

Update on S0 Work in the Americas Region

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Progress at Argonne Cavity Processing Facility



Installation of ultrasonic cleaning system in progress

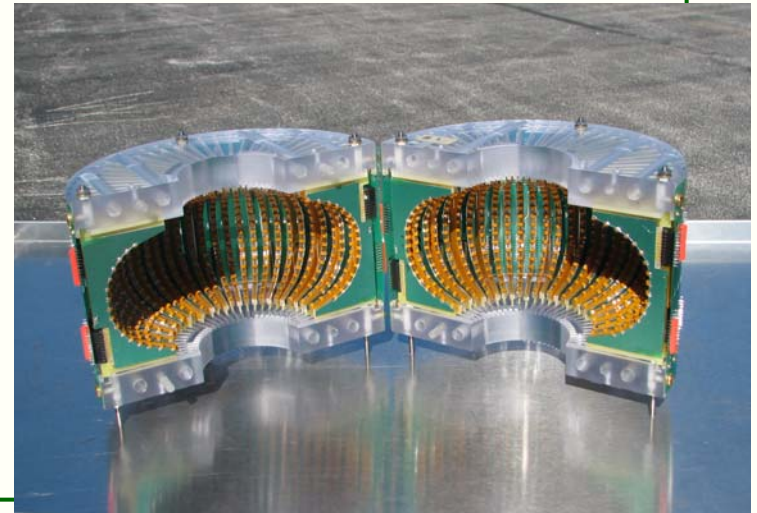


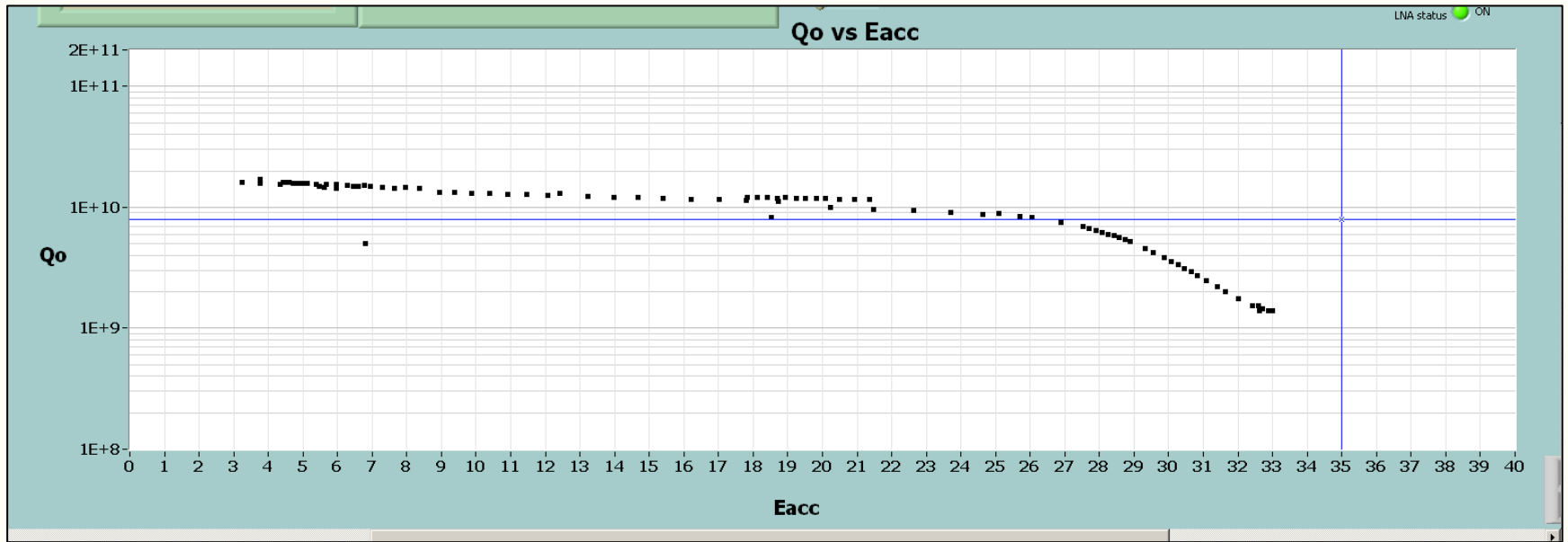
High-pressure rinsing system commissioned Oct 29

