CM-1 Status

ILC Cryomodule meeting 22 November 2011 E. Harms/FNAL

Recent Measurements

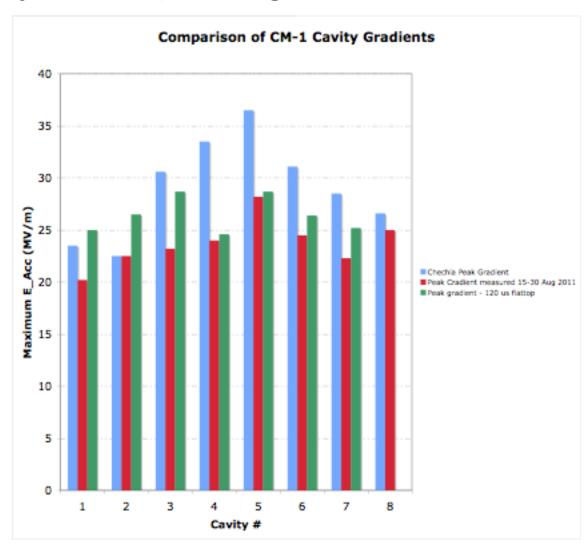
- Peak Gradient and Q_L as a function of flattop length
- LFDC see Yuriy's slides
- LLRF
- Investigate/search for localized field emission

Vary Flattop Length

- Operating parameters
 - 5 Hz operation
 - Fill time = $500 \mu s$ (typical)
 - Vary flattop from 120 μs to 620 μs
 - One cavity on resonance at a time
- Record
 - Q_I drop
 - Limit of cryogenic stability
 - Peak stable gradient
 - Quench or other limit
 - Diagnostic signals
 - HOM response and temperatures
 - FEP
- Motivation discern cause of 'high heat load' in poorly performing cavities
 - HOM heating/multi-pacting?

Vary Flattop Length

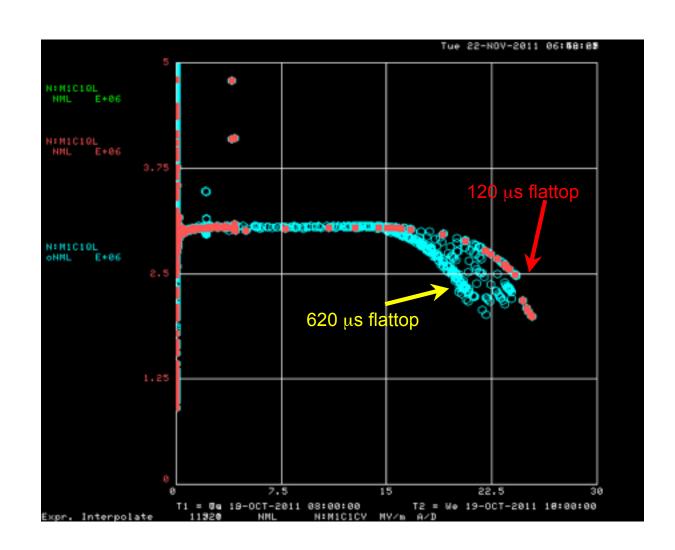
- Peak gradients all increased (green compared to red)
- No clear indication of increased HOM heating on suspect cavities
- Quench limit generally inversely proportional to flattop length
- Some cavities limited by available RF power



Vary Flattop Length

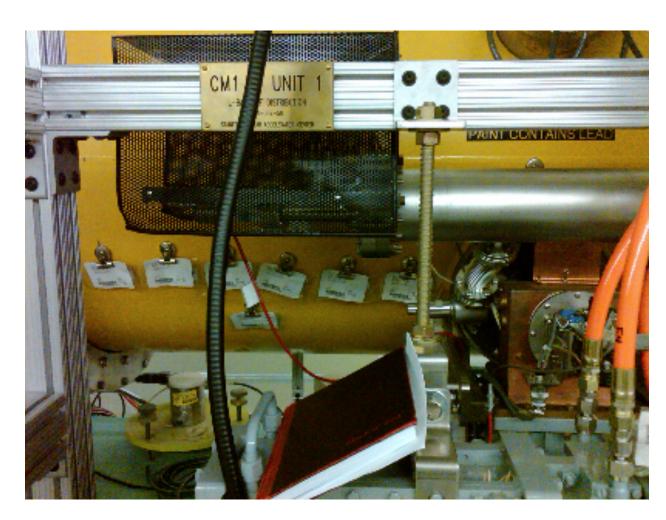
Cavity #1

- Variation of Q_L
 and peak
 gradient with
 flattop length
- 100 μs
 increments in flattop length
- Onset of Q_L
 drop from 14 17 MV/m
- Peak gradient increased from 21 to 25 MV/m



