

Americas Region Update

C.M. Ginsburg (Fermilab)

S0 Meeting - WebEx

July 20, 2010

Cryomodule 2

Cavity ID	CM2 candidate	Vertical Test	He vessel?	Horizontal Test	cryomodule ready?
TB9AES009		1 36 MV/m	dressed	35 MV/m	yes
TB9ACC013		2 38 MV/m	dressed	ongoing	
TB9AES010		3 38 MV/m	dressed		
TB9AES008		4 41 MV/m	dressed		
TB9ACC016		5 39 MV/m	dressed		
TB9AES007		6 42 MV/m	dressed		
TB9RI029		7 35 MV/m	dressed		
TB9RI018		8 39 MV/m			
ACCEL8	backup	31 MV/m	dressed	31 MV/m	yes
TB9RI019	backup	38 MV/m*			

- Vast majority of cavities vertically qualified at JLab
- Will vertically re-test TB9RI019 at FNAL because of mode mixing
- horizontal test is the bottleneck, improving; now on 4th HT of 1.3 GHz cavities for CM2; TB9ACC013 had coupler problem in 1st HT so re-test
- plan CM2 assembly this calendar year

- **High-temperature furnace**
 - (currently all hydrogen degassing done at JLab)
 - acceptance test at vendor this week
 - receipt, installation in IB4, and final acceptance test by mid-September
 - cavity commissioning complete by mid-October
- **Final two RI cavities from 12-cavity order at JLab for std process/test [S0]**
- **Six cavity order from Niowave-Roark [new vendor qualification]**
 - **two 9-cell cavities received end-March**
 - TB9NR001: JLab standard process/test path
 - TB9NR002: FNAL/ANL standard process/test path
 - **incoming inspection (FNAL) and 10 um BCP complete (JLab)**
 - cavities are dirtier than those received from other vendors, greatly improved by BCP
 - one HOM notch filter frequency on TB9NR001 is too far off; HOM ass'y is abnormal
 - beamline flanges missing counterbores
 - some e-beam instability evident in weld overlap regions – studies at vendor in progress
- **Six cavity order from AES [experienced vendor; cavities partially for S0]**
 - five of six completed final assembly; sixth was to be finished yesterday
 - 10 um BCP at vendor starts late this week
 - delivery of first cavities starts late next week with few-day periodicity

