

Update on S0 Work in the Americas Region

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27 January 2009



Argonne-Fermilab Cavity Processing Facility Status



- Vacuum system installation and commissioning completed last week.
- Water plant sanitization performed Monday, Jan. 26th.
- Ultrasonic tank is approved for operation.
- Cavity handling cart was load tested at Fermilab. Safety documentation delivered to Argonne for review.
- Cavity assembly fixture due from manufacturing this week. Thereafter, perform load test at Fermilab. Safety documentation delivered to Argonne for review.
- Gantry design is finalized. Materials partially received; remainder due in next week. Engineering note and hazard analysis in progress.
- First complete single-cell processing planned for later this week
 - Electro-polishing, ultrasonic cleaning, high-pressure rinsing, assembly, and vacuum leak testing
- First complete nine-cell processing planned for February

Needed for
nine-cell cavities



NR-4 single-cell cavity result after HPR and assembly at Argonne-Fermilab cavity processing facility

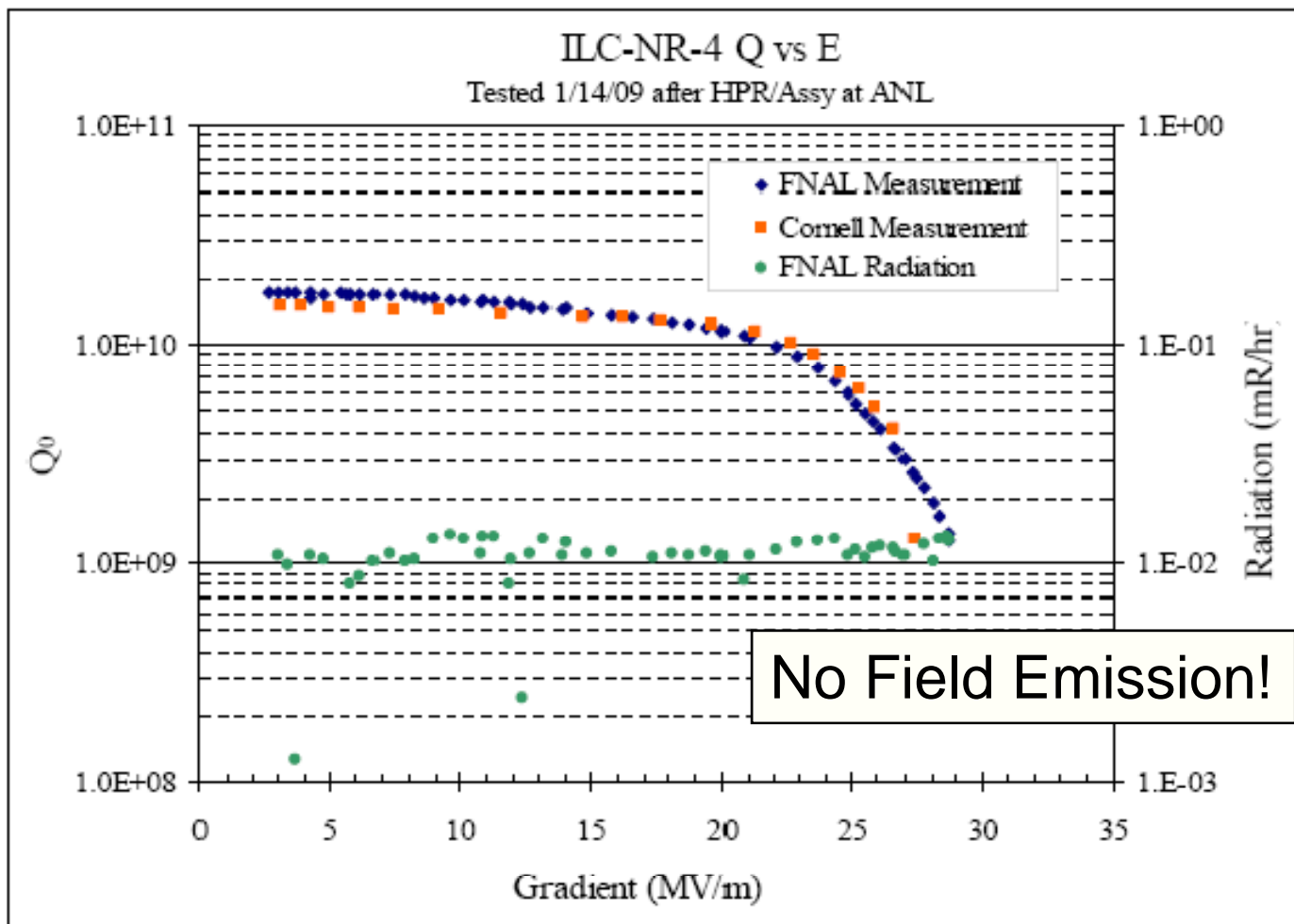


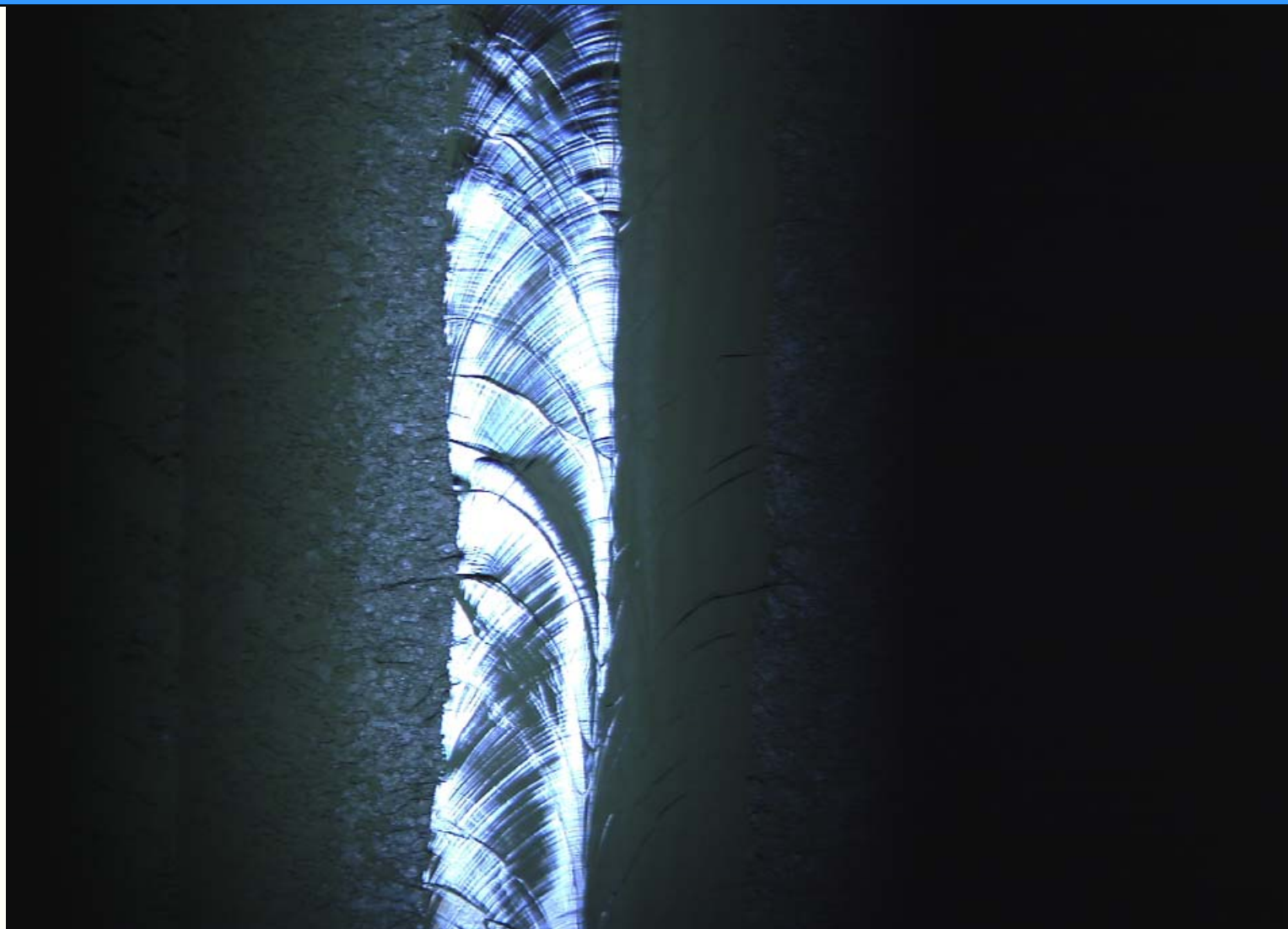
Figure 3.) Final Q_0 vs E run at 2K at FNAL, compared to Cornell data from 2008.



