ILC International Linear Collider

Jefferson Lab

Jlab Electropolish Update 8/30/06

J. Mammosser

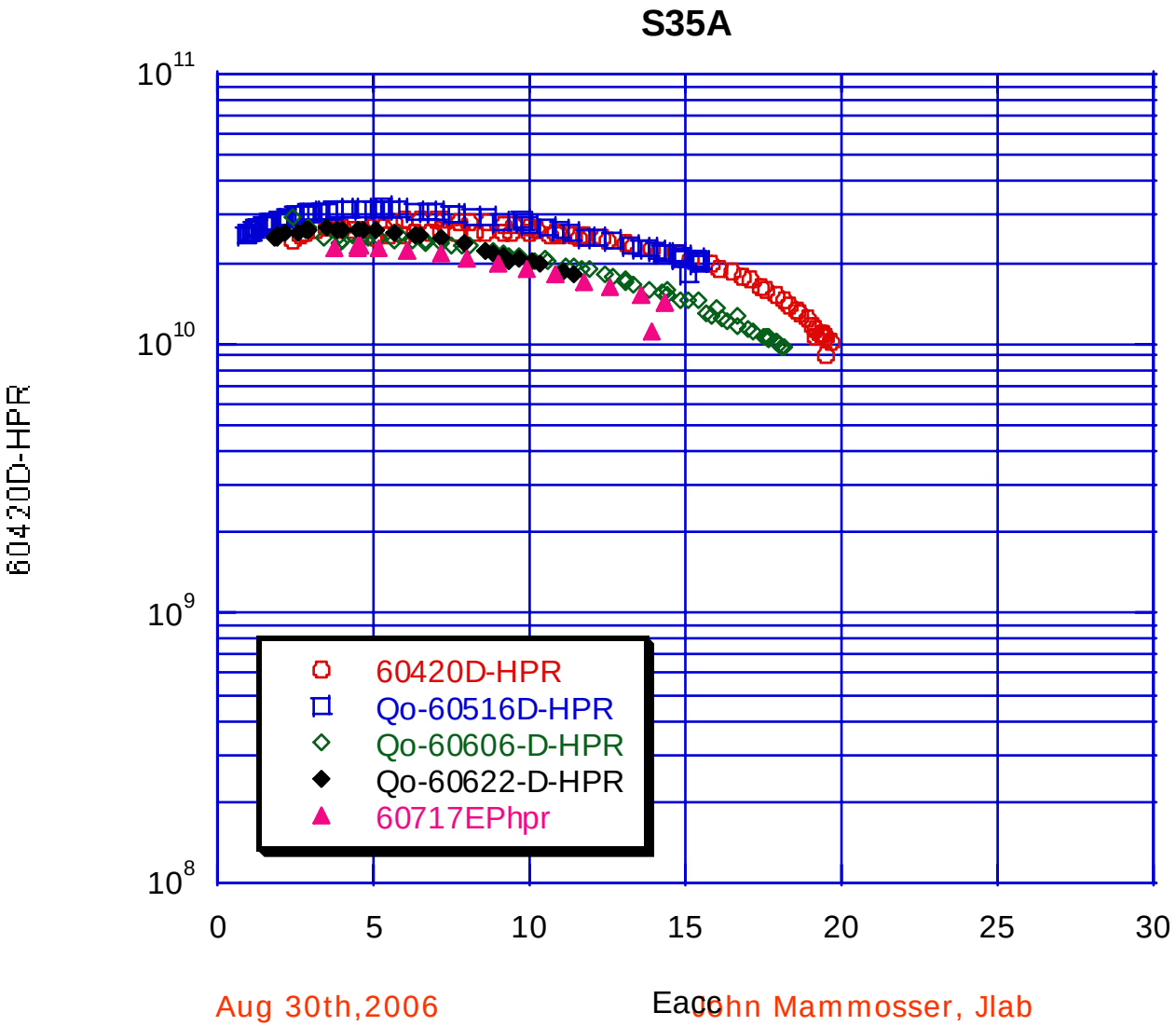
Outline:

- Current status on S-35
- Current status on A-7
- Process Issues Encountered
- Accomplishments
- Direction Forward
  - A-6 planning

Current Status on S35

- S35 was first used to develop tooling and procedures
- Multiple RF tests with no chemistry were performed (5)
  - Standard procedures used, identified new methods to reduce particulates
  - Degreasing, HPR, Clean assembly and Baking Performed
- First 9-cell EP performed
  - Light EP performed identified many improvements in data acquisition and implemented them

S35 Vertical Test Results Summary:



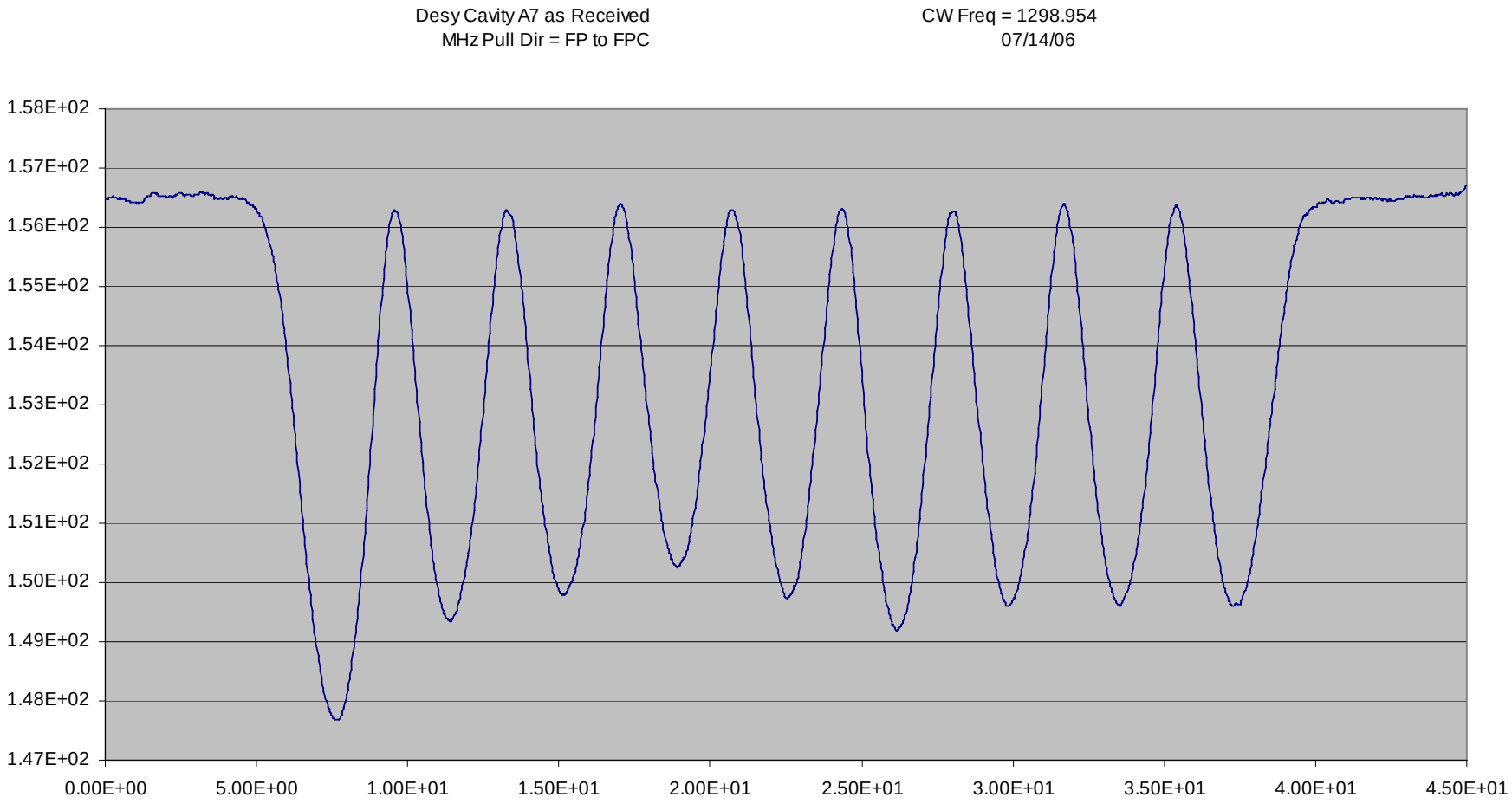
Only the first test had field emission!