JLab Update

RG

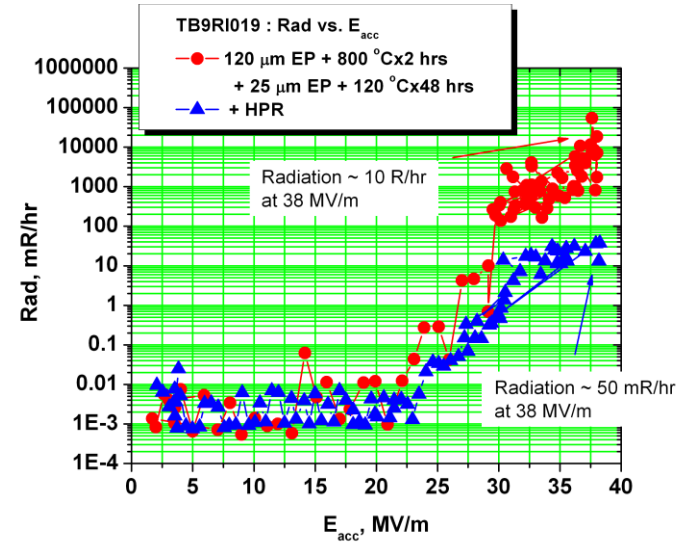
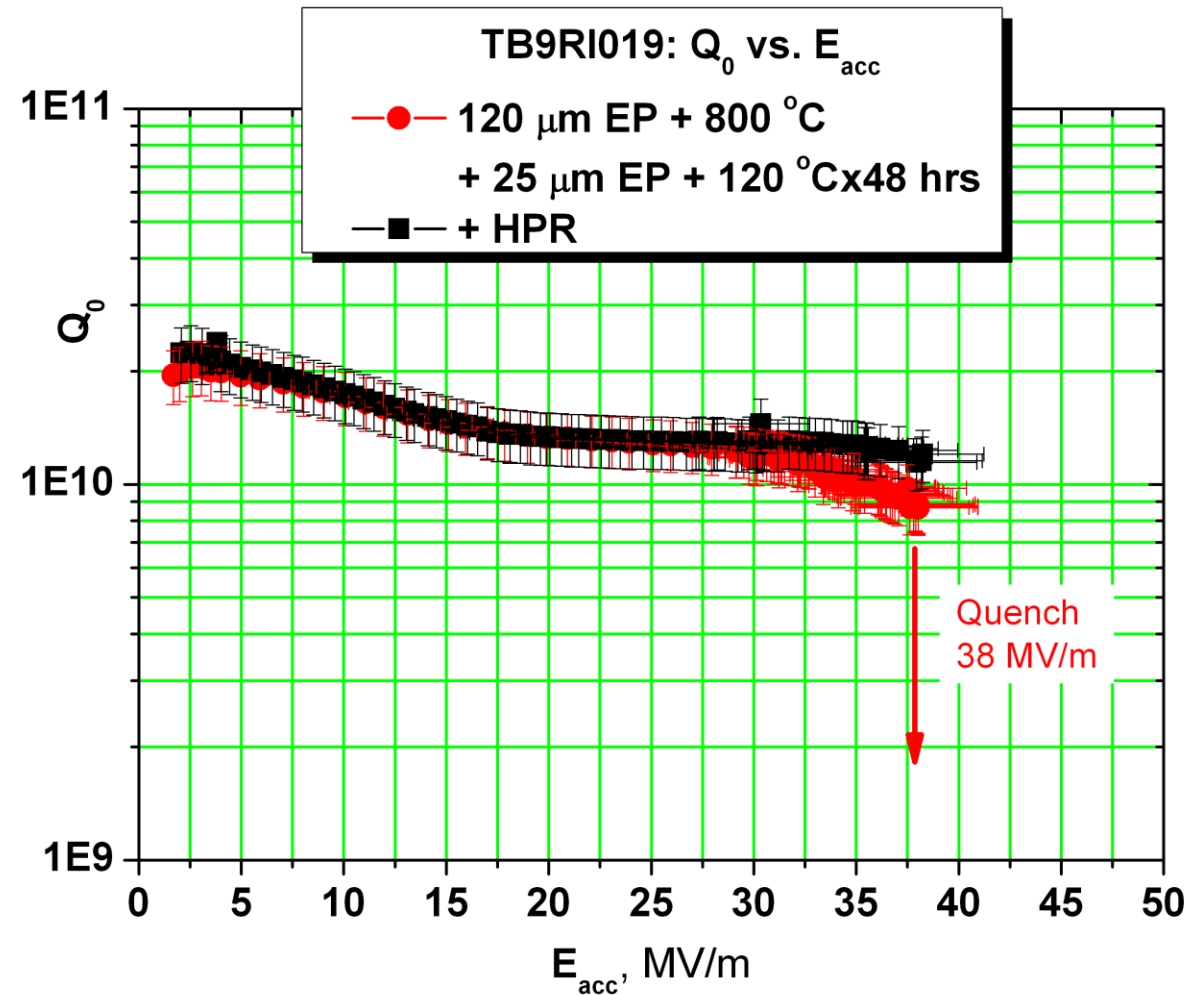
ILC Cavity Group Meeting