First image using optical inspection system at Fermilab, Jan 13



Fermilab



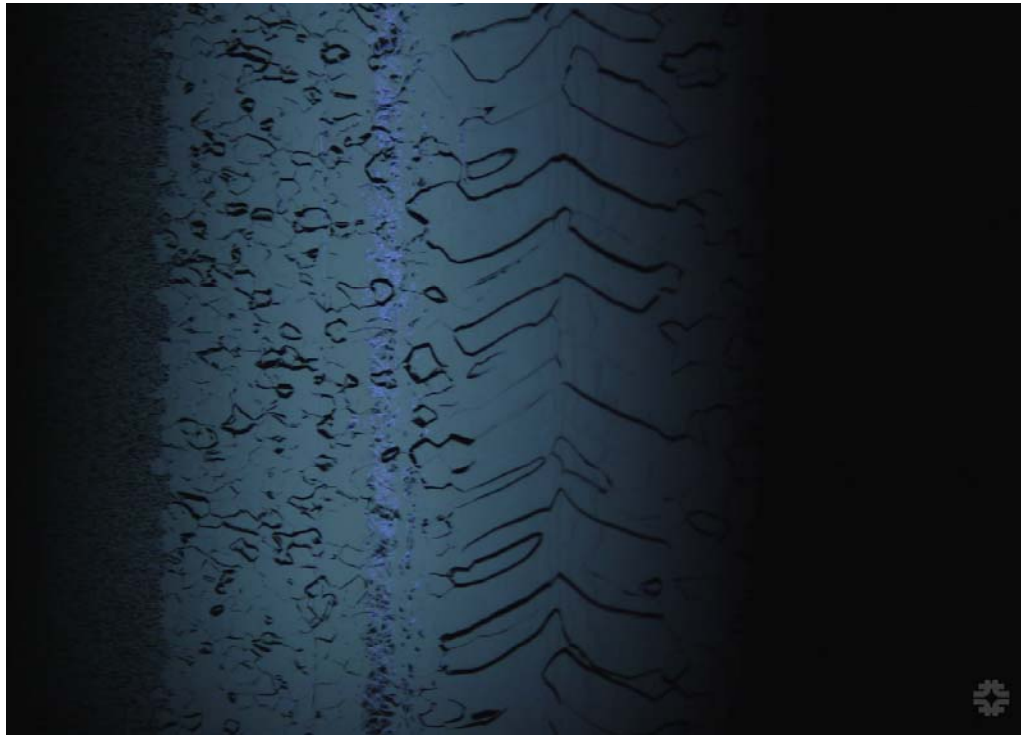


- The following slides are from Genfa Wu, Fermilab.

NR-1

Cavity history:

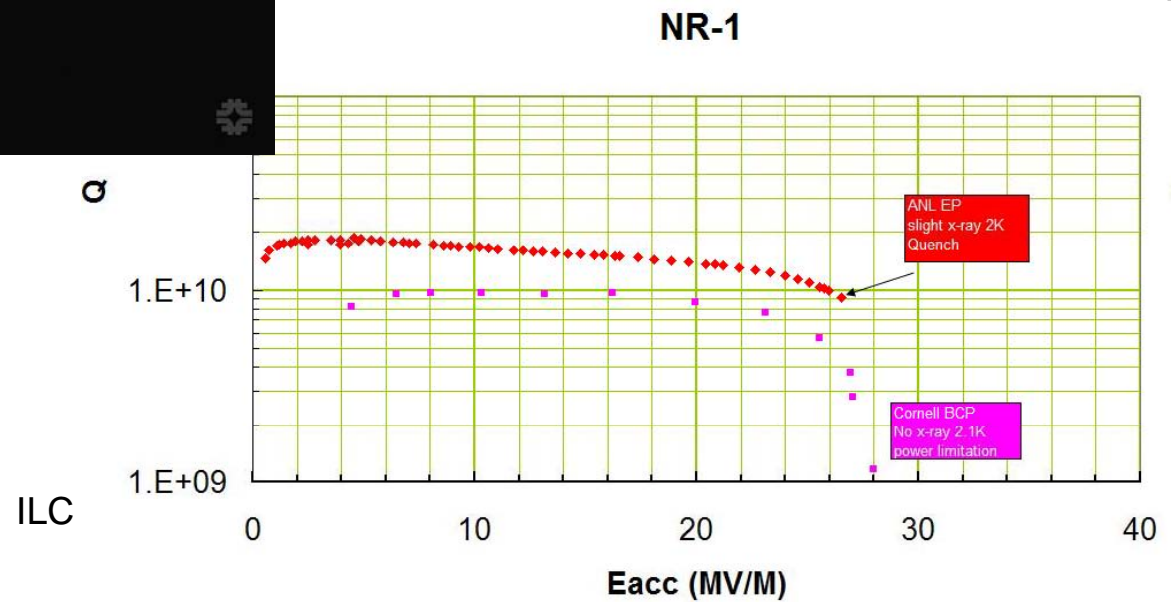
BCP 150 μm ,
EP 100 μm ,
No In-situ baking