All limitations were quenches, last two tests all modes measured (all quenched), quenches were at a verity of stored energy's (no smoking gun)

Conclusion:

Most likely the quenches are located at pits in the surface which are in all cells along the walls, would need thermometry to determine for sure

A-7 As received from Accel

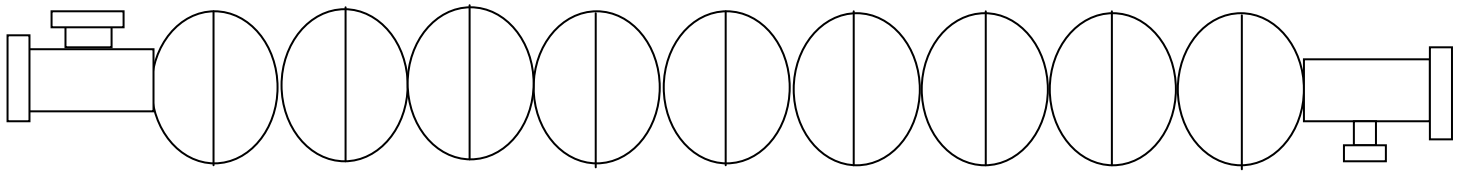


ILC International Linear Collider

Jefferson Lab

Bulk Chemistry Material Removal in um

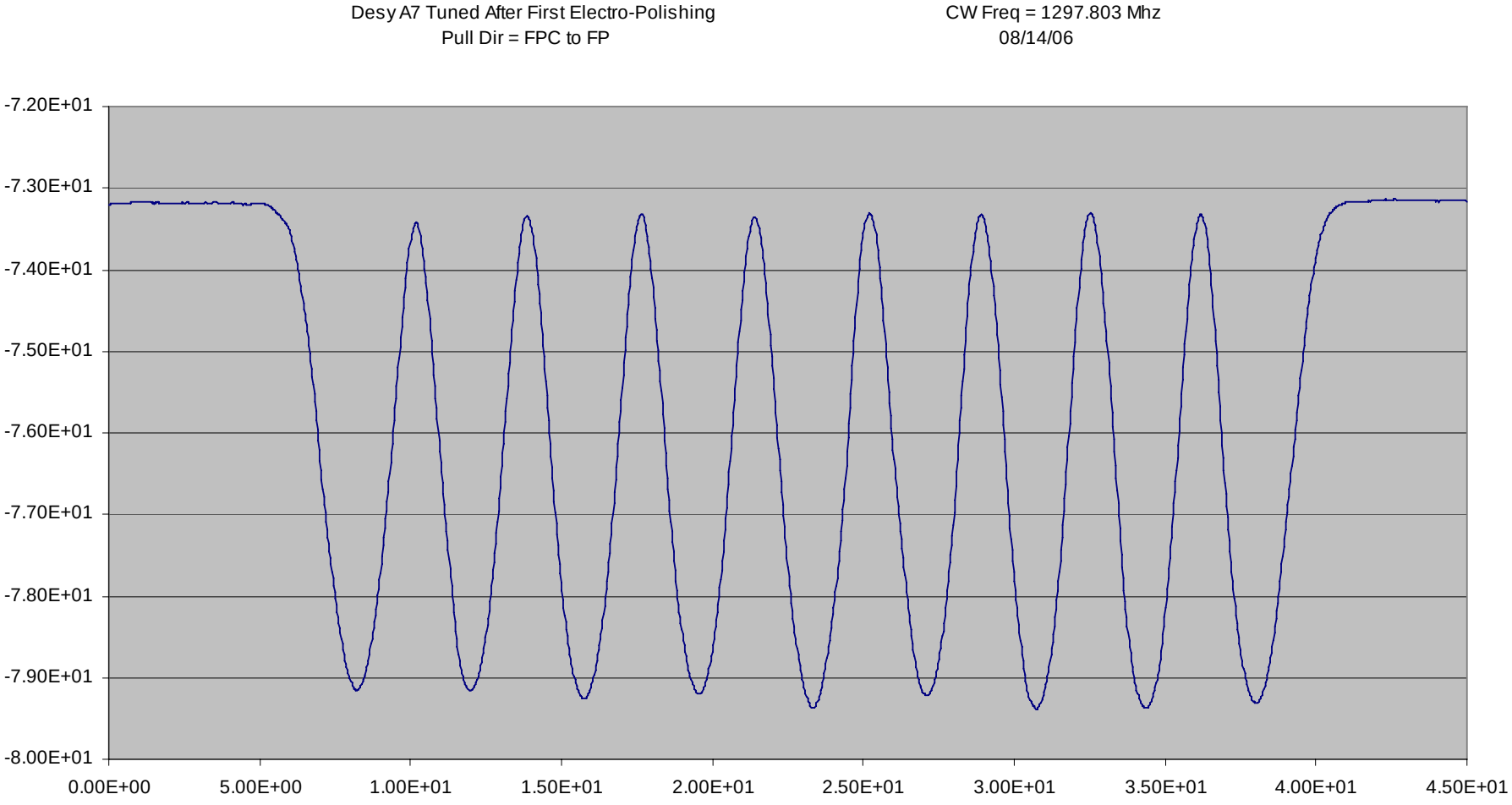
		FPC-end								FP-end
Equators		172	163	167	160	179	176	180	165	180
Walls	**Left**		152	146	157	155	154	153	154	157
	Right	184	181	170	174	182	176	177	166	

