

Raising quench limit of A16
from 30 MV/m to 39 MV/m
by a 2nd-pass processing at JLab

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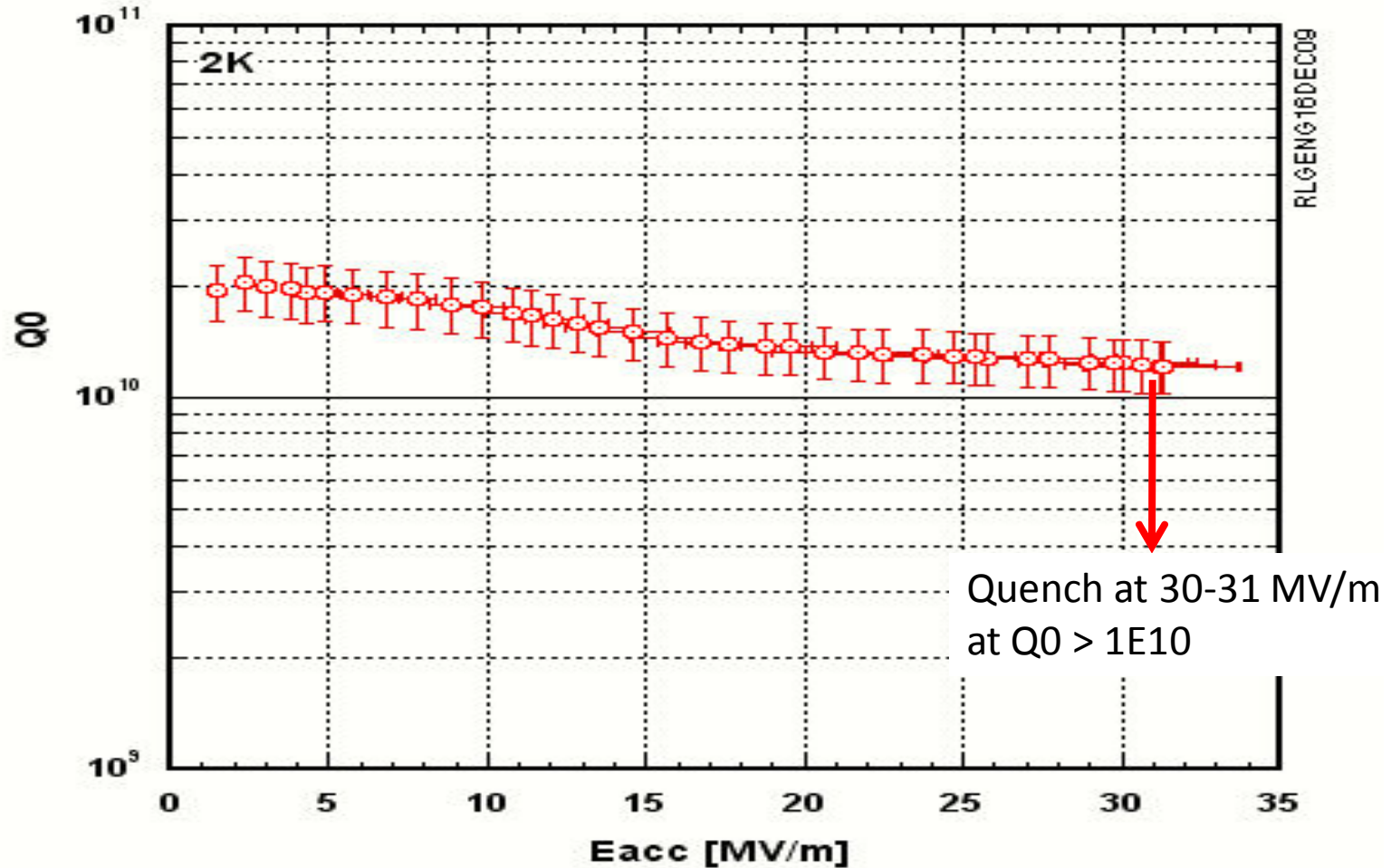
16feb2010

20th ILC Cavity Group Meeting

First pass processing and testing

EP 120um + 800Cx2hr + EP 25 um + 120Cx48hr

A16 first RF test following first light EP



Pass-band mode measurements suggest cell 1/9 being candidate cells for quench limit