July 20, 2010

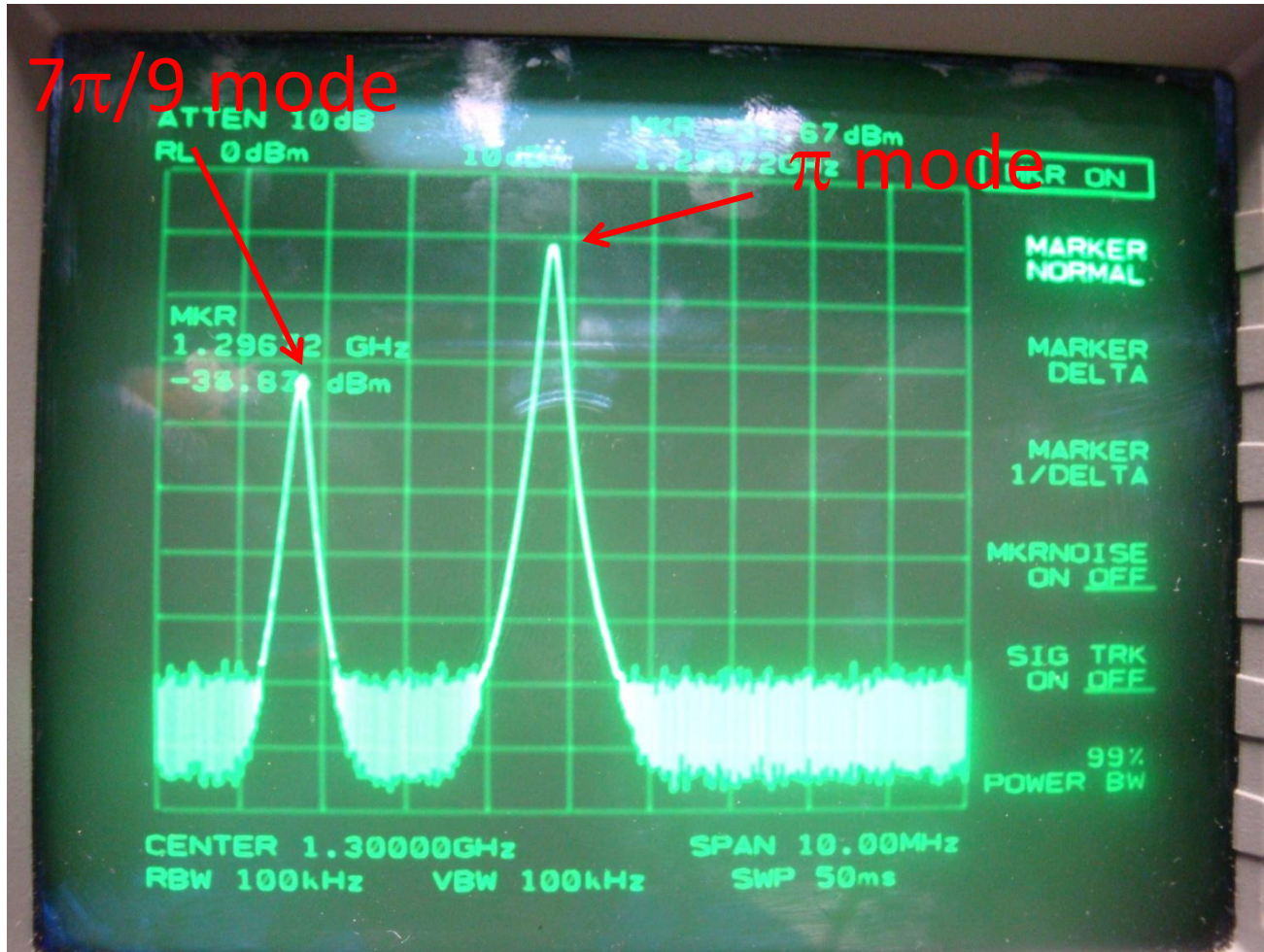
Cavity TB9RI019 Mode Mixing Observation and Quench Studies

- TB9RI019 re-tested after re-HPR.
 - Significant reduction in X-rays, some improvement in Q0.
 - Quench field remains the same, 38 MV/m.
 - Observed mode mixing at Eacc > 30 MV/m.
 - Quench cell predicted by OST's; quench location predicted by fixed thermometers.
 - Outstanding defects observed within 5mm distance from predicted quench location.
- TB9RI018 (39 MV/m) and TB9RI019 (38 MV/m) both shipped back to Fermilab.
- Received two more new raw RI cavities (TB9RI027 and TB9RI028).
- Received one (TB9NR001) of the first two Niowave-Roark cavities for standard JLab processing and testing.