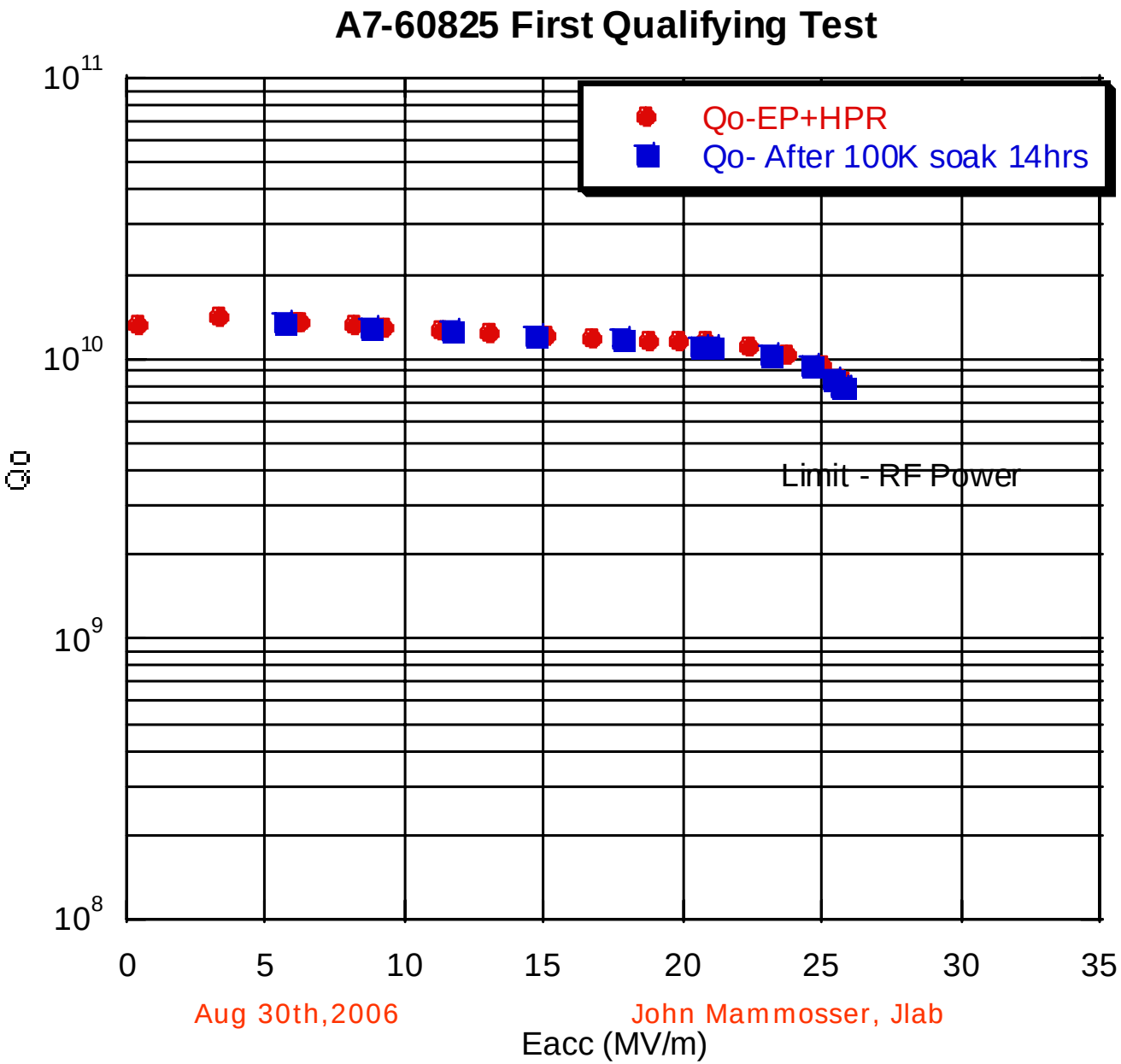


Aug 30th,2006

John Mammosser, Jlab

Tuning - prior to final chemistry





Limited by the RF power available and input coupling!!