Other cell already reaching equivalent gradient of >39 MV/m

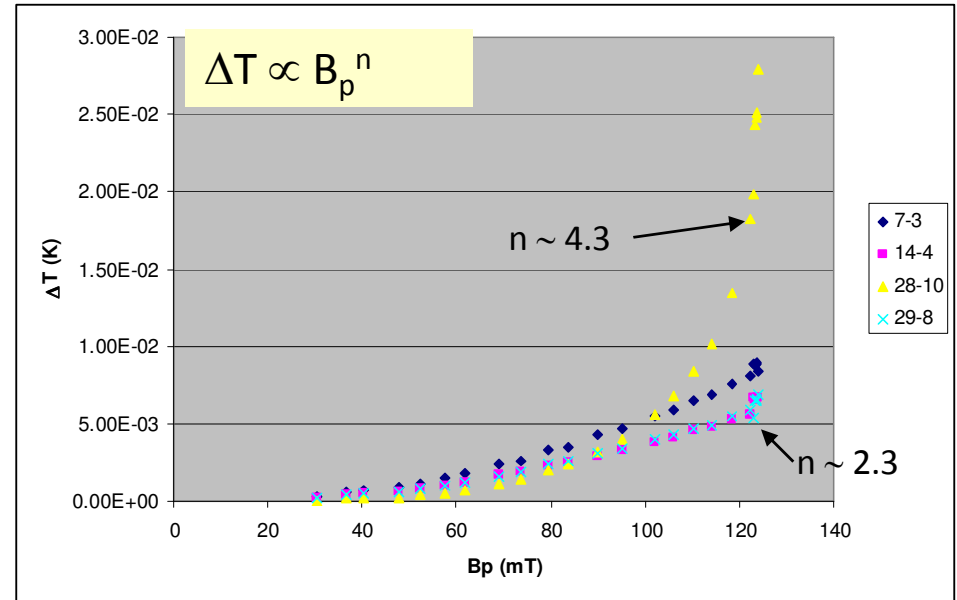
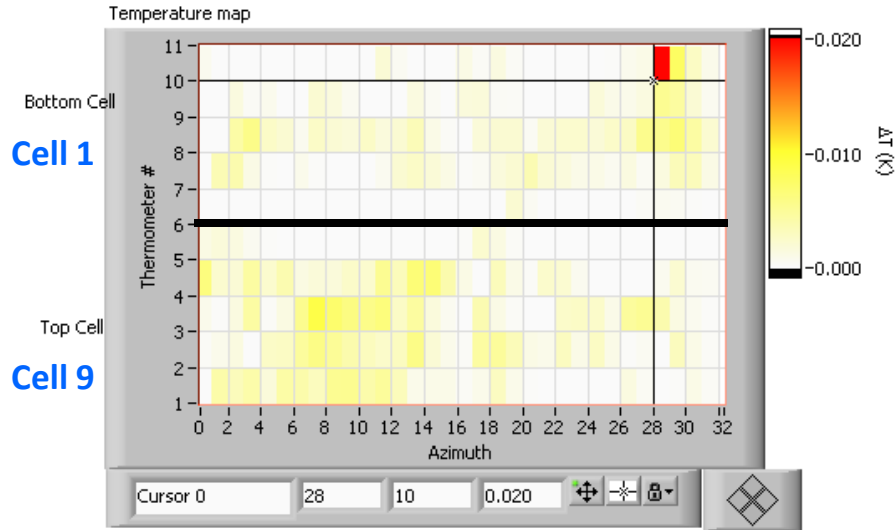
gradient in MV/m

mode index	max. end cell grad.	Pt [Watt]	X-ray [mR/h]
9/9-Pi	31.20		100
8/9-Pi	29.50		2
7/9-Pi	28.30		0
6/9-Pi	26.30		0
5/9-Pi	25.40		0
4/9-Pi	26.10		4
3/9-Pi	22.10		20
2/9-Pi	16.70		1
1/9-Pi	6.60		RF cable limited