TB9RI019 RF tests results

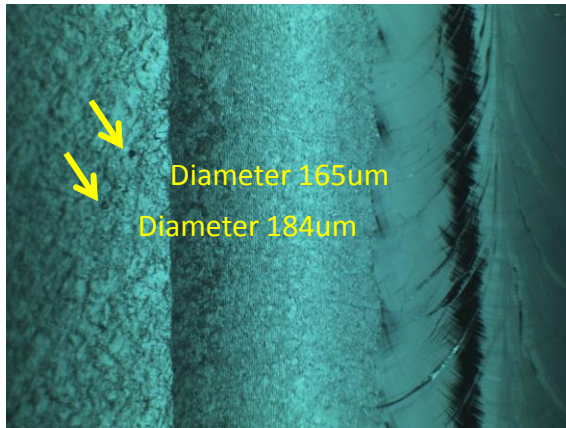


TB9RI019 RF tests results

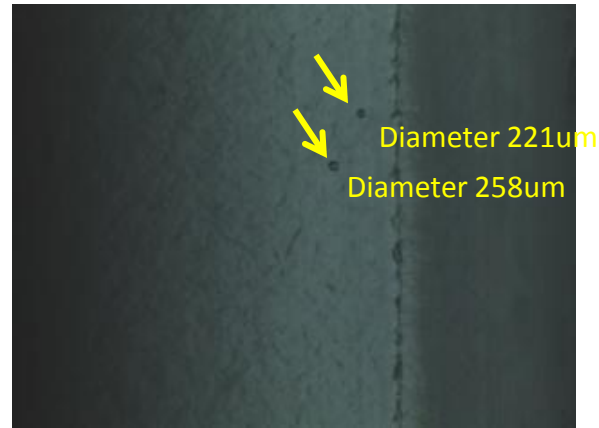


Evolution of the defects near quench location

TB9RI019 cell 1

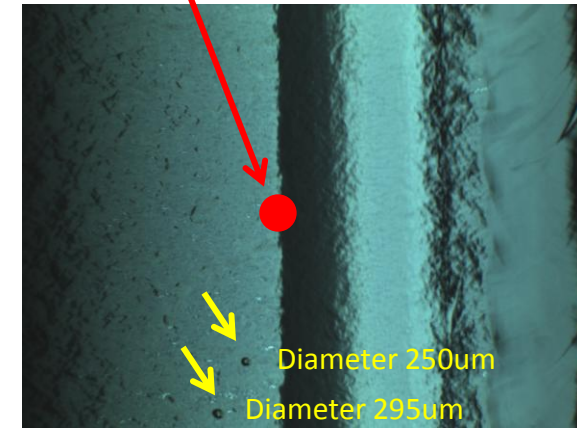


As received



EP 120um + 800Cx2hr

Predicted quench location
(38 MV/m)



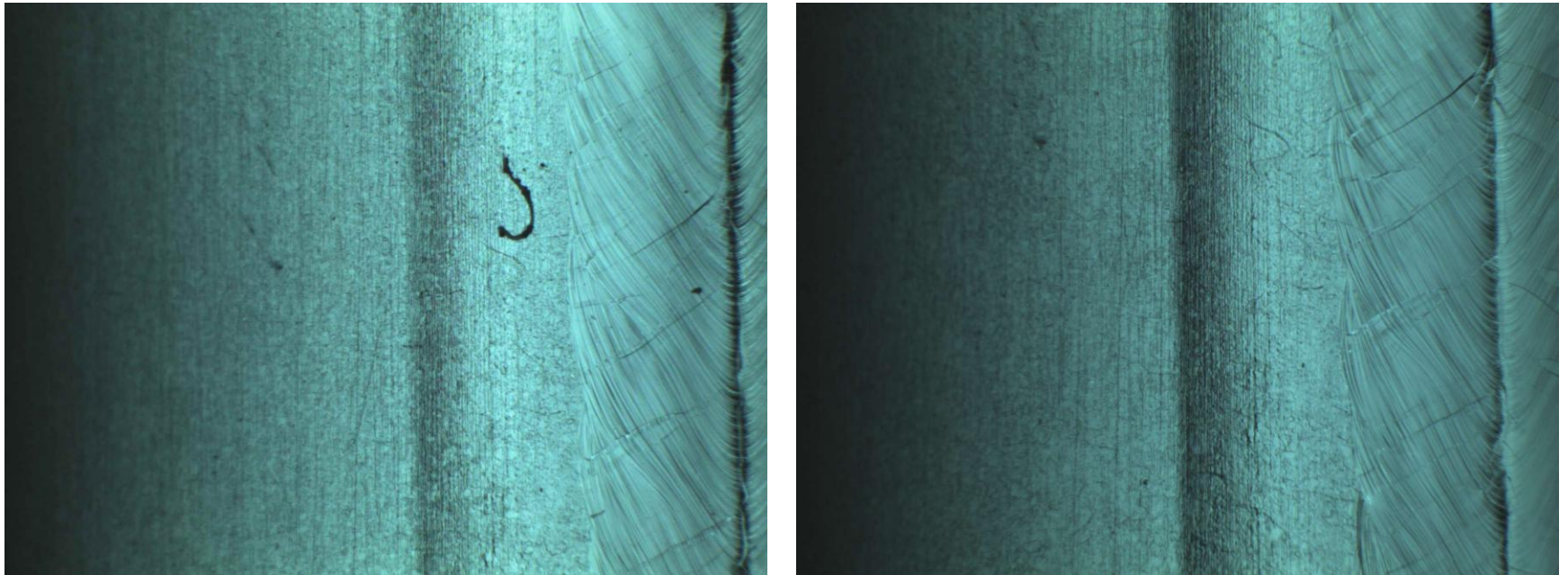
+ EP 25 um

TB9NR001 optical inspection and tracking

- 1st inspection as received
- 2nd inspection after USC + BCP 10um

Lots of dust particles observed on as-received surface.
Efficient removal of them by USC + BCP 10 um evident