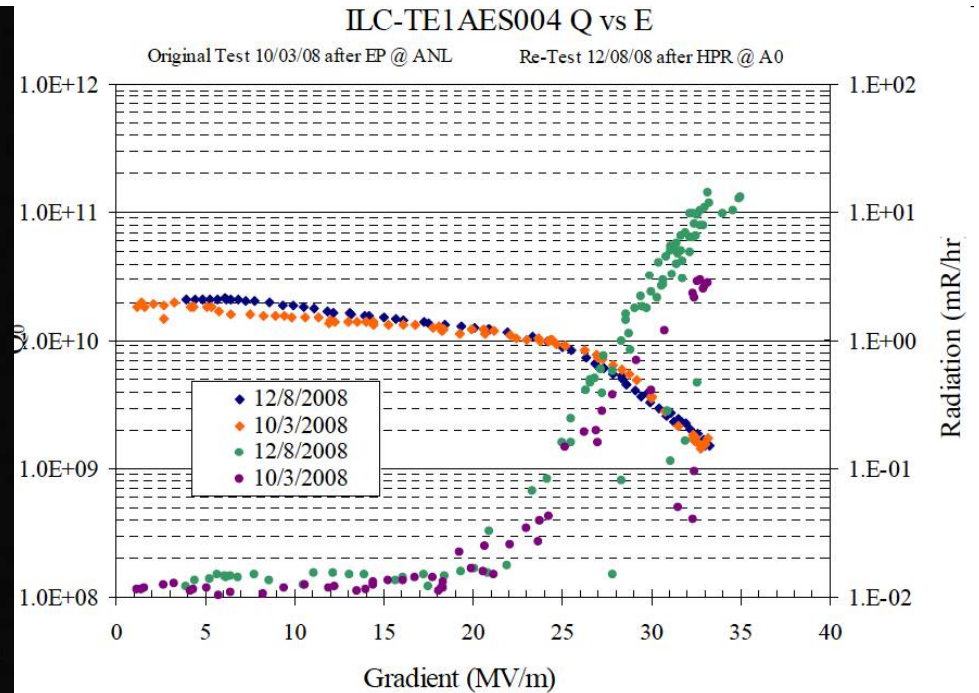
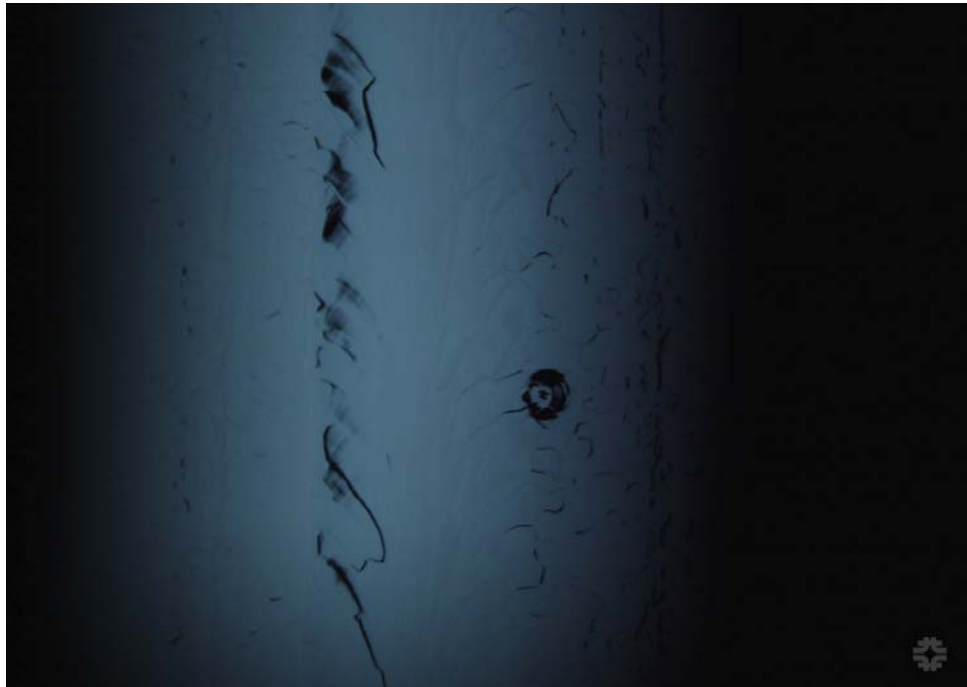
26 MV/m, quench

Equator weld rough
despite 100 μm EP

January 27, 2009



TE1AES004



Cavity history:

BCP 107 μm ,

EP 65 μm ,

In-situ baking 120°C

33 MV/m, No quench, limited by power

Pit 0.9 mm diameter, depth still being investigated



Iris ridge evident, despite BCP and EP.
This may be cause of persistent FE.

