

TTC Cornell Talks

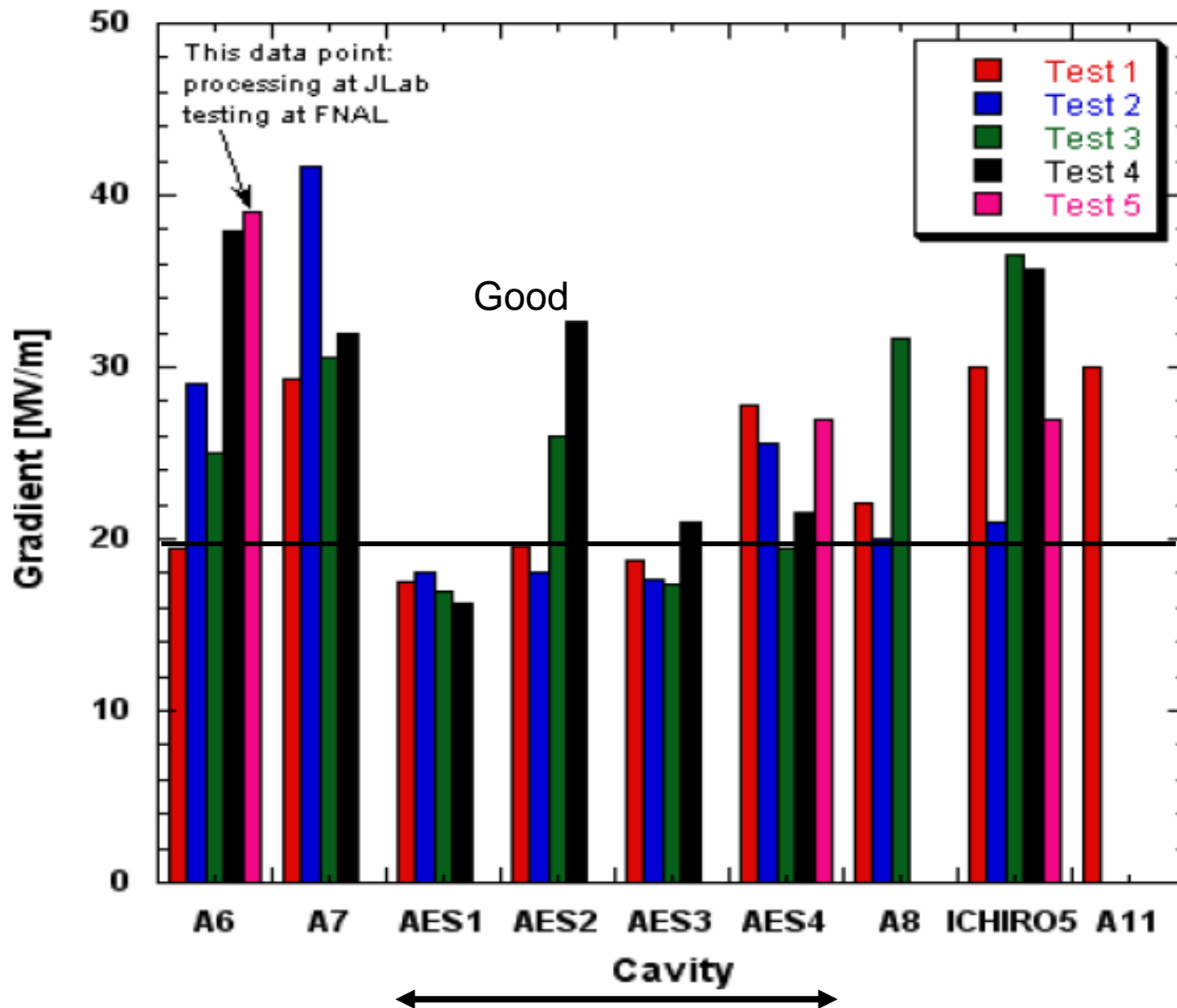
(15 min) Cornell:

1-cell test results from new vendor
cavities

Goal

- Develop two new cavity vendors : AES and Niowave
 - in collaboration with FNAL
- AES (Medford NY)
 - AES built four 9-cell cavities for FNAL using e-beam welder at EBTECH (company in Boston)
 - Two performed below 20 MV/m in several tests (at Jlab), defects found optical microscopy at KEK
 - One cavity performed below 30 MV/m
 - One cavity reached 32 MV/m best
 - AES acquired a new e-beam welder, installed at AES in Medford
 - Start with six single cell cavities for FNAL to qualify new beam welder
 - Cornell: Quick qualification of cavities with BCP (< 15C),
 - No HT to 800 C
 - Goal: determine if Quench field is > 20 MV/m
 - Answer is Yes
 - => Good News for next batch (6) of 9-cell cavities