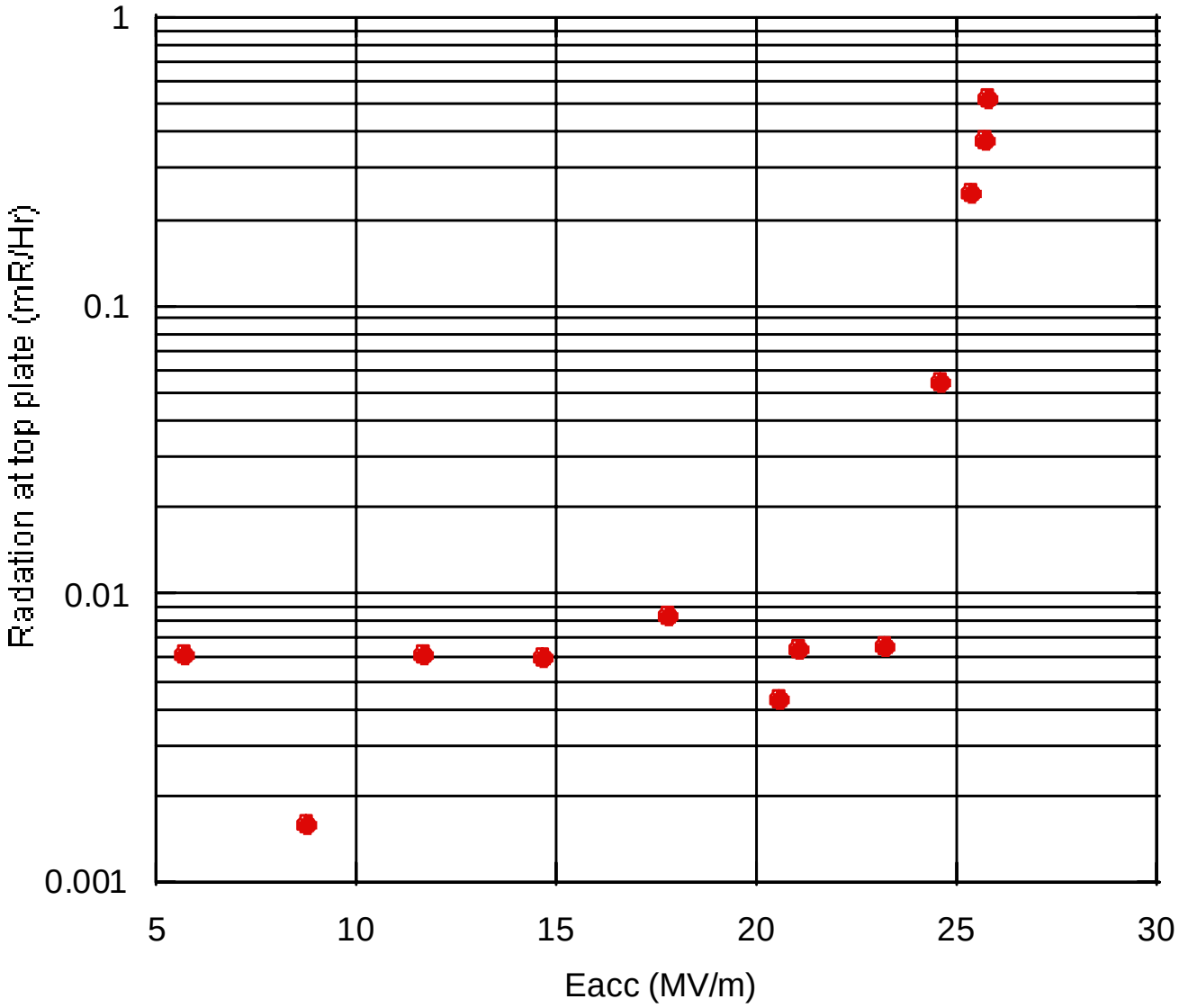
New amplifier should allow us to reach its limiting performance

Need a variable input coupler, evaluating KEK and Jlab designs, will wait for new funding to fabricate