TE1AES004



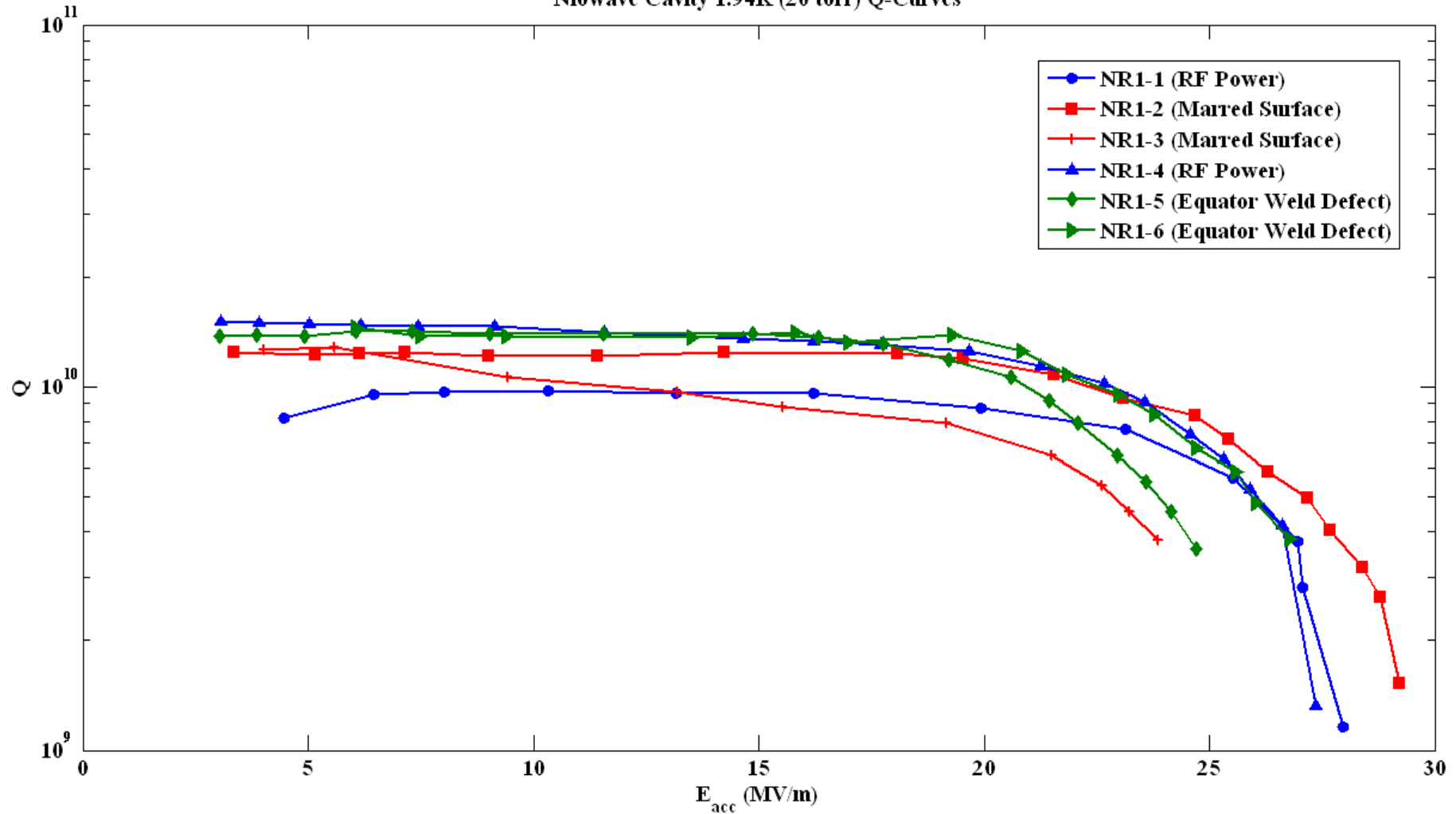
- The following slides are from Zack Conway, Cornell.

Niowave Single-Cell BCP Cavity Performance

Niowave Cavity	BCP (1:1:2) Etch	Q_0 (1.94 K)	Peak E_{acc}	Q at Peak E_{acc}	Field Limit
NR1-1	85 μm	8.2 e 9	27.9 MV/m	1.2 e 9	RF Power
NR1-2	113 μm	1.2 e 10	29.2 MV/m	1.5 e 9	Marred Surface
NR1-3	60 μm	1.3 e 10	23.8 MV/m	3.8 e 9	Marred Surface
NR1-4	254 μm	1.5 e 10	27.4 MV/m	1.3 e 9	RF Power
NR1-5	184 μm	1.4 e 10	24.7 MV/m	3.6 e 9	Equator Weld Defect
NR1-6	205 μm	1.5 e 10	26.8 MV/m	3.8 e 9	Equator Weld Defect

Niowave Single-Cell BCP Cavity Performance

Niowave Cavity 1.94K (20 torr) Q-Curves



Niowave Defect Location

- The maximum field of 4 out of 6 Niowave cavities were limited by defects.
- The defects were located with a second sound time-of-flight measurement system.
- Niowave cavities 2 and 3 quenched at a surface defect caused by the die used to form the half cells.

