



3.9 GHz 3rd Harmonic Cavities