- **12 nine-cell cavities ordered recently**
 - Six from AES
 - Six from Niowave-Roark
 - All due in about 1 year

- **AES single-cell cavity (TE1AES004) tested after electro-polishing at Argonne; degreasing, HPR and assembly at Fermilab**

- **Single-cell T-mapping system tested**
 - Data analysis in progress
 - Will undergo more testing in coming weeks





- 33 MV/m at $Q_o \sim 1.3e9$; field emission limited; no baking
- Next performed 120 C bake, but leak in cavity vacuum line caused contamination and greatly increased the field emission
- Cavity will undergo additional degreasing and high-pressure rinsing and then another test
- Meanwhile, a Niowave-Roark single-cell cavity (NR2) has been electro-polished and is being prepared for testing at Fermilab



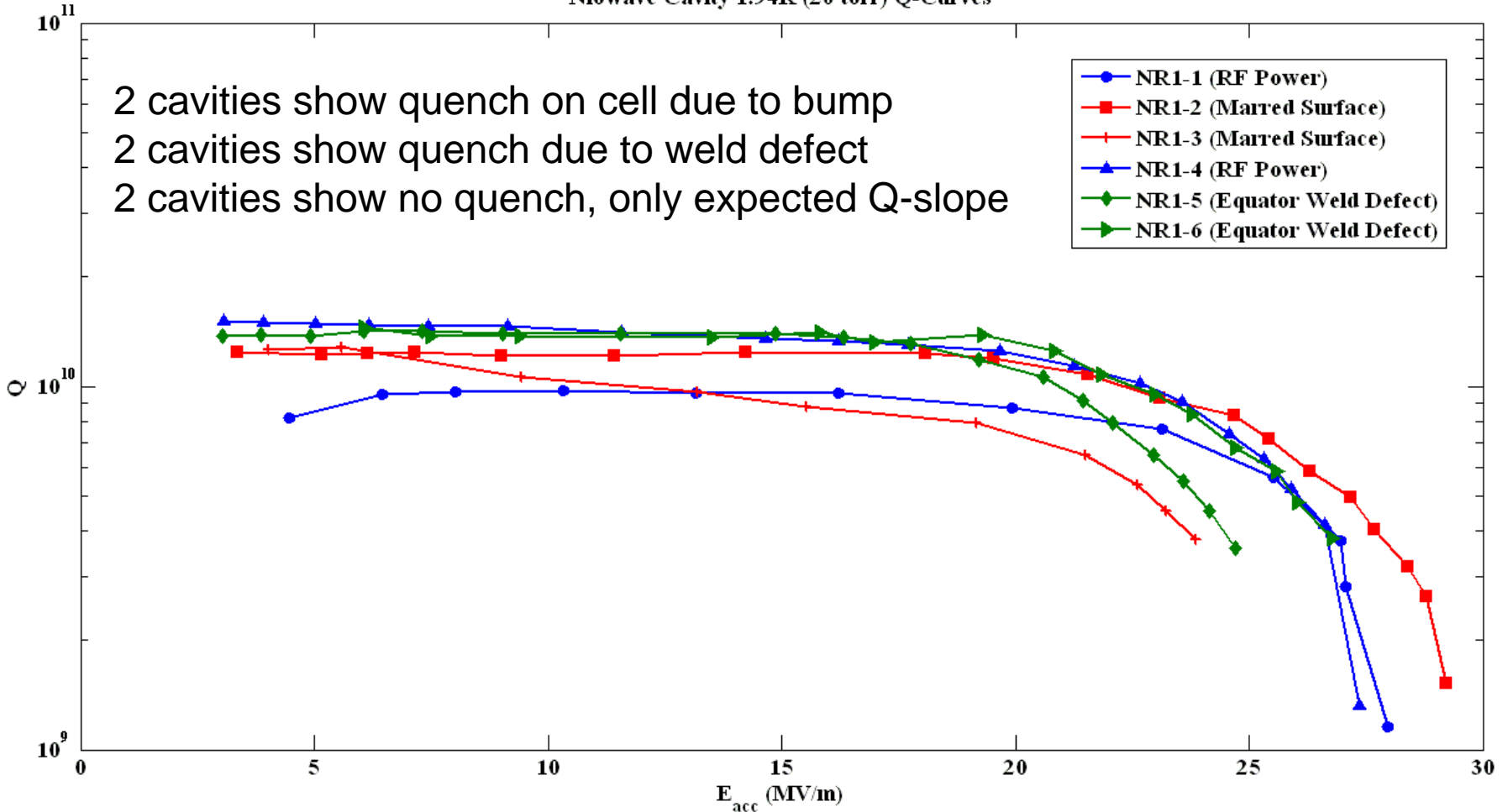
- **Slides provided by Hasan**



Niowave-Roark Cavities Preparation

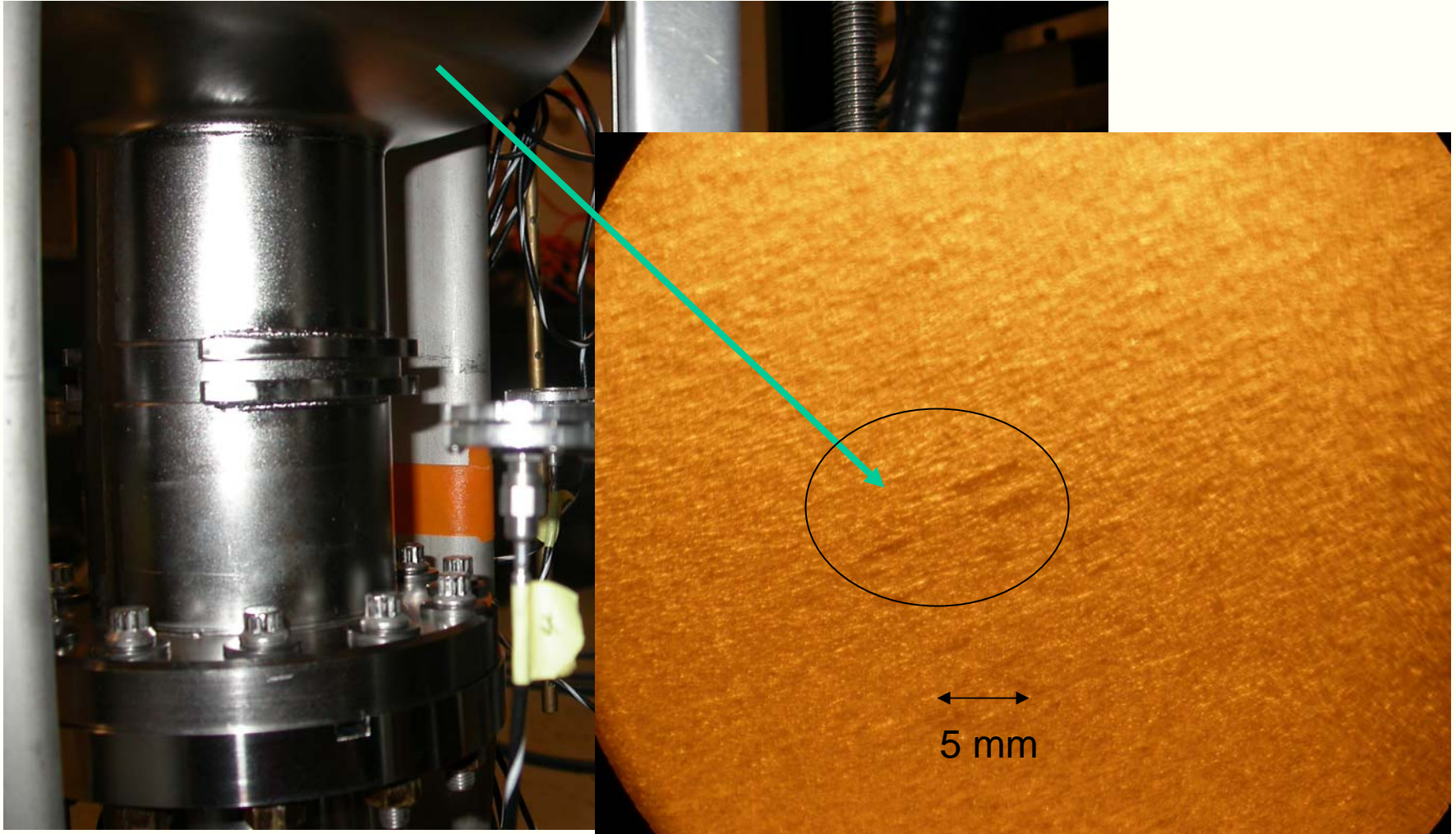
Niowave Cavity	BCP (1:1:2) Etch	Q_0 (1.94 K)	Peak E_{acc}	Q at Peak E_{acc}	Field Limit
NR1-1	85 mm	8.2 e 9	27.9 MV/m	1.2 e 9	RF Power
NR1-2	113 mm	1.2 e 10	29.2 MV/m	1.5 e 9	Marred Surface Picture shown
NR1-3	60 mm	1.3 e 10	23.8 MV/m	3.8 e 9	Marred Surface Picture shown
NR1-4	254 mm	1.5 e 10	27.4 MV/m	1.3 e 9	RF Power
NR1-5	184 mm	1.4 e 10	24.7 MV/m	3.6 e 9	Equator Weld Defect Picture shown
NR1-6	205 mm	1.5 e 10	26.8 MV/m	3.8 e 9	Equator Weld Defect No picture yet