Niowave Single Cell NR-3



January 27, 2009



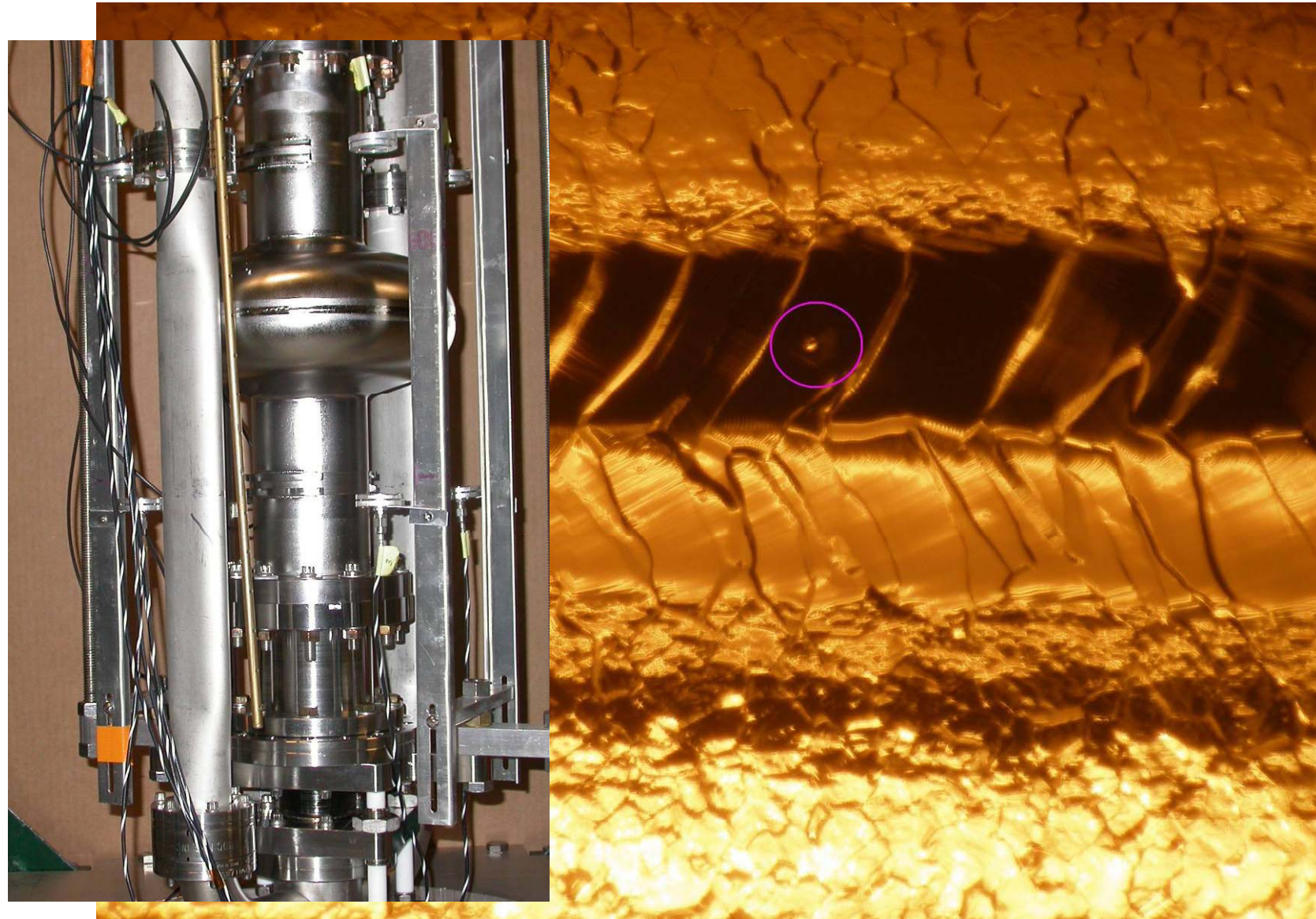
ILC S0 WebEx Meeting

13

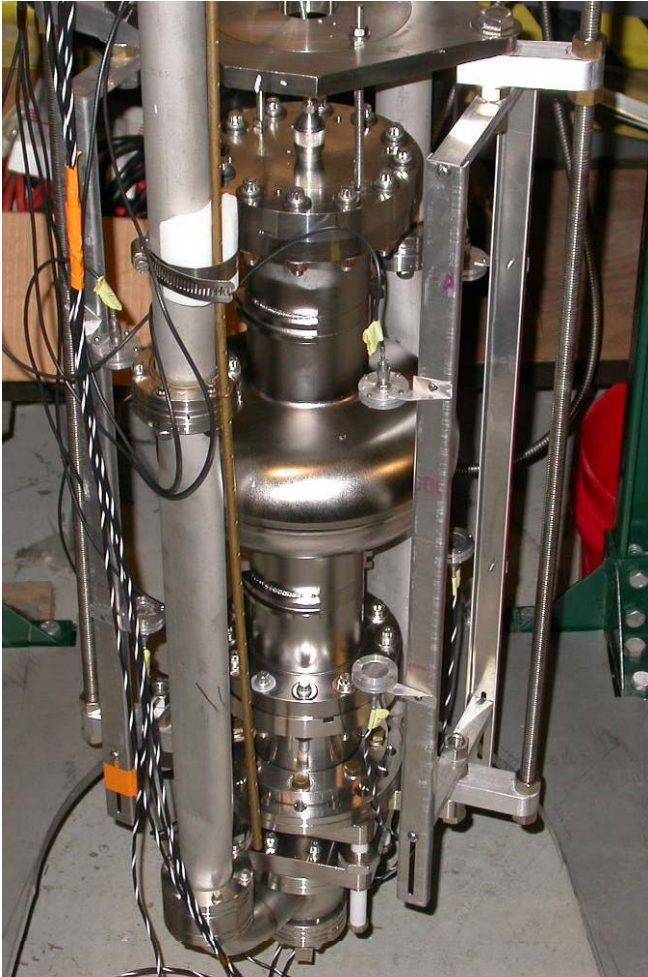
Niowave Defect Location

- Niowave cavities 4, 5, and 6 received extra BCP to remove the die caused surface defect.
- Cavities 5 and 6 quenched on the equator weld. Cavity 4 was limited by Q-slope.