ILC 9-cell cavity processing and test at JLab



AES New Welder in Clean Room



Figure 5: Rotary/Carousel Weld Fixture



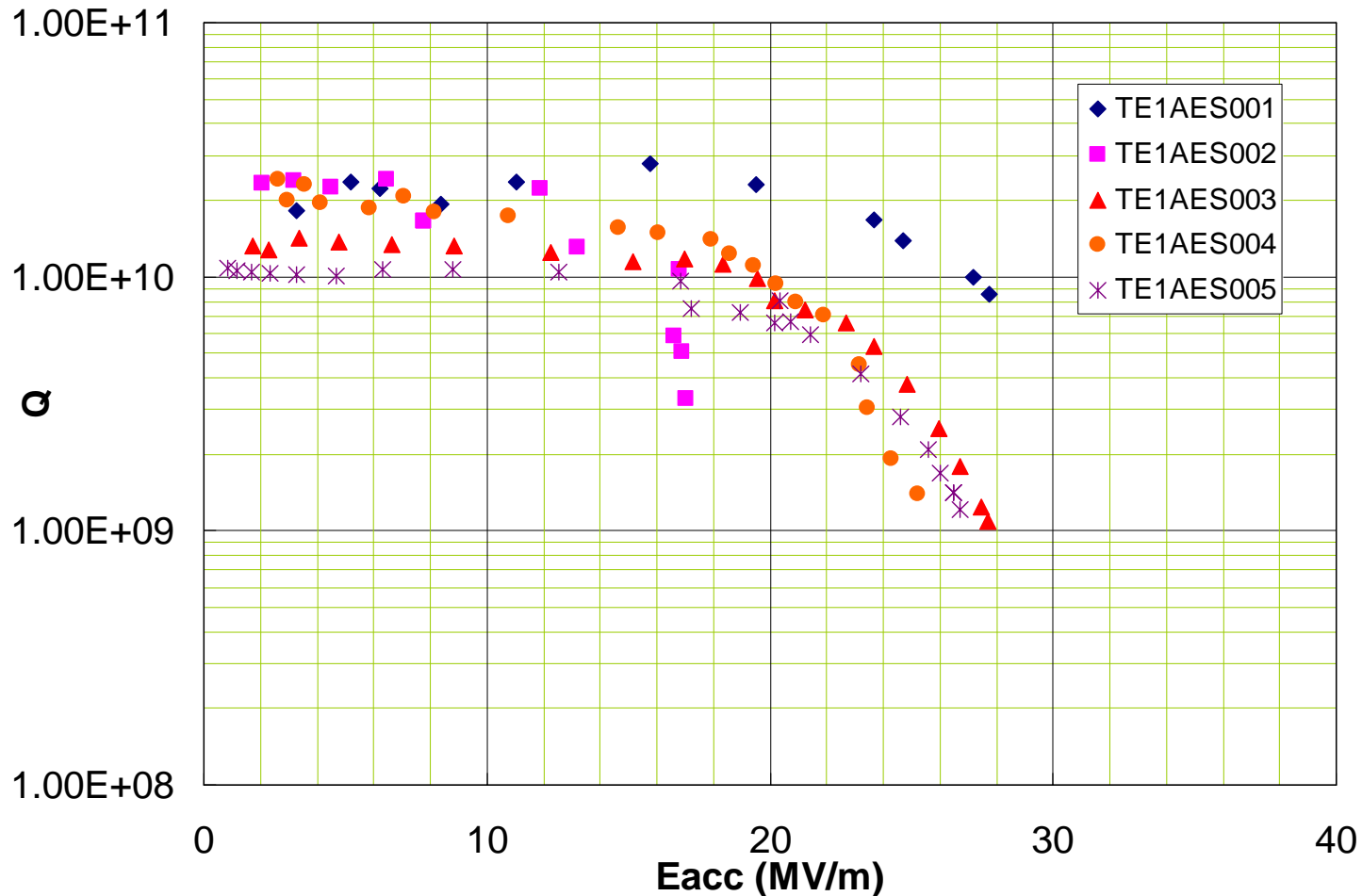
Figure 3: EB Welding System at AES



Figure 9: Six, Single-Cell ILC Cavities

4/5 Single Cells Tested (#6 to be tested) No Quench, $E_{acc} > 25$ MV/m

AES Single Cells



Niowave (with Roark) – Michigan/Chicago

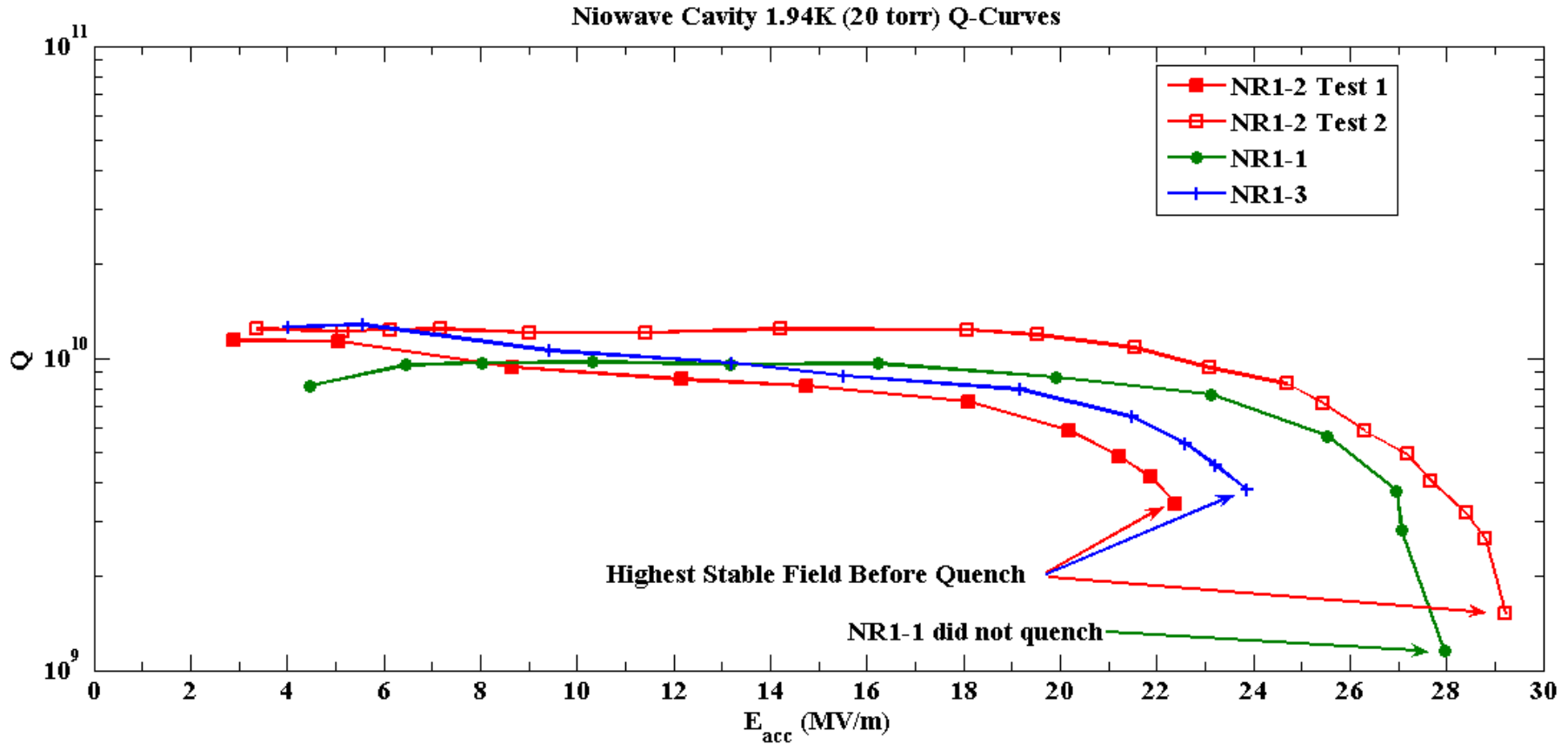
- Start with six single cell cavities to qualify new vendor
- Quick qualification of cavities with BCP to determine if Quench field is > 20 MV/m
- No HT at 800 C
- First results on 4 cavities: promising
- Quench found for 2 cavities on cell in about the same (r.z) location...bumps (see later pictures)
- Suggests a manufacturing problem between material and die?
- One cavity with possible quench near equator weld (not yet inspected).

