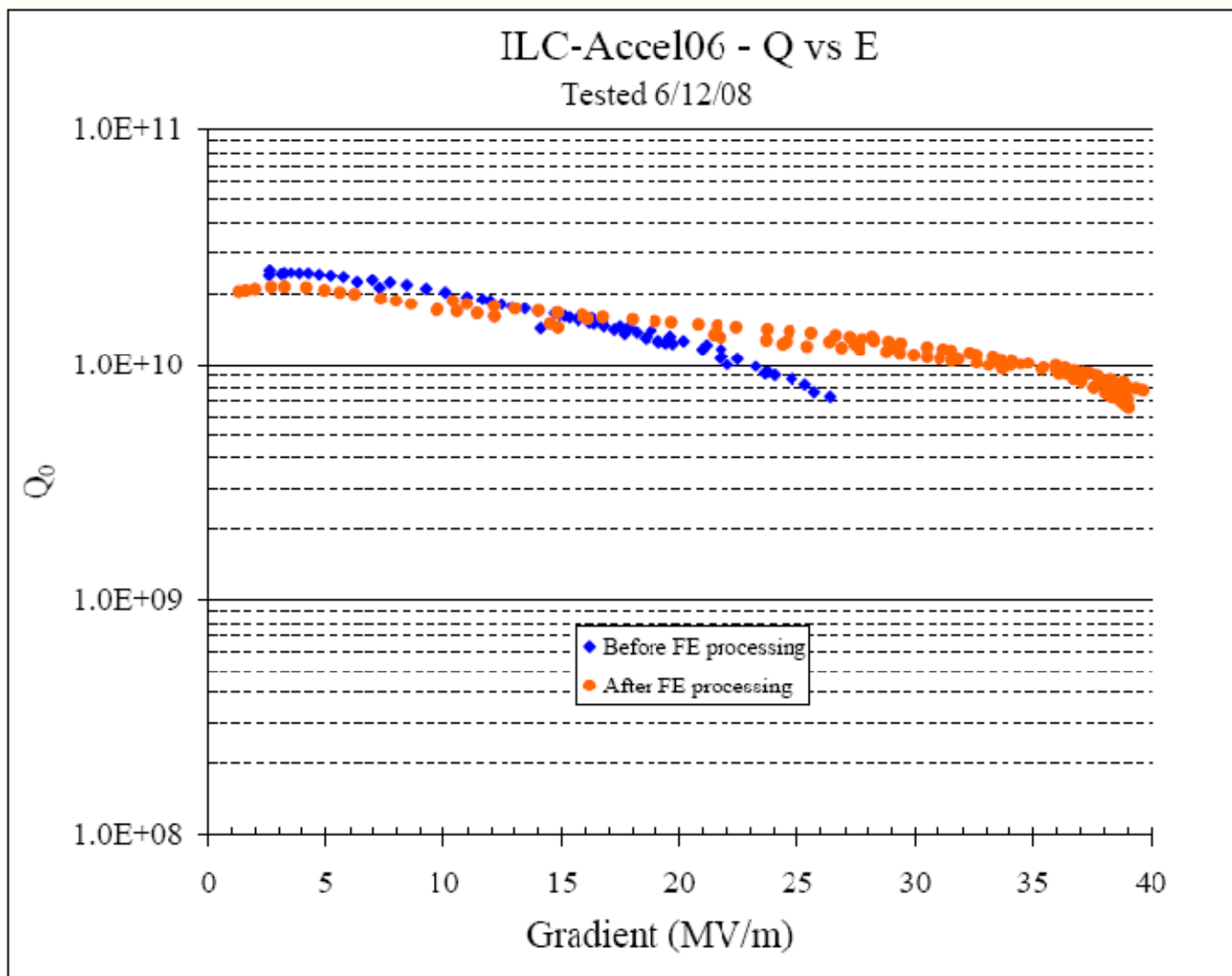




# Accel6: $Q_0$ vs Gradient



Fermilab

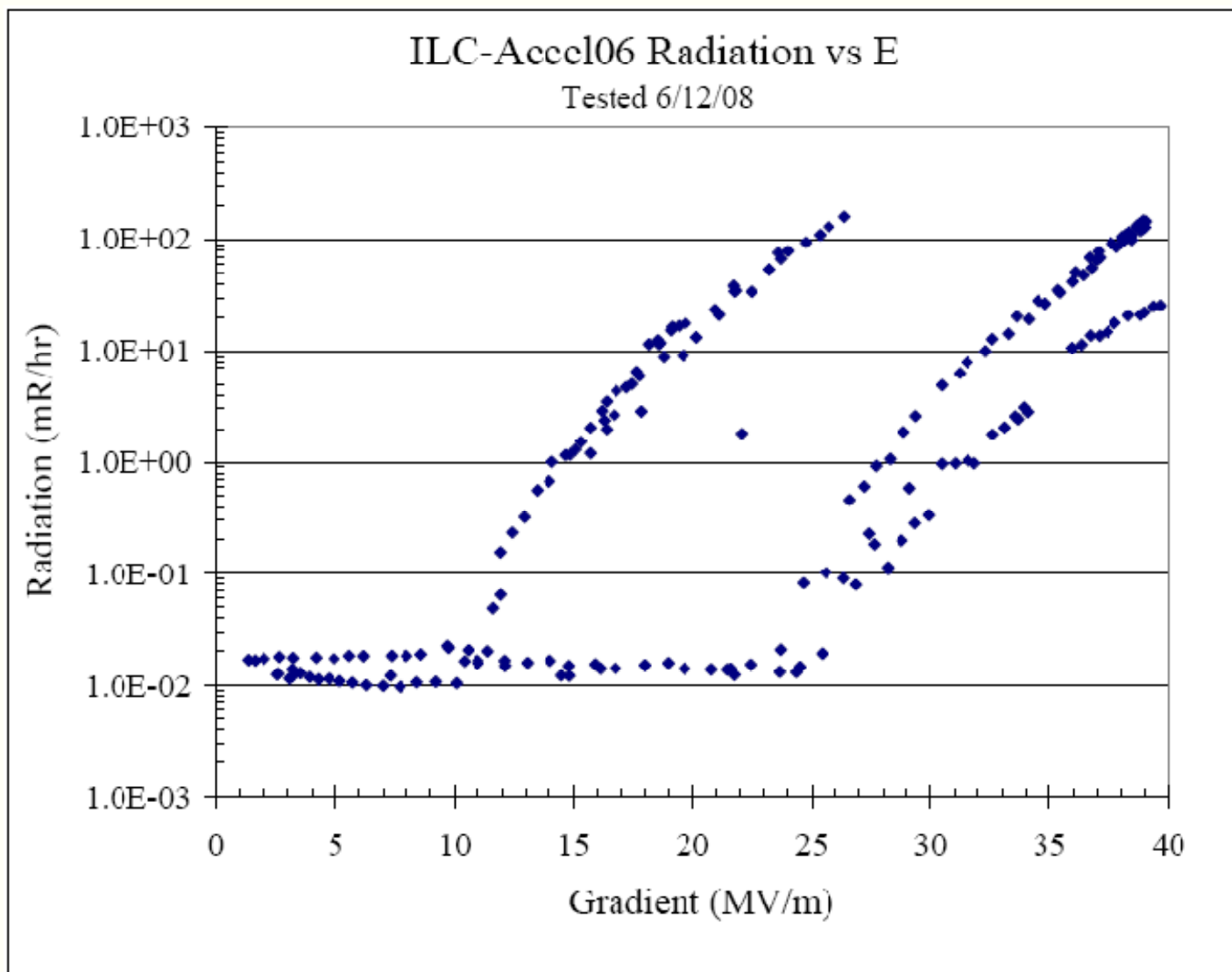




# Accel6: Radiation vs Gradient

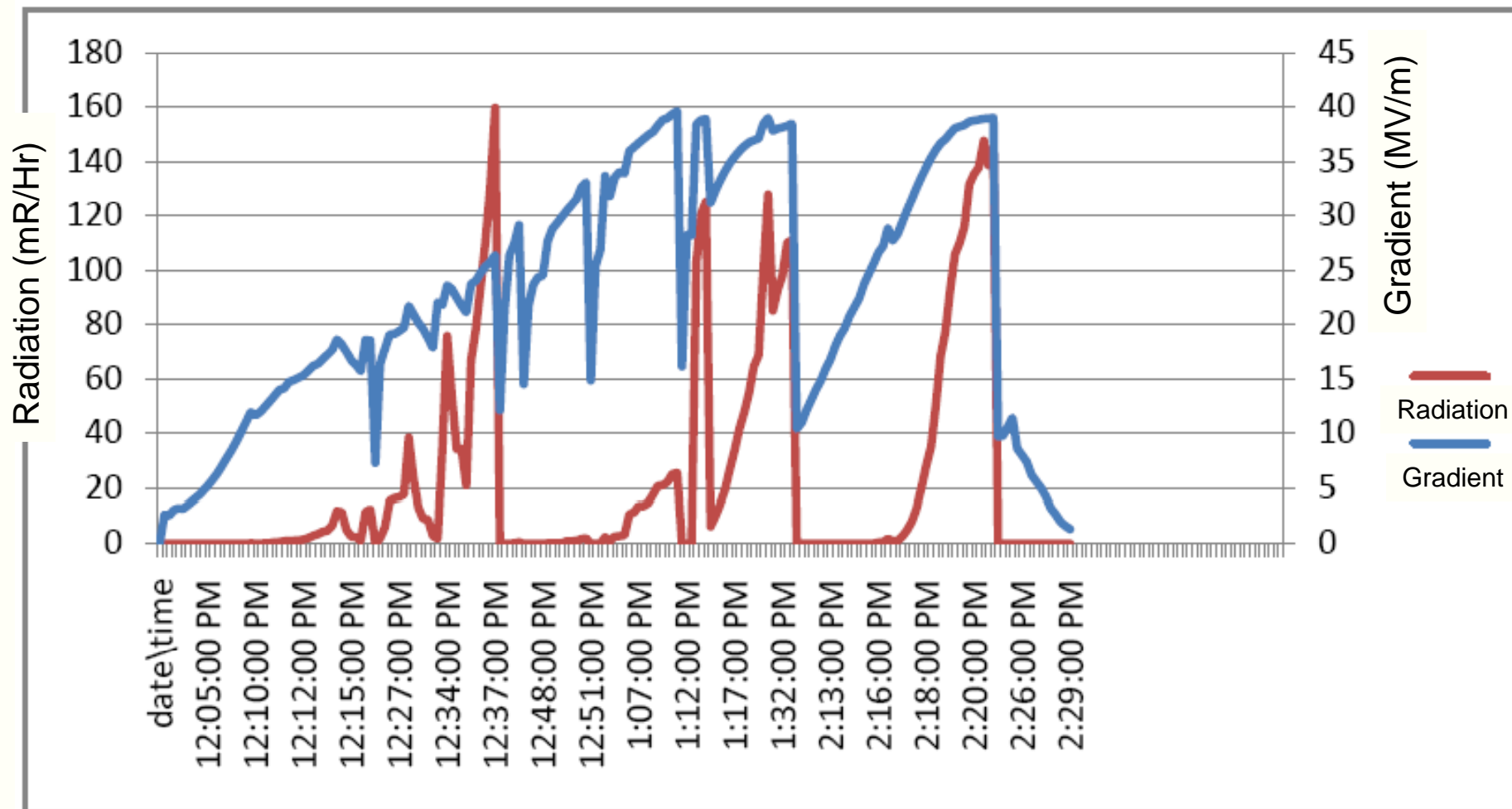