Niowave Cavity 1.94K (20 torr) Q-Curves



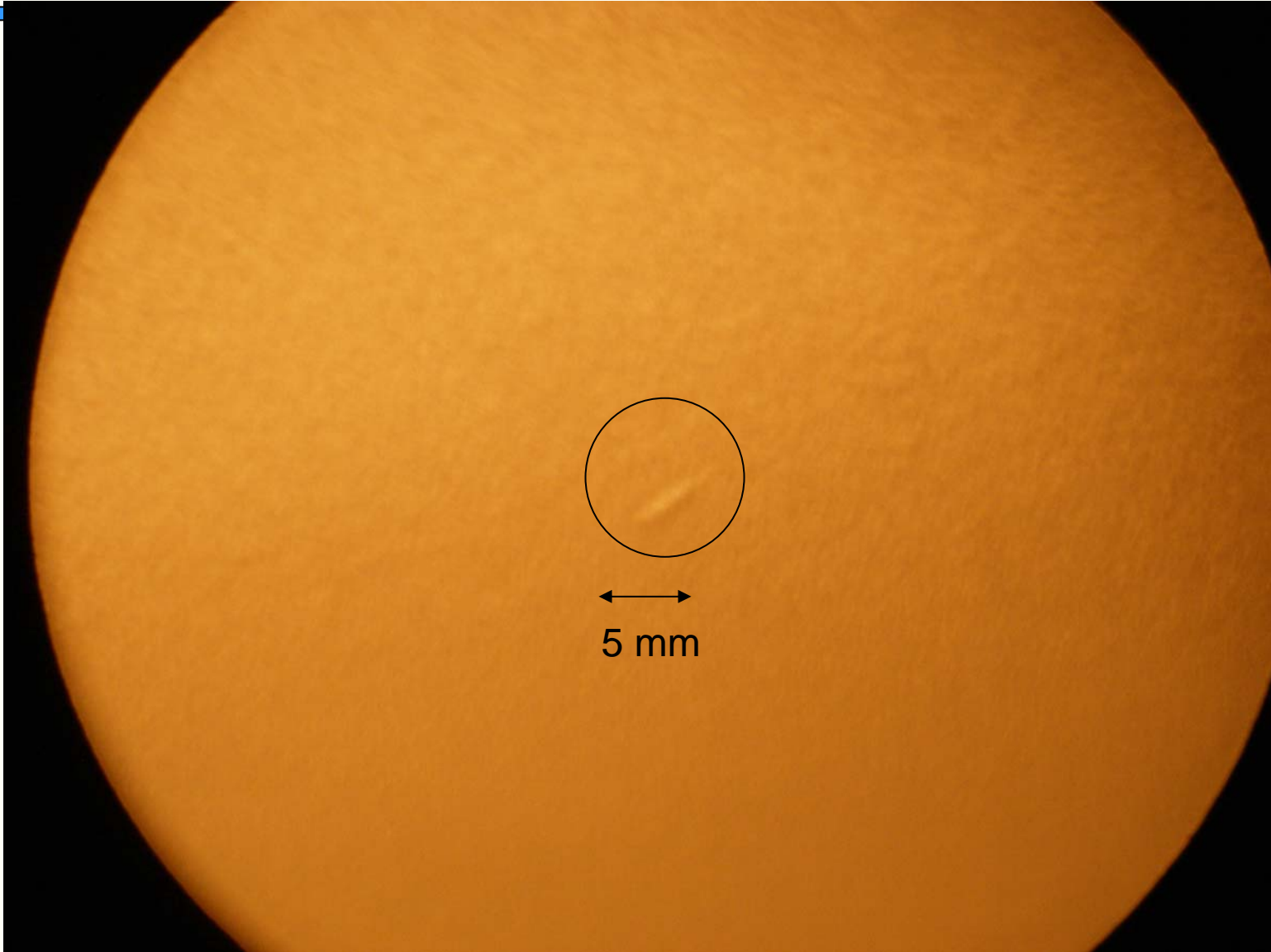


Cavity #3: Defect Discovered with 2nd Sound Detection and Questar Optical Inspection