Sciacky Beam Welder at Roark



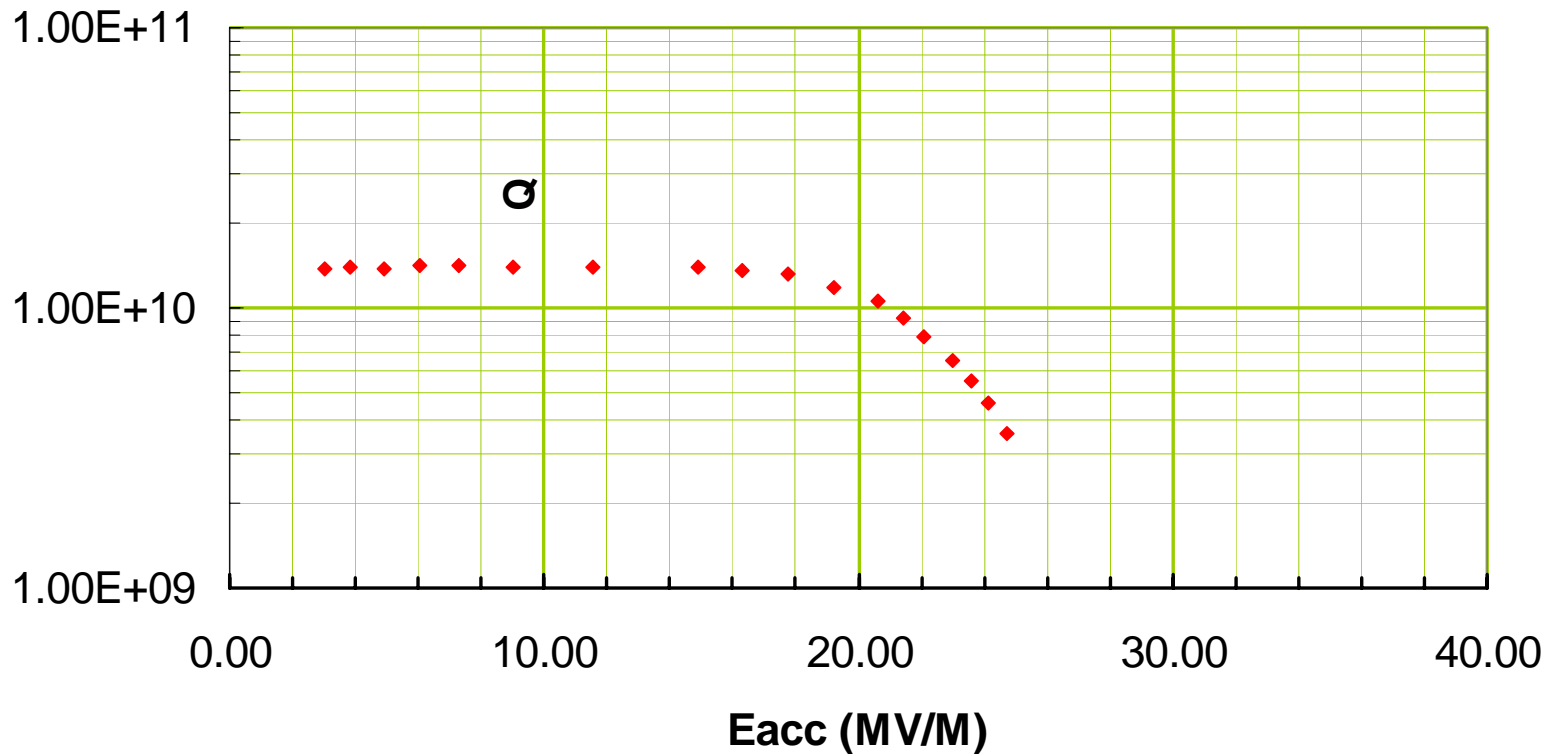
Cavities (limit)

1 (Q-slope), 2 (Qu), 2' (Qu), 3 (Qu)