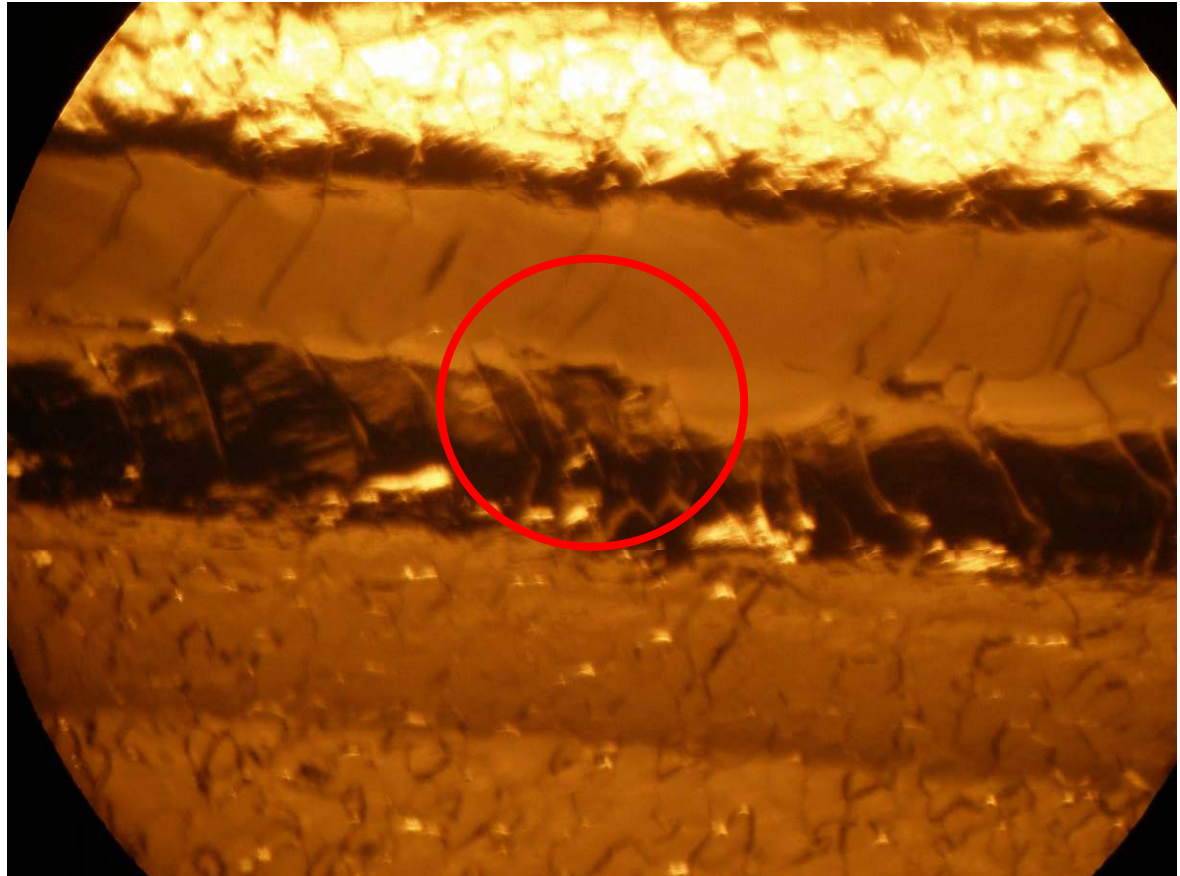
Niowave Single Cell NR-5



Niowave Single Cell NR-6



January 27, 2009

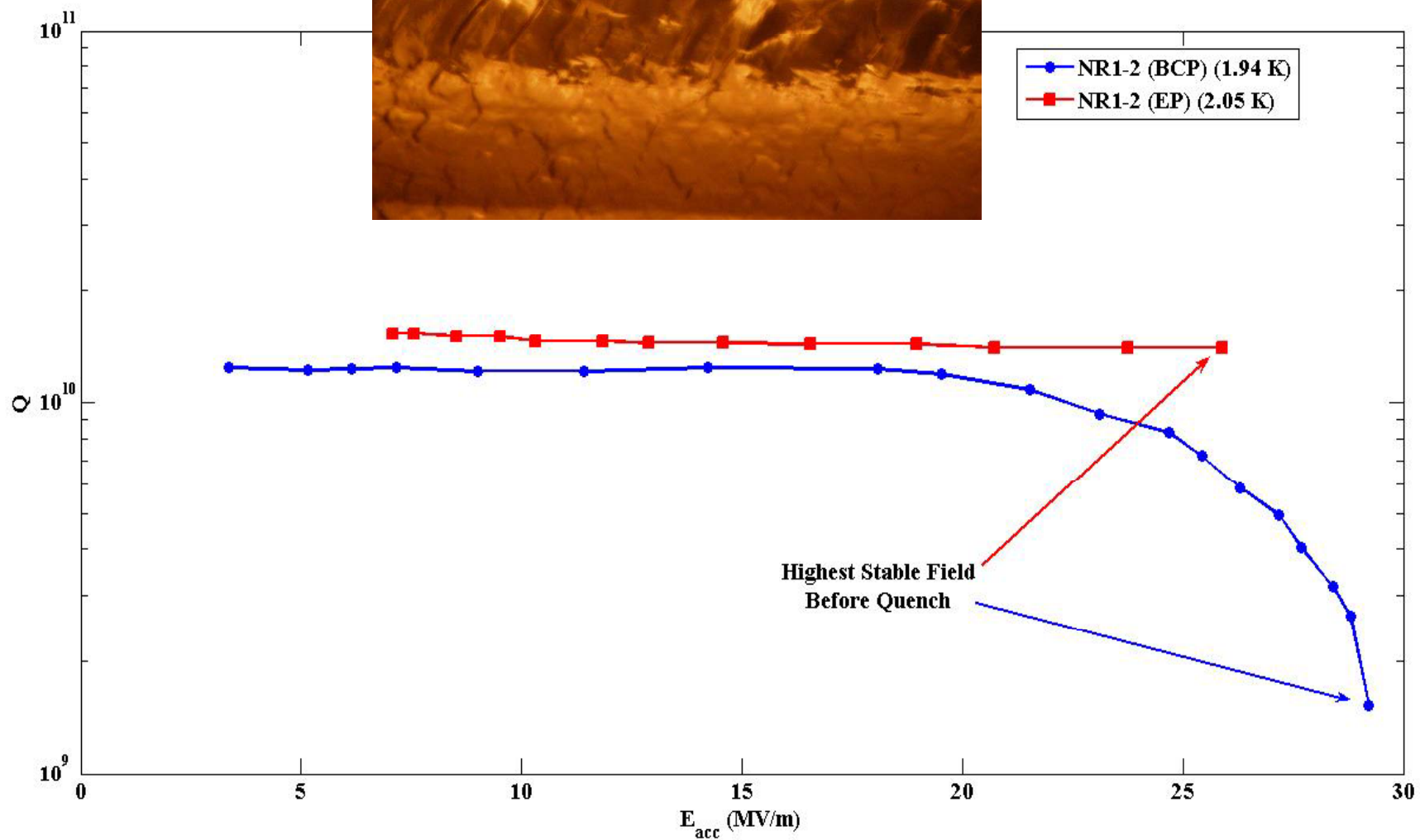
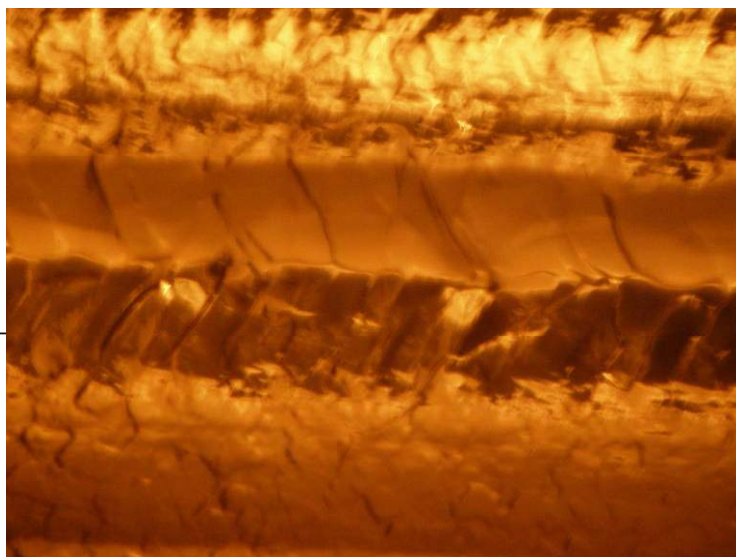


ILC S0 WebEx Meeting

16

Niowave Cavity #2

- Following the BCP test, Niowave cavity #2 received a heavy VEP (200 μm), a 2 hour 800 C bake, and a 25 μm VEP.
- Test results are shown on the next slide.
- This cavity had a high Q and no Q-slope. This cavity quenched on the equator weld.





- **There are no new test results (I think) due to the holiday shutdown and recent problems with the high-pressure rinsing system.**
- **Accel 13 achieved >40 MV/m and is being shipped to Fermilab.**
- **Accel 14 received light electro-polish and is being prepared for testing.**
- **Accel 7 delivered to Fermilab for flange repair.**
- **Two new AES cavities (AES5 and AES6) received from Fermilab.**