Cavity #2: Defect Discovered with 2nd Sound Detection and Questar Optical Inspection



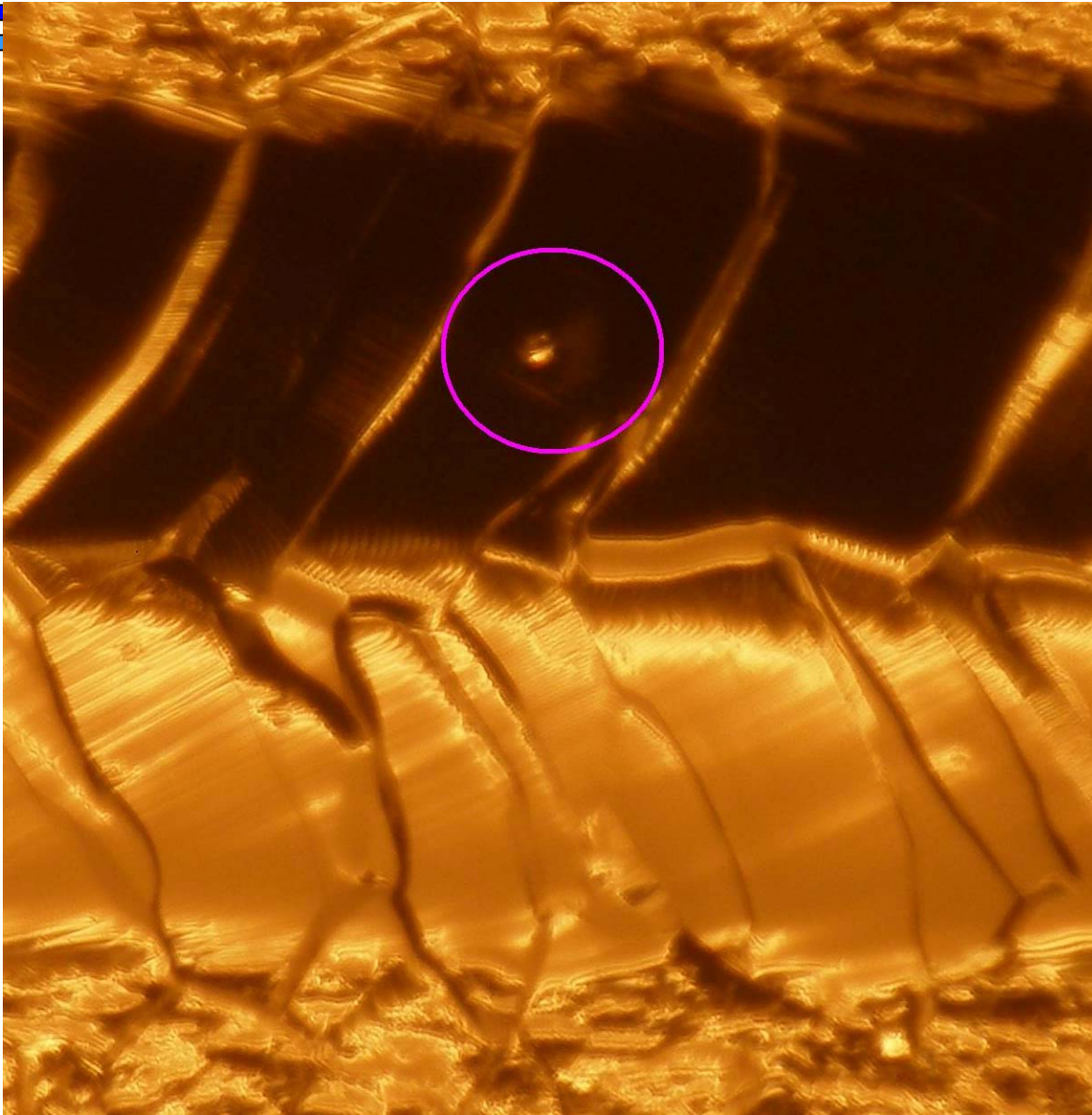


Related Defect on Die at Niowave





Cavity #5: Pit on Equator Weld Discovered with 2nd Sound Detection and Questar Optical Inspection