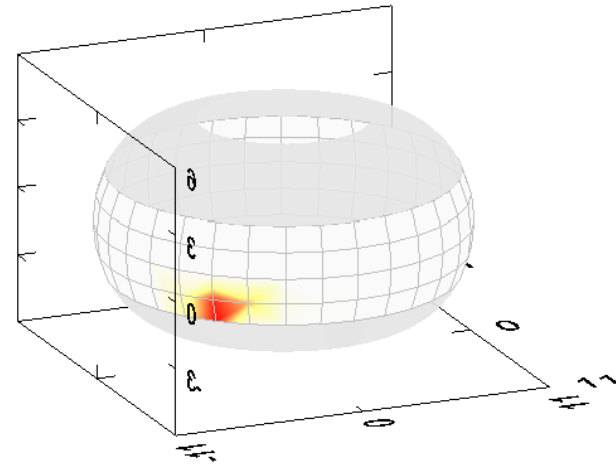
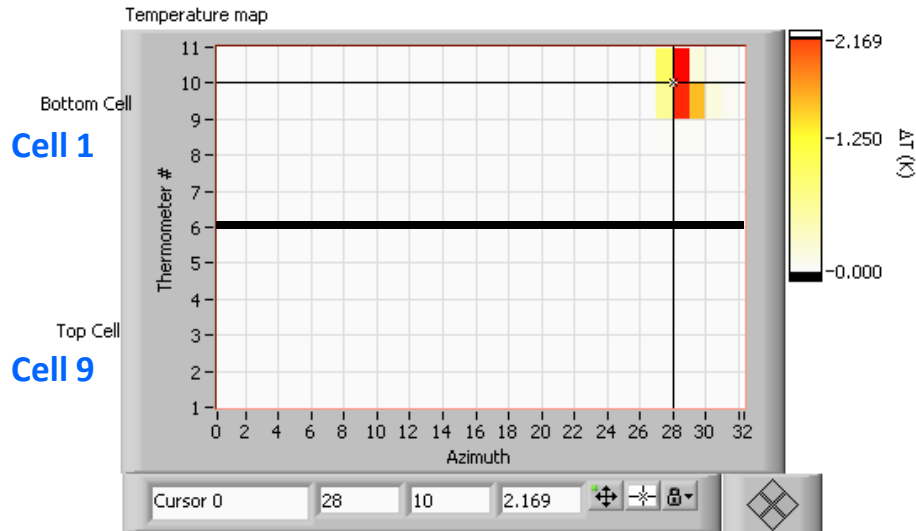
cell#	max. cell grad.	8/9-Pi coeff.	8/9-Pi cell grad.	7/9-Pi coeff.	7/9-Pi cell grad.	6/9-Pi coeff.	6/9-Pi cell grad.	5/9-Pi coeff.	5/9-Pi cell grad.	4/9-Pi coeff.	4/9-Pi cell grad.	3/9-Pi coeff.	3/9-Pi cell grad.	2/9-Pi coeff.	2/9-Pi cell grad.	1/9-Pi coeff.	1/9-Pi cell grad.
1	29.50	1.000	29.500	1.000	28.300	1.000	26.300	1.000	25.400	1.000	26.100	1.000	22.100	1.000	16.700	1.000	6.600
2	43.32	0.880	25.960	0.540	15.282	0.000	0.000	0.640	16.256	1.310	34.191	1.960	43.316	2.480	41.416	2.820	18.612
3	46.93	0.650	19.175	0.180	5.094	0.980	25.774	1.210	30.734	0.530	13.833	0.970	21.437	2.810	46.927	4.310	28.446
4	39.15	0.350	10.325	0.800	22.640	0.990	26.037	0.220	5.588	1.500	39.150	0.990	21.879	1.830	30.561	5.290	34.914
5	43.32	0.000	0.000	1.060	29.998	0.000	0.000	1.280	32.512	0.000	0.000	1.960	43.316	0.000	0.000	5.620	37.092
6	39.15	0.350	10.325	0.800	22.640	0.990	26.037	0.220	5.588	1.500	39.150	0.990	21.879	1.830	30.561	5.290	34.914
7	46.93	0.650	19.175	0.180	5.094	0.980	25.774	1.210	30.734	0.530	13.833	0.970	21.437	2.810	46.927	4.310	28.446
8	43.32	0.880	25.960	0.540	15.282	0.000	0.000	0.640	16.256	1.310	34.191	1.960	43.316	2.480	41.416	2.820	18.612
9	29.50	1.000	29.500	1.000	28.300	1.000	26.300	1.000	25.400	1.000	26.100	1.000	22.100	1.000	16.700	1.000	6.600