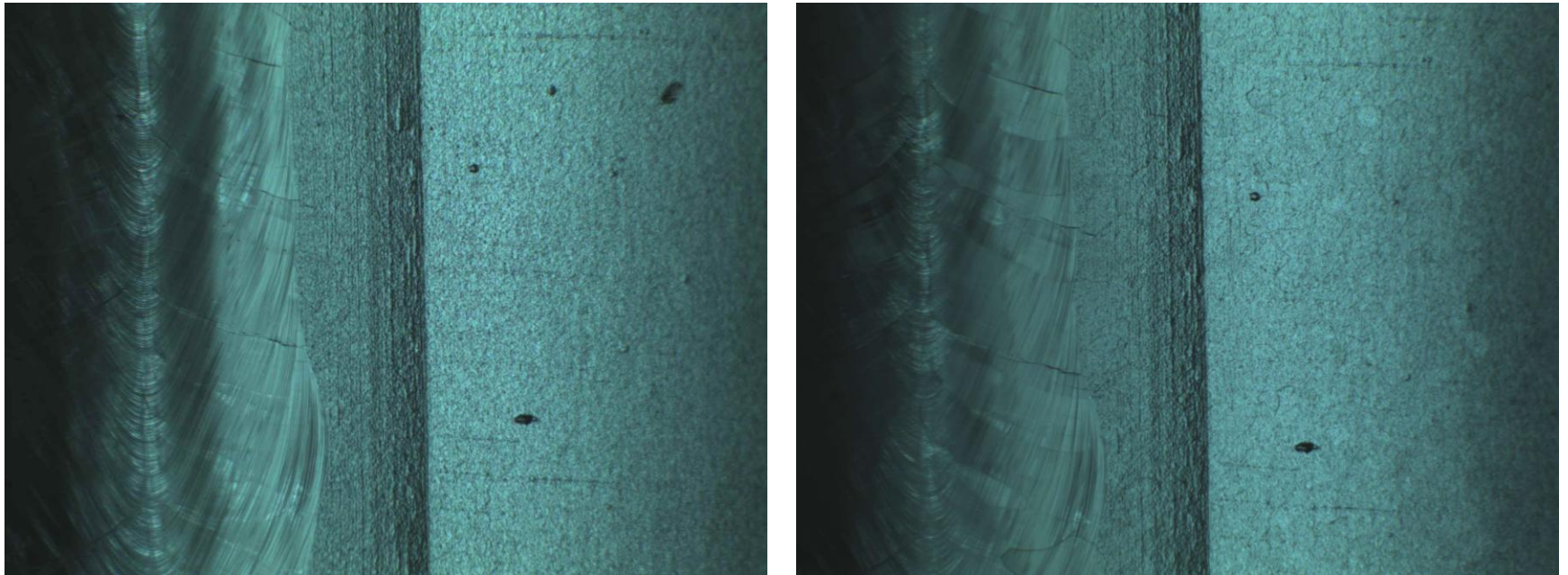
TB9NR001



Equator_NR001_E1_Z161mm_146Degrees0170

Lots of pits observed near equator EBW on as-received surface
USC + BCP 10 um ineffective in removing these defects
Consistent with previous observations at JLab
What is new: pit density significantly higher than early cavities