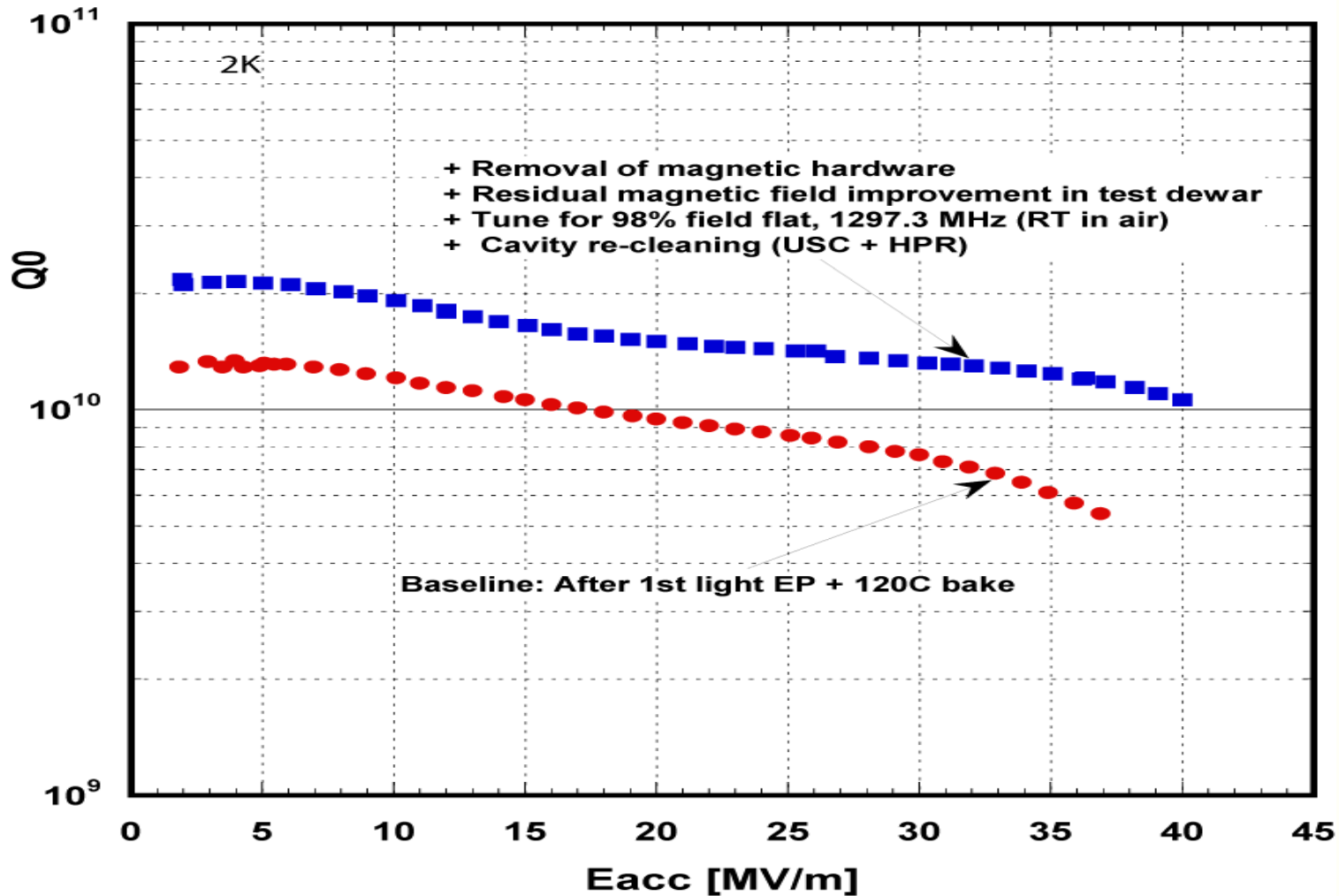


Pit size = 100 μm



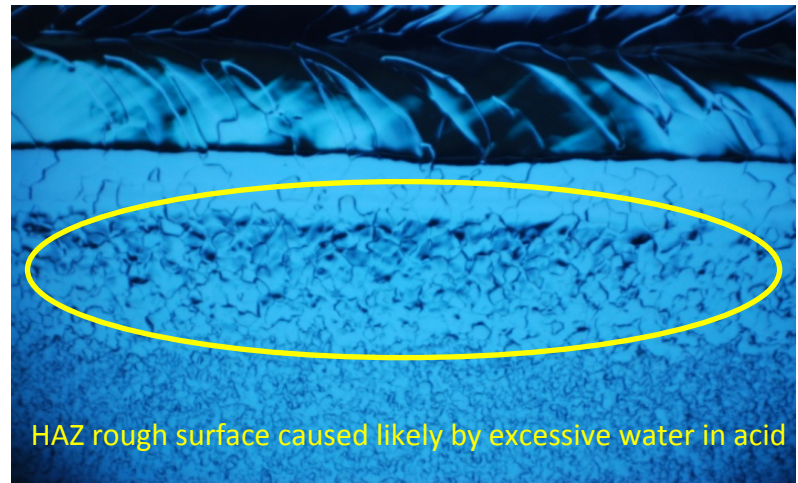
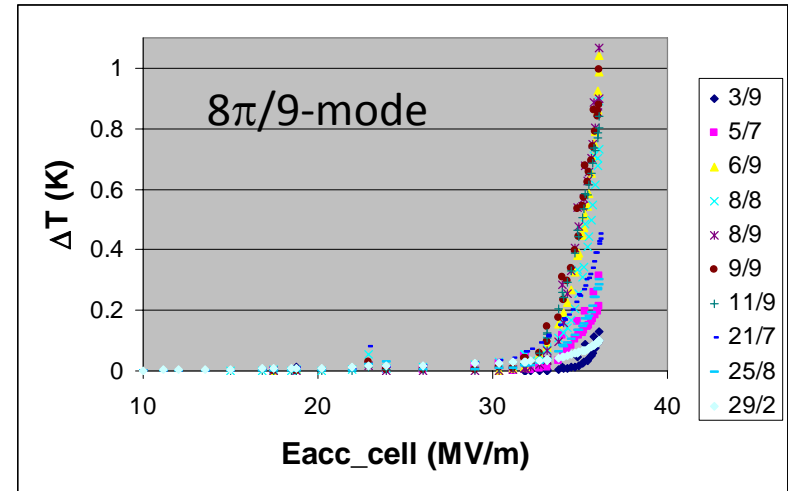