Fermilab





# Accel6: Gradient and Radiation vs Time



# JLab High Gradient R&D Update

Rongli Geng

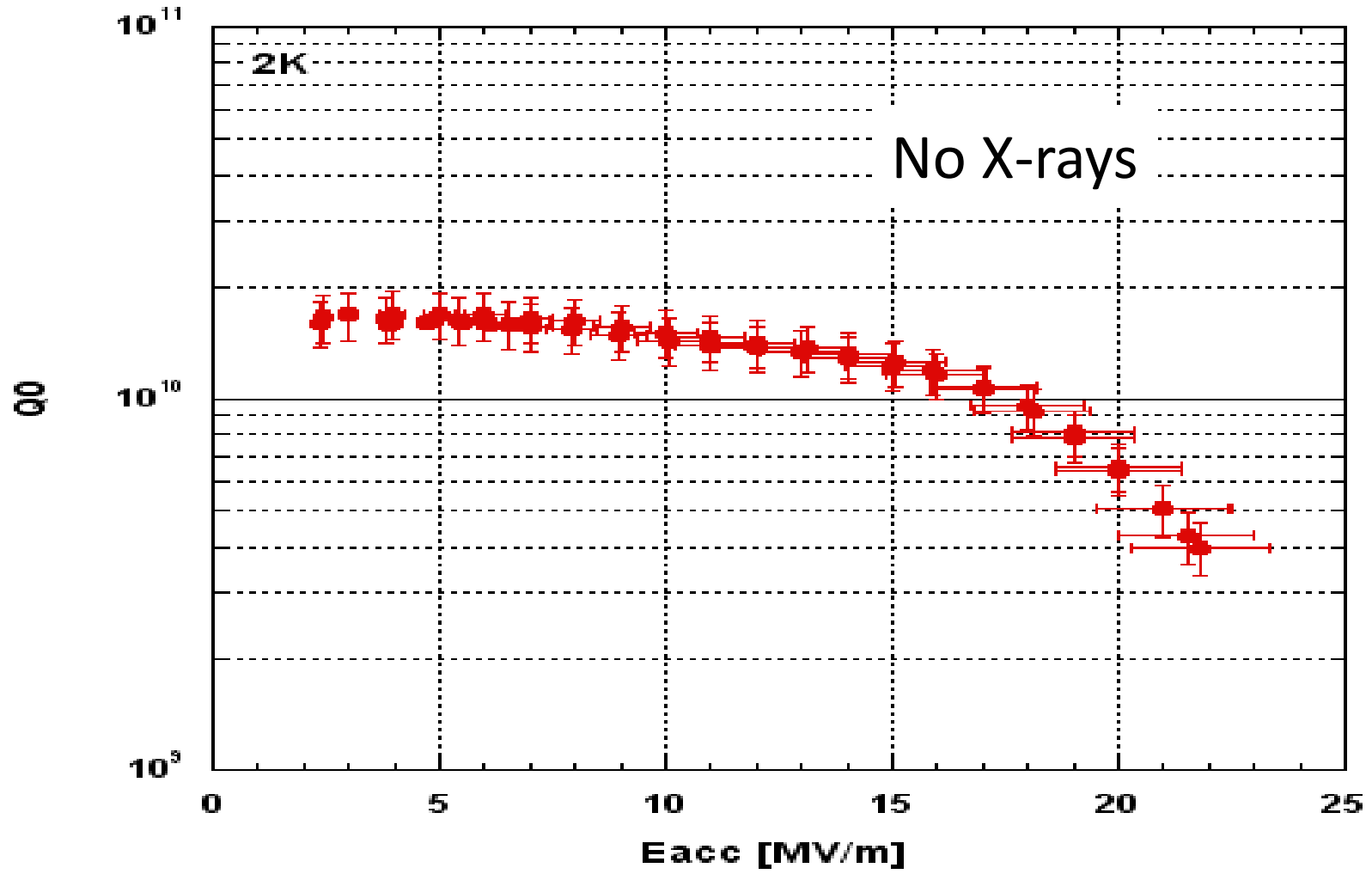
June 17, 2008  
ILC S0 WebEx Meeting



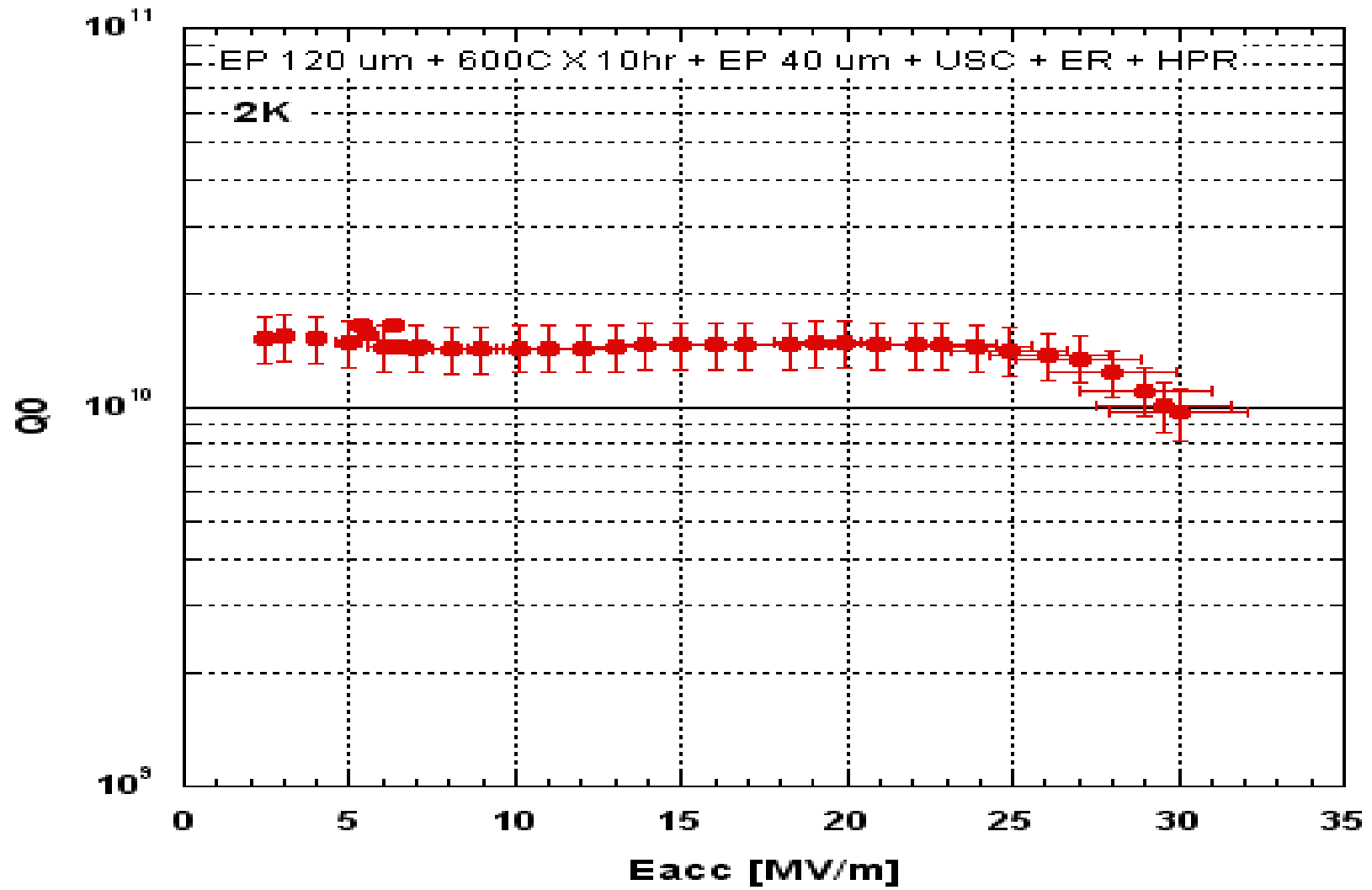
# 9-cell cavities

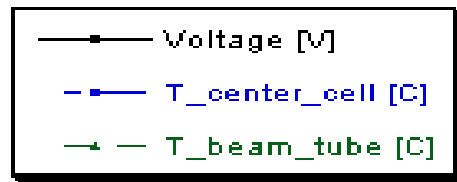
- A7 (ANL: EP 27  $\mu\text{m}$  + JLab: USC + HPR + 120C X 48 hr), 22 MV/m @ Q0 4E9, no FE, Q-slope limit.
- A12 (EP 125  $\mu\text{m}$  + HPR + EP  $\sim 30$   $\mu\text{m}$  + USC + ER + HPR, no bake), 30 MV/m @ Q0 1E10, FE limit. Next re-cleaning (USC + HPR) and re-test.
- A15 bulk EP (1<sup>st</sup> experiment acid supplying holes facing up). Very satisfactory EP process. (graph later). Cavity in vacuum furnace for 600CX12hr.
- First model built to bead pull 9-cell without touching iris. Received A11 from FNAL for first bead pull experiment.