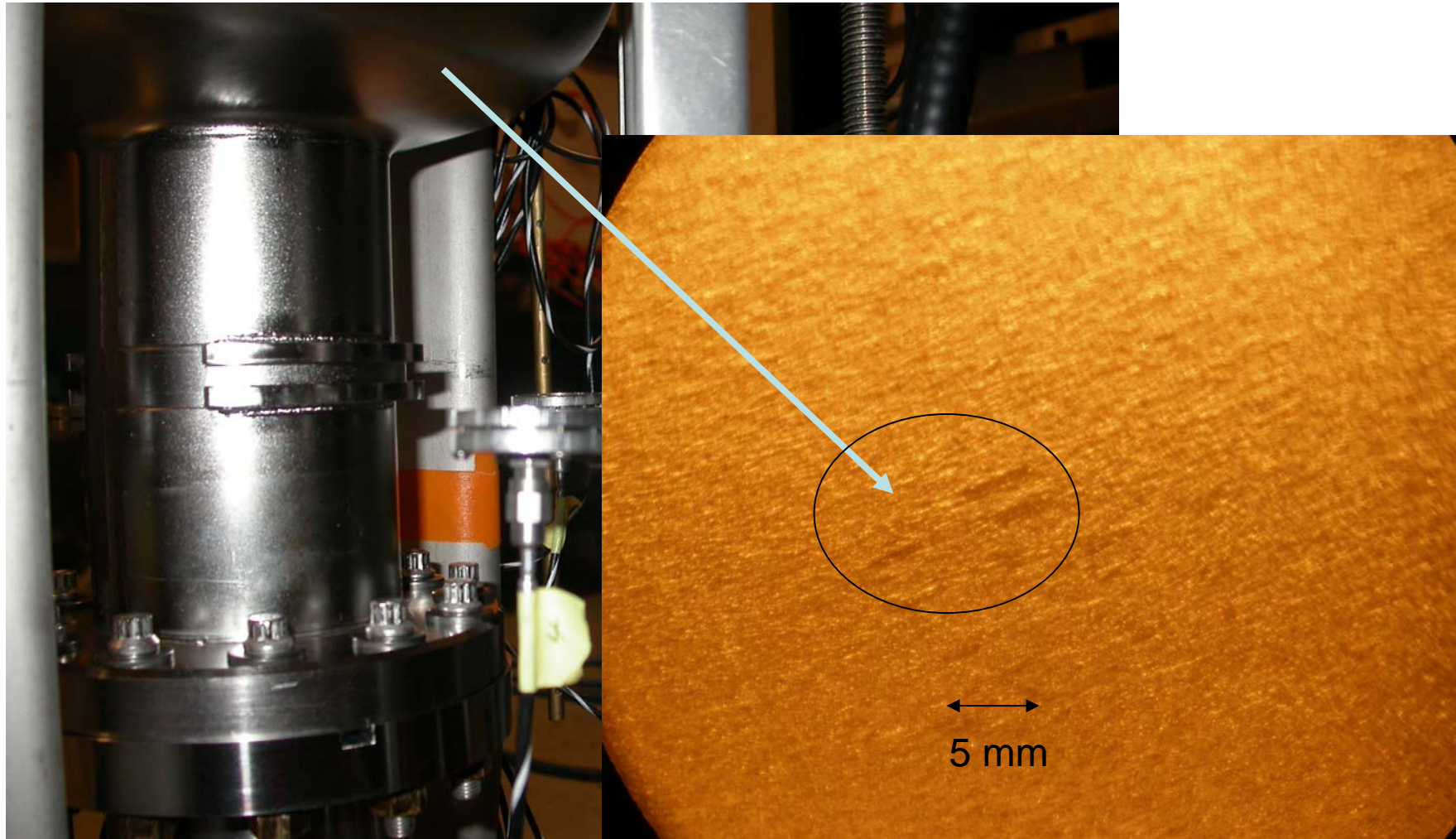
Cavity 4 (Q-slope + Quench)