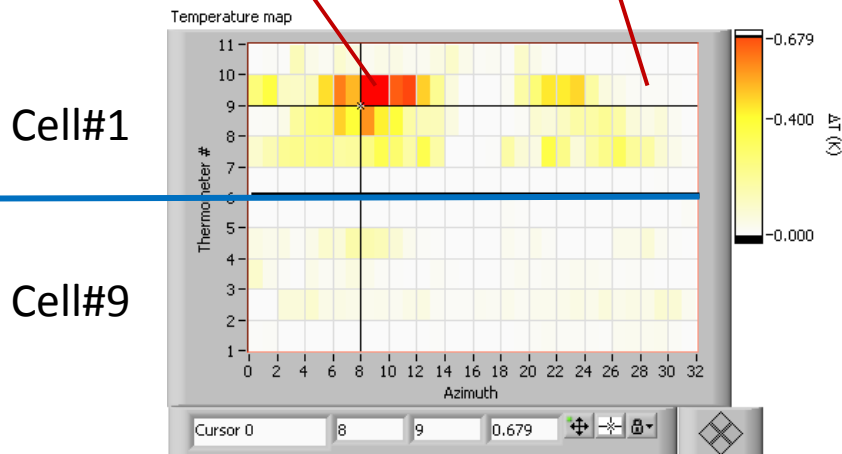
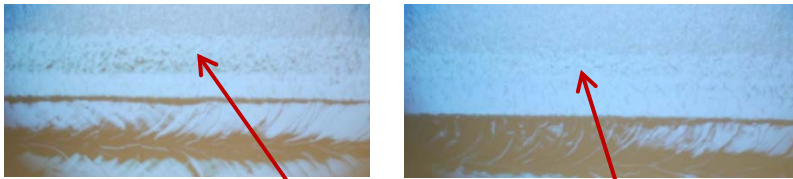
- **Slides provided by Rongli**