TB9NR001

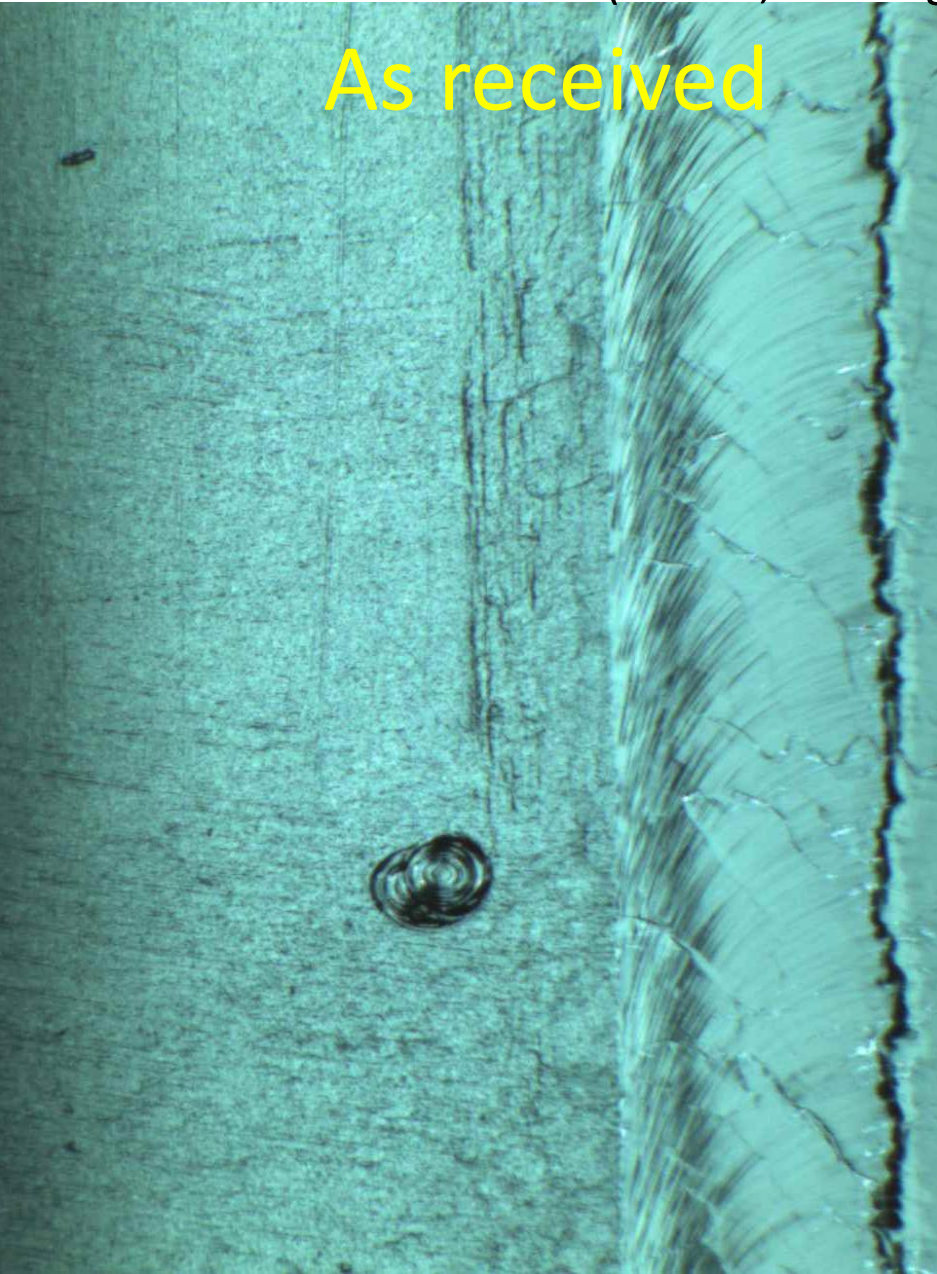


Equator_NR001_E1_Z171mm_353Degrees0085

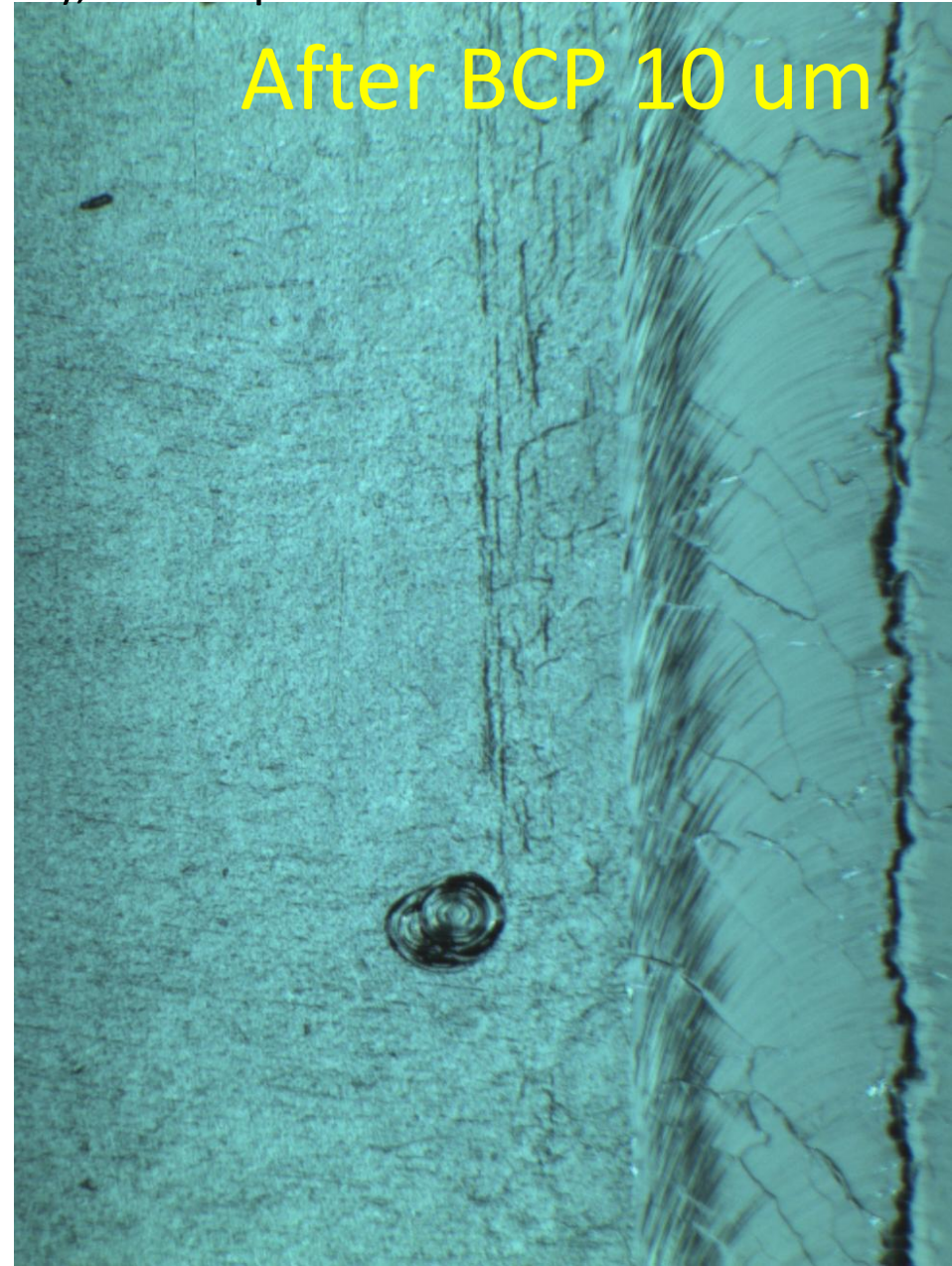
A Very Large Defect on RF Surface of TB9NR001