A7\_June0408\_after\_ANL\_EP\_May1208

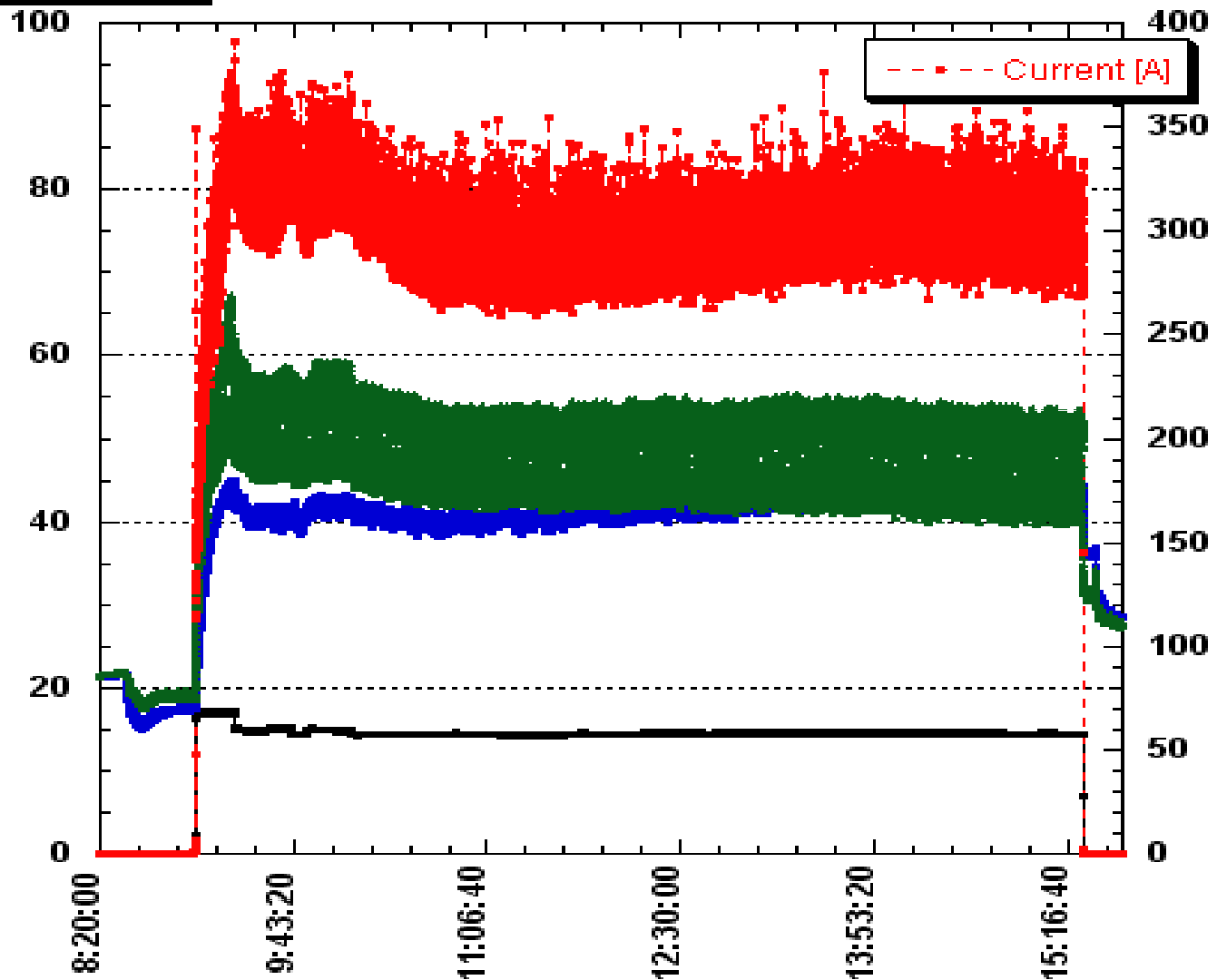


### A12\_test1\_June102008

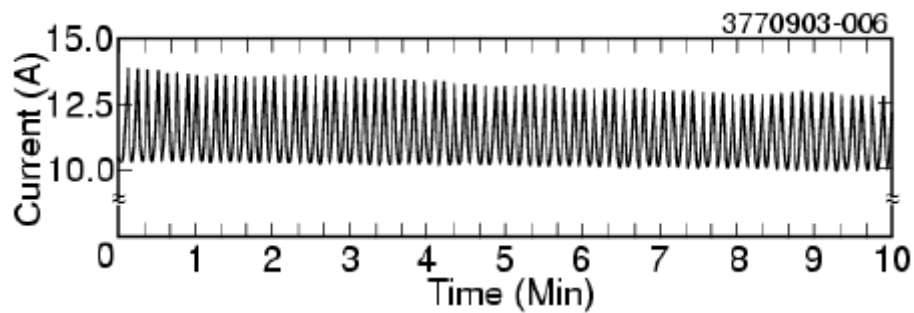
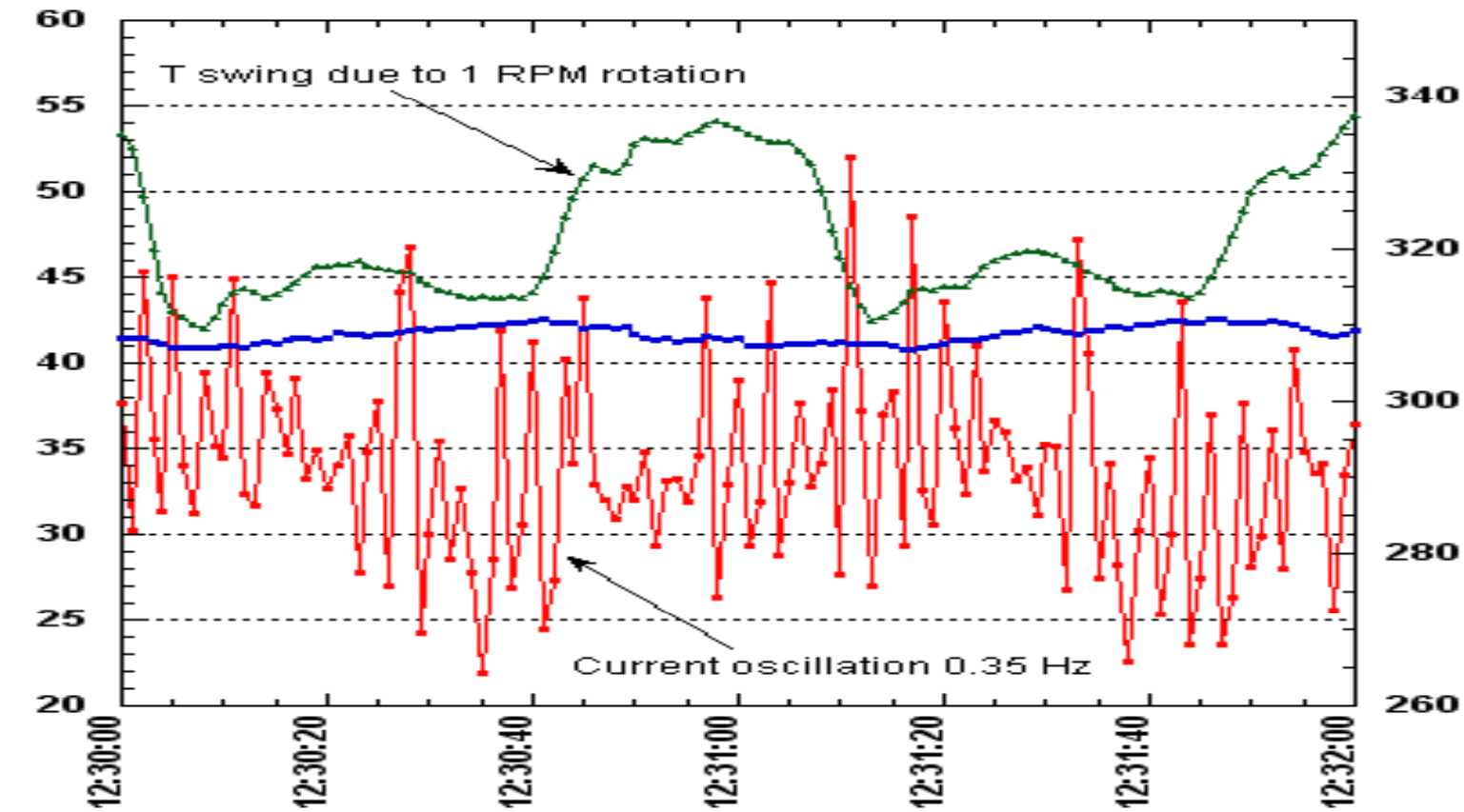




A15\_bulk\_EP\_June122008



### Optimal EP in continuous current oscillation mode



R.L. Geng, A. Crawford et. al.,  
[Continuous current oscillation electropolishing and applications to half-cells](#)  
**SRF2003**

Jun Figure 1: Continuous current oscillation EP.