Search for Localized Field Emission

- Personnel dosimetry installed near Cavity #1
 - 20 badges
 - Cavity #1 only on resonance
 - ~3 hours of operation near peak gradient, full flattop
 - Only minimal response, mainly near upstream end (way from coupler)
 - Repeat with more running time



Search for Localized Field Emission

COLUMN DAMES AND ALL COLUMN DESCRIPTION OF A COLUMN DAMES AND A COLUMN

LANDAUER*

1.00° N KD --

180659

| Institute | 12 September | Proof | September | Ends | E1475-1566 | Trimbane | (200, 200-2006 | Face side | 1/20, 200-2006 | Color on Service | (260, 260-3606 | Color on Ser

13. 30

1 07 1

0000

D/2i/H



RADIATION DOSIMETRY REPORT

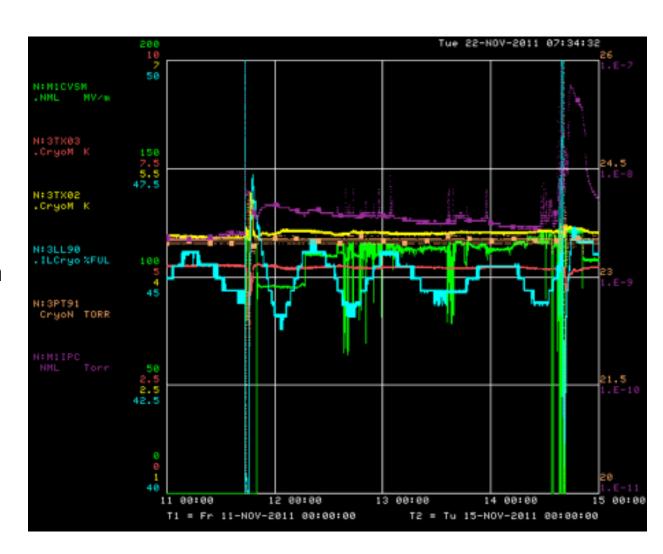
** Energetica (ROCESSON) **

96 L	N4KF		_ 1		ñ≥			786 74 78. 41 75							COLONE COS COLOS ORDADOS			97	58	- ű	23
PR CENT	C HUVSER	BIRTH DATE SE	- 1	, M	200	DEEP IC-	E/E ICH	SHALL YN MOT	OEE?	14	983 1997 505	0883 0883	ENE U.S.	8-41.6W 50-	1: +	Eve			2.00 mg/s	86 100 100 100 100 100 100 100 100 100 10	SECTION AND AND ADDRESS OF THE PARTY OF THE
3. S.S.	nder de	30:	-			$\Sigma_{i}(1)$	1			æ.c			2011			i				1	
000 000 2002 8002 8003 8004 8004 0007 0007 0007 0001 8004 8004 8004 8004 8004 8004 8004	1 15 B1		THE A PARKETER A TOO I	WEELY WEELY WEELY WHEN WITH WITH WITH WITH WITH WITH WITH WITH			X	20 mm						MOREOTE STORY OF THE STORY OF T					6.70	208031 202032 203031 203032 203032 203032 203032 203033 203034 203034 203034 20303 2	
310 310 314			- 15	09 150 09 150 00 00 00 00 00 00 00 00 00 00 00 00 00		26.34.34	X X X	l H						2003 2003 2004 2004				5 5 5		2001004 2001004	2000



Sustained Operation

- The longest period of continuous operation has been 68 hours. Limitations
 - Water issues
 - Coupler vacuum at high power and repetition rate
 - Off-site power 'glitches'



Remaining Work

- Detailed HOM study multipacting?
- Phase adjustment to put all cavities in accelerating phase
- 100 hour+ sustained operation
- P-X 2-cavity 8 ms pulse test
- Thermal cycle
- Other suggestions?

Schedule

- LLRF work this week
- LFDC ongoing
- Prepare and conduct 8ms 2-cavity test
 - Early December
 - ~2 weeks
- Thermal cycle late December (Christmas holiday)
- Cool down and resume operation early January
- Final tests first half of January
 - Including Piezo break CM-1 tests
- Begin warm-up late January

Post Mortem

- Once module is warm and open inspect
 - Cavity #8 tuner
 - Thermal intercepts on Cavities 1, 3, 7, especially HOM cans
 - Piezo on #7