T-mapping cell 1 & 9

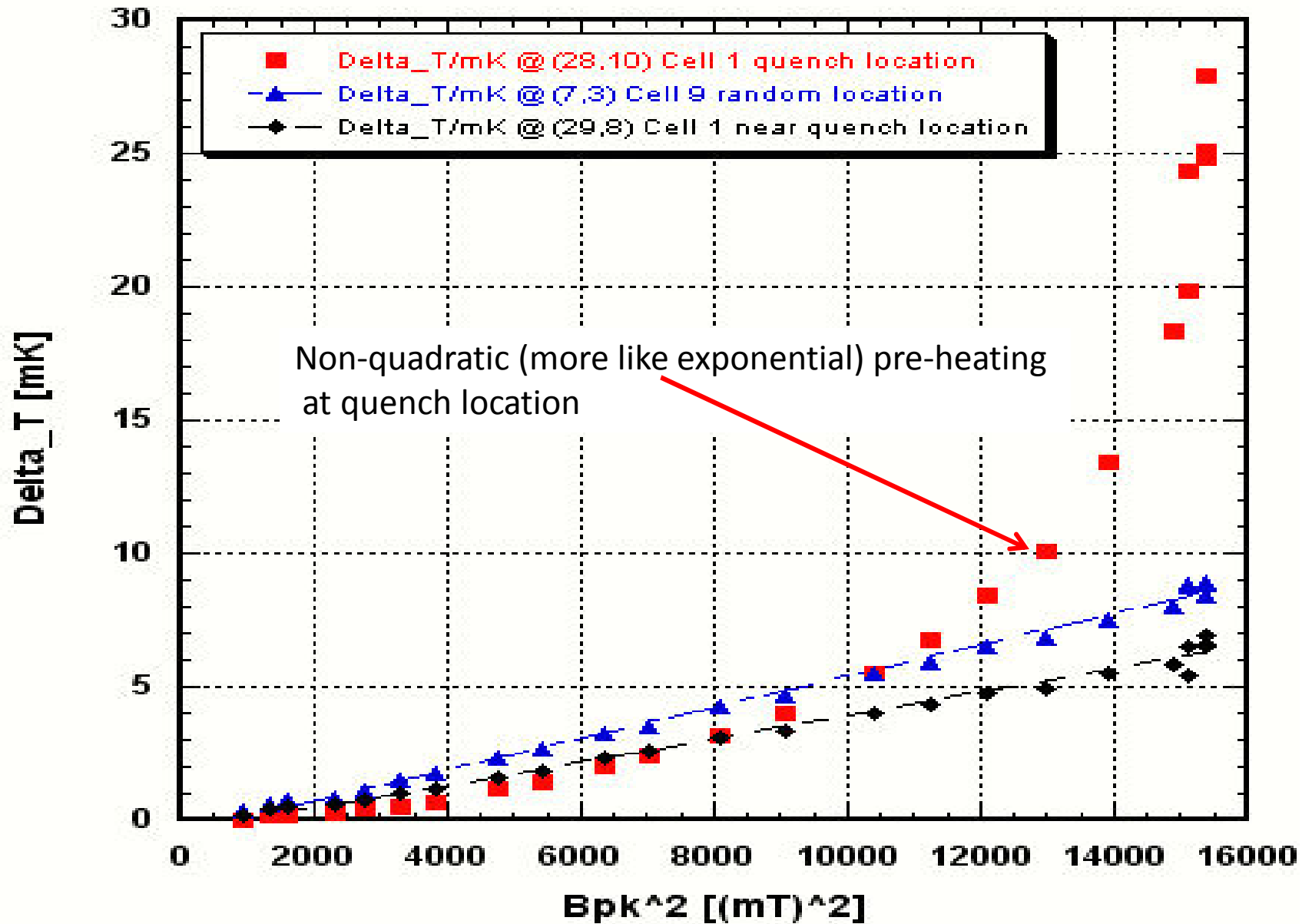
T-map just below quench



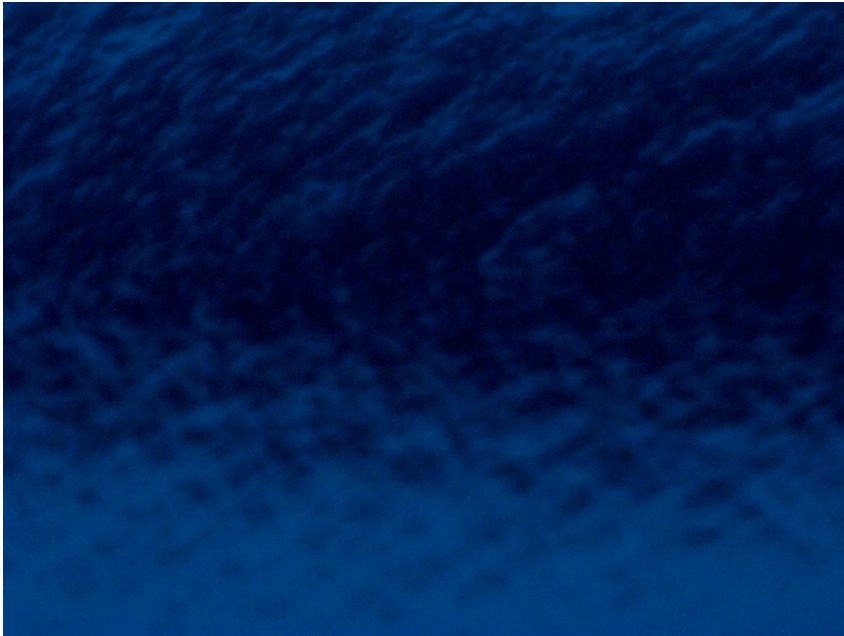
T-map during quench