Cell#4 (51mm, 175Degree), near equator EBW

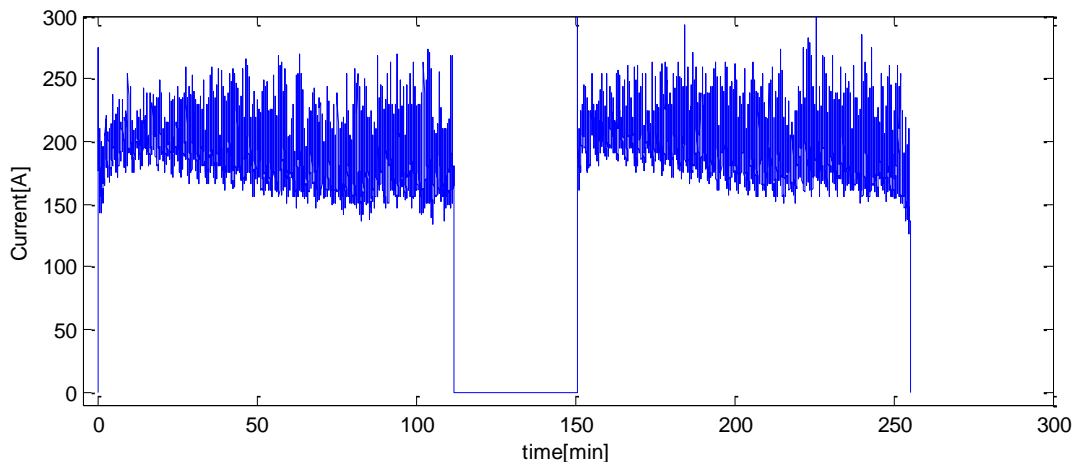
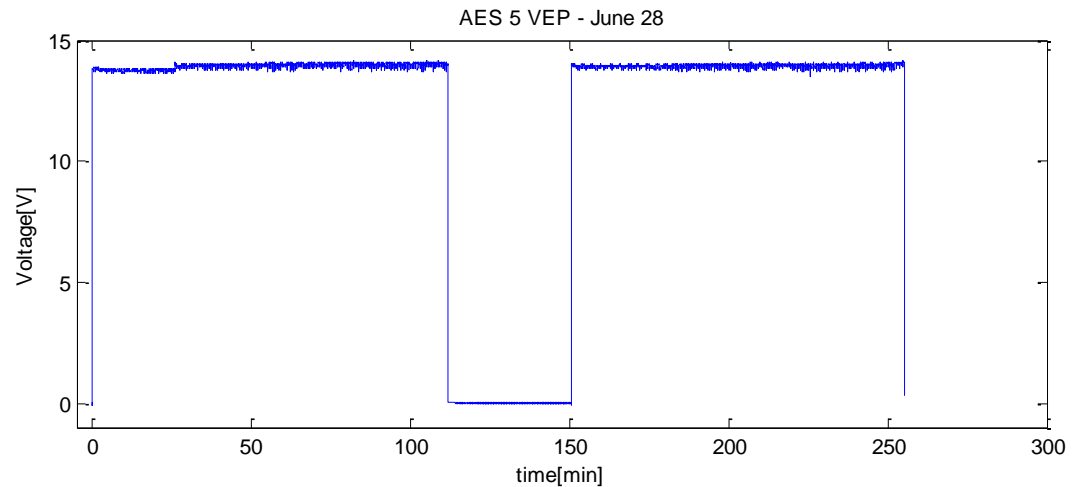
As received