A11_test2_data_aug222008_2
 A11_test4_FinalPowerRise_21oct08



J2 re-tested with T-mapping & RF surface inspected

- Thermometers on cell #1 & #9. Mode-mixing (π & $8\pi/9$) observed when $E_{acc} > 9$ MV/m for π -mode excitation. Some evidence of electronic activity at tip of transmitted power antenna.
- With $8\pi/9$ -mode excitation, Quench limit reached at 36 MV/m. Hot spots in cell#1.
- Apparent enhanced roughness in hot region as well as pits close to hot spots.
- $\Delta T(E_{acc})QE^n$, $n=2.5-3$ for $E_{acc}=10-30$ MV/m in hot AND cold region; $n=25-40$ for $E_{acc}>30$ MV/m.
- HAZ of all cells inspected (7 of 9) show enhanced roughness – presumably caused by less-optimal bulk EP due to water addition into EP acid after one use.

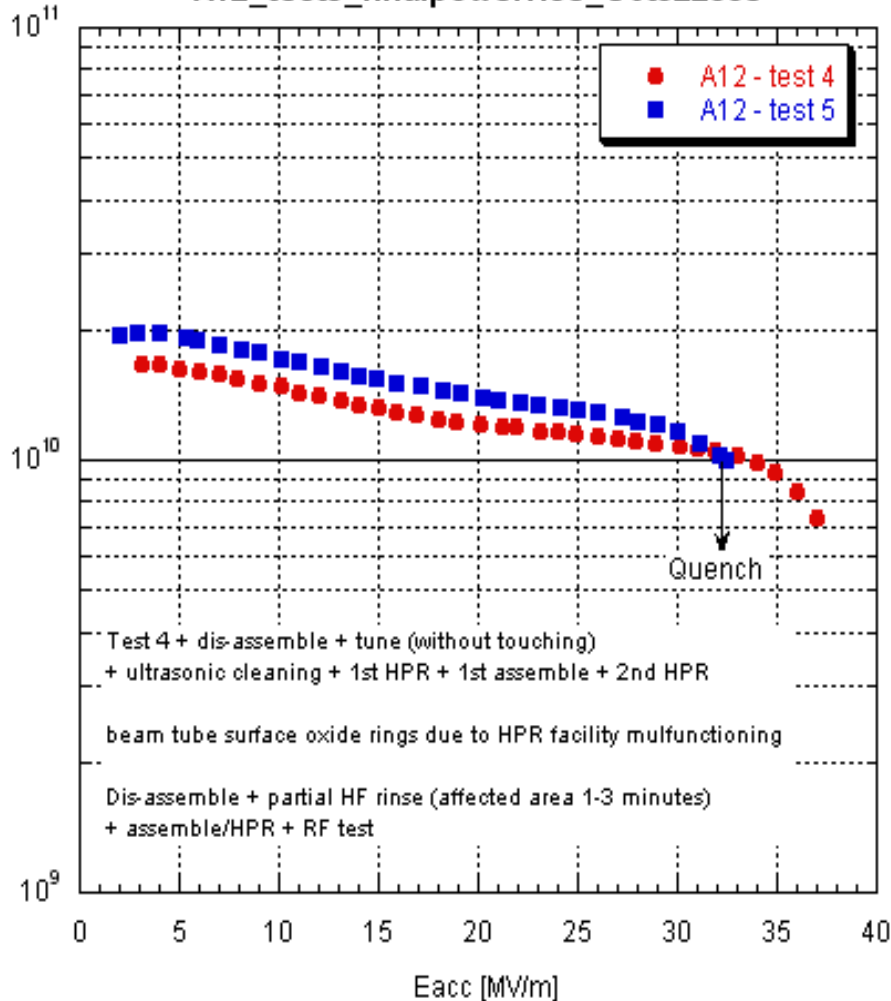


HAZ rough surface caused likely by excessive water in acid

A major bug (causing H2O addition into sump) in EP machine discovered/removed J2 second light EP Wednesday – stay tuned

November 04, 2008

A12_test4_finalpowerrise_July212008
 A12_test5_finalpowerrise_Oct022008



Status

- A12 exceeded 35 MV/m after first light EP.
- Plan was tuning for final frequency and field flatness and ship to FNAL.
- Oxide rings formed inside beam tube during final HPR due to stoppage of wand movement.
- Removal of oxide rings necessary – localized HF rinse successful.
- A12 reached quench limit at 32.5 MV/m after localized HF rinse.

Next

- T-mapping is next
- Another light EP will follow