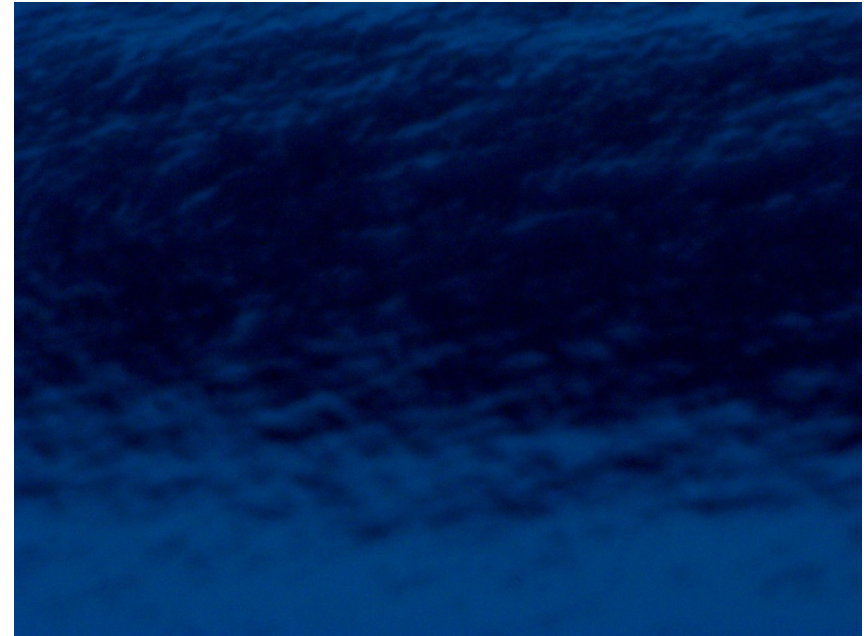
A16_T_mapping_heating_data_7jan2010



A16 Optical Inspection at Quench Location Predicted by T-mapping **NO Apparent Flaw Observed**