NR1_5 17 October 2008

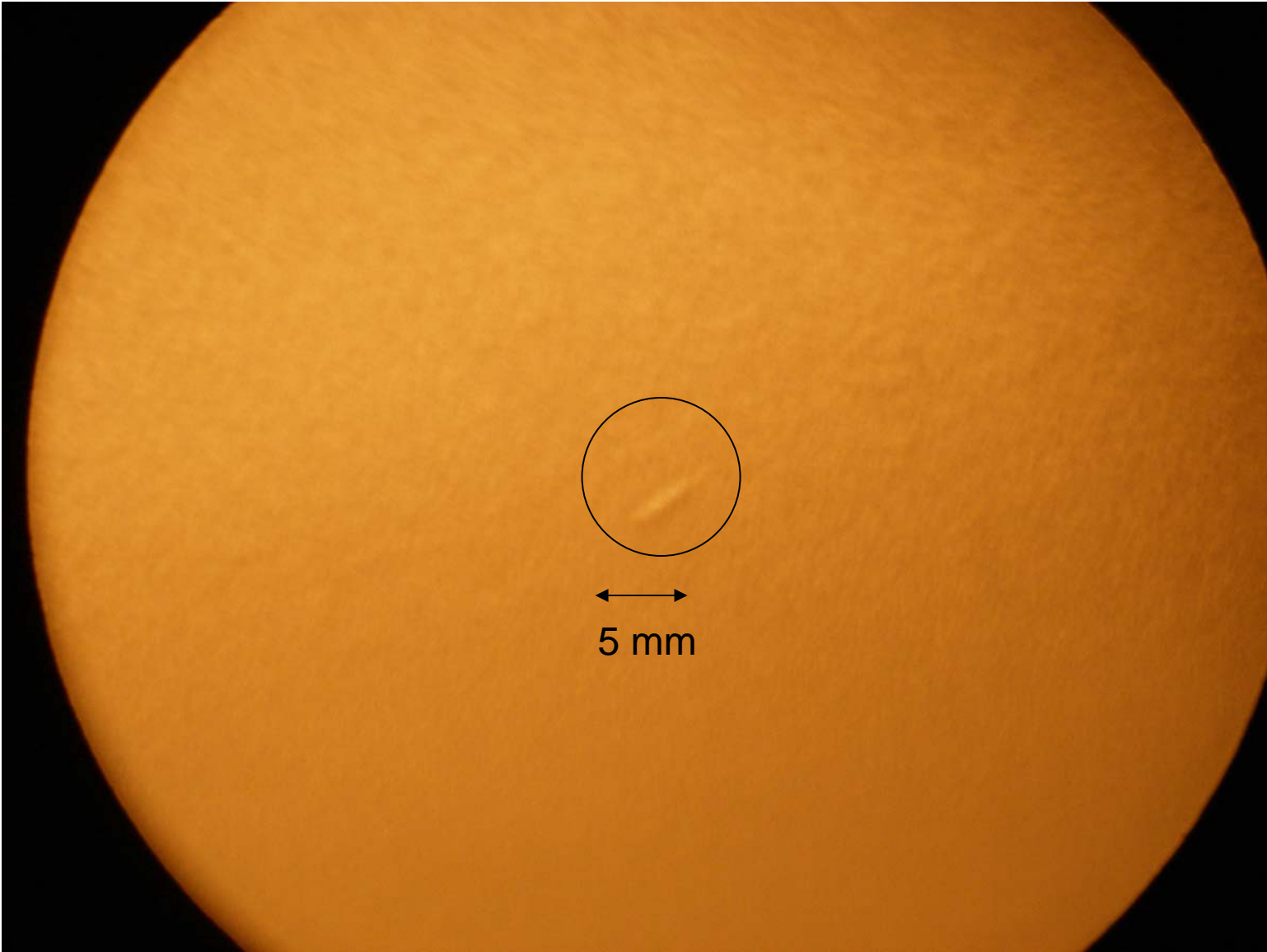


- Cavity 1, BCP 75 μm after fabrication
 - Q-slope to 28 MV/m, no quench, return to FNAL
- Cavity 2, BCP 60 μm after fabrication
 - Q-slope to 22 MV/m, then quench
 - Quench location identified with 2nd sound
 - optical microscopy with Questar shows bump (s) –see figure
 - (but not on weld)
- Cavity 2' BCP Total 180 μm
 - Q-slope to 29 MV/m, then quench
 - Same location, only one bump remaining
- Cavity 3, BCP 60 mm
 - Q-slope to 24 MV/m, then quench
 - Quench location identified with 2nd sound
 - optical microscopy with Questar shows bump (s) –see figure
 - (but not on weld)
- Cavity 4, BCP total 150 mm
 - Q-slope to 25 MV/m. then quench
 - Quench location identified with 2nd sound
 - Preliminary analysis, location near weld (different from others)
 - Optical inspect coming this week
- Summary
 - Gradient > 25 MV/m possible
 - Quench is not in weld
 - But fabrication technique leaves bumps on material

Defect Found in Cavity #1 with 2nd Sound Detection and Questar Inspection



Defect found with 2nd Sound and inspection
by Questar on Cavity # 3



End