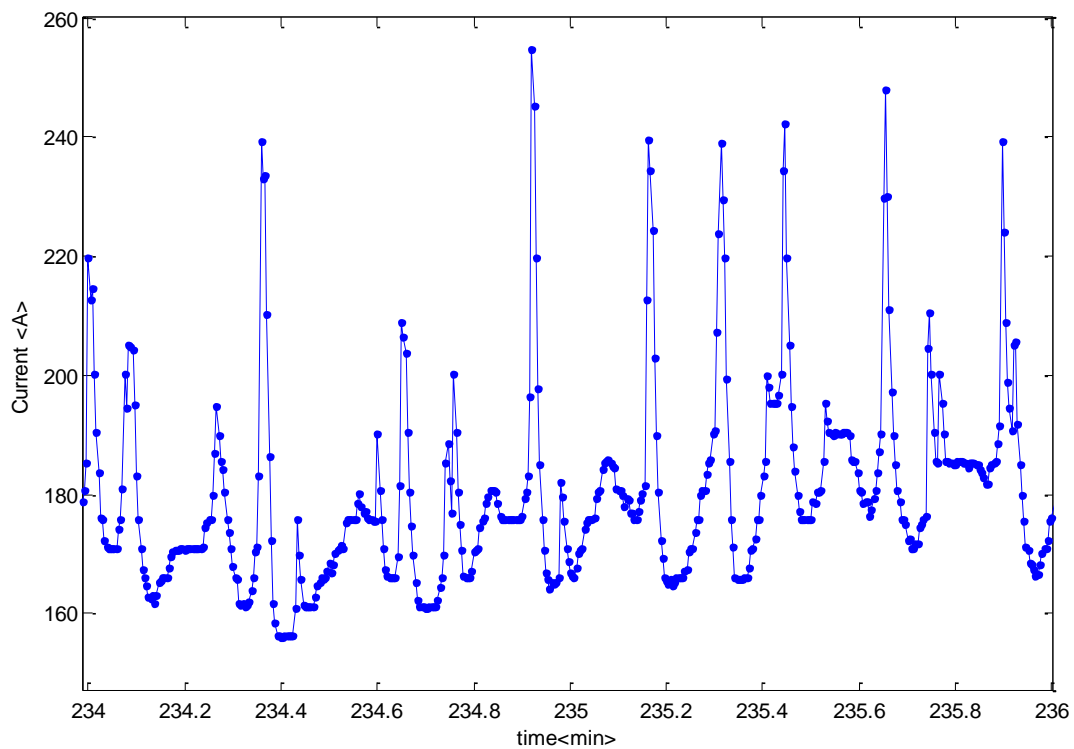


After BCP 10 um



- Material removal: 70 μm
- Temperature: 22 C
- Slow stirring speed: 0.8 Hz
- Current oscillations with good modulation depth were achieved, similar to the JLab horizontal system
- Electropolished surfaces have similar appearance to JLab horizontally polished cavities
- VEP System is ready for two new AES cavities.





Detail of Current Oscillations

Cornell ILC Program

- Short Time Scale
 - Tumble and VEP three cavities that were limited by quench (June-July)
 - VEP two new AES cavities (August)
 - Rf test all cavities in new Dewar with increased thermal efficiency and improved magshielding (August - October)
- Longer Time Scale
 - Commission new centrifugal barrel polisher (September)
 - Install and commission new high vacuum furnace (January)
 - Design, fabricate and commission second generation VEP machine (September - January)