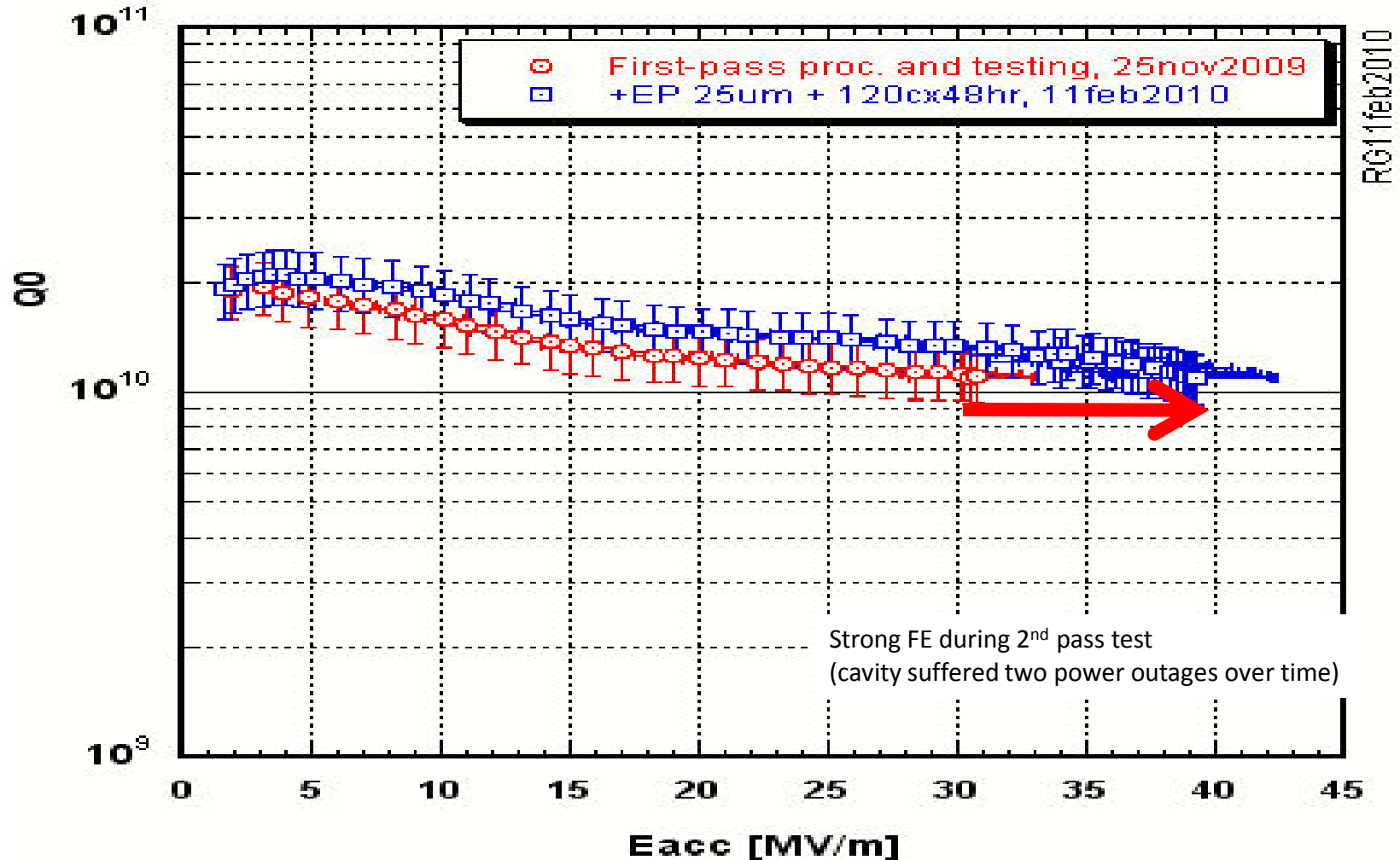
Quench location (137.5727, 20.61)
First half cell from Pi
23 mm from equator EBW seam



Random location (137.4235, 42.21)
First half cell from Pi
23 mm from equator EBW seam
30 mm away from quench location

2nd pass processing + EP 26 μ m + 120cx48hr raised quench limit from 30 MV/m to 39 MV/m

A16 First-Pass & Second-Pass Processing Test Results



Next Steps

A16 will be shipped back to FNAL
for cryomodule (CM2) inclusion

Cavity pre-tuned prior to second EP:

Pi-mode freq. at 2K achieved 1299.750 MHz
Field flatness tuned to 97%