ILC International Linear Collider

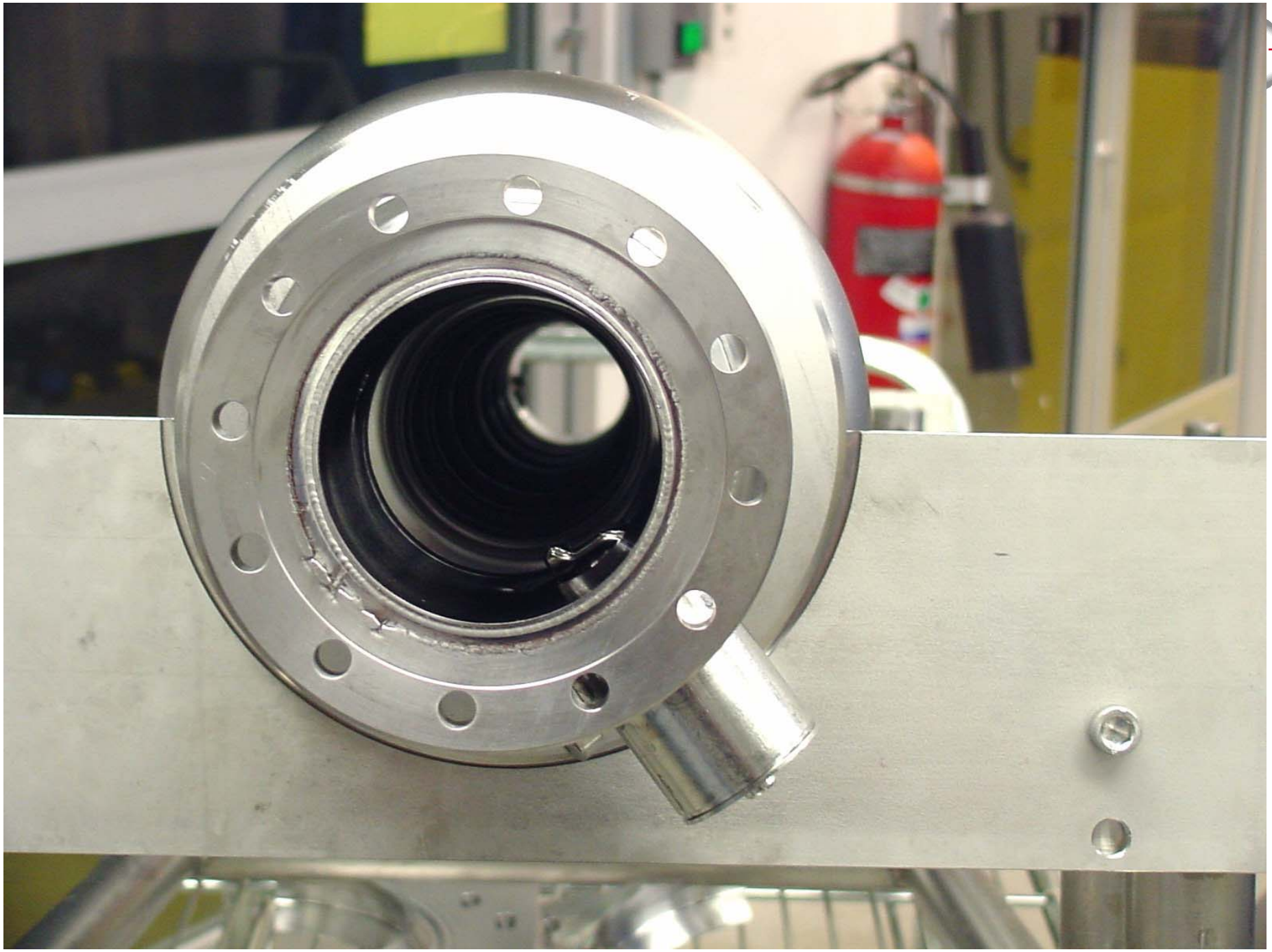
Jefferson Lab

A7 - Radiation During Testing



Process Issues Encountered:

- Electropolish
  - During the bulk chemistry I discovered a problem with the beamline seals which resulted in multiple leaks during the chemistry and heavily damaging the beamline flanges
    - Round seals were used which left a gap at the flange ends
    - Endgroup areas were electrically shielded to reduce etching in the endgroups
    - This allowed for low current density in these areas and caused flange gaps to be most likely in active dilution instead of polishing
  - Problem was solved for final chemistry with increasing the cathode surface area in the end-group area
  - Flange sealing surfaces were mechanically polished to recover them



Process Issues Encountered:

- Assembly by hand was difficult with current assembly tooling
  - Two persons and multiple hands on parts
  - Tight spots due to cavity holding plates
  - Nut plates were not critically dimensioned for self alignment
  - No ability to rotate cavity in cage to align after installation

Accomplishments:

- Developed video/particle count tooling to record assemblies
  - Tapes reviewed after each assembly and many improvements identified, some resolved already
  - Others will wait when we get more funding
- Proof of principle for removal of sulfur after EP
  - Degreasing cavity open ultrasonic tank with Hot DI and micro-90, seem to work (no sulfur smell after and good performance)
- Learned from S35 – many hard quench limits no field emission, multipacting ?
  - Need to review simulation data to know where barriers should be

Direction forward:

- Money is tight, I will only use labor until FY07 funding comes
- A-6 was received (thanks)
  - RF inspection complete
  - Next CMM and RF probe calibration
  - Setup for bulk chemistry
  - Furnace treatment 600C
  - Tuning field flat
  - Qualification testing
- Tooling improvements made
  - Focus is now on particle free assemblies, all will be recorded and analyzed

A6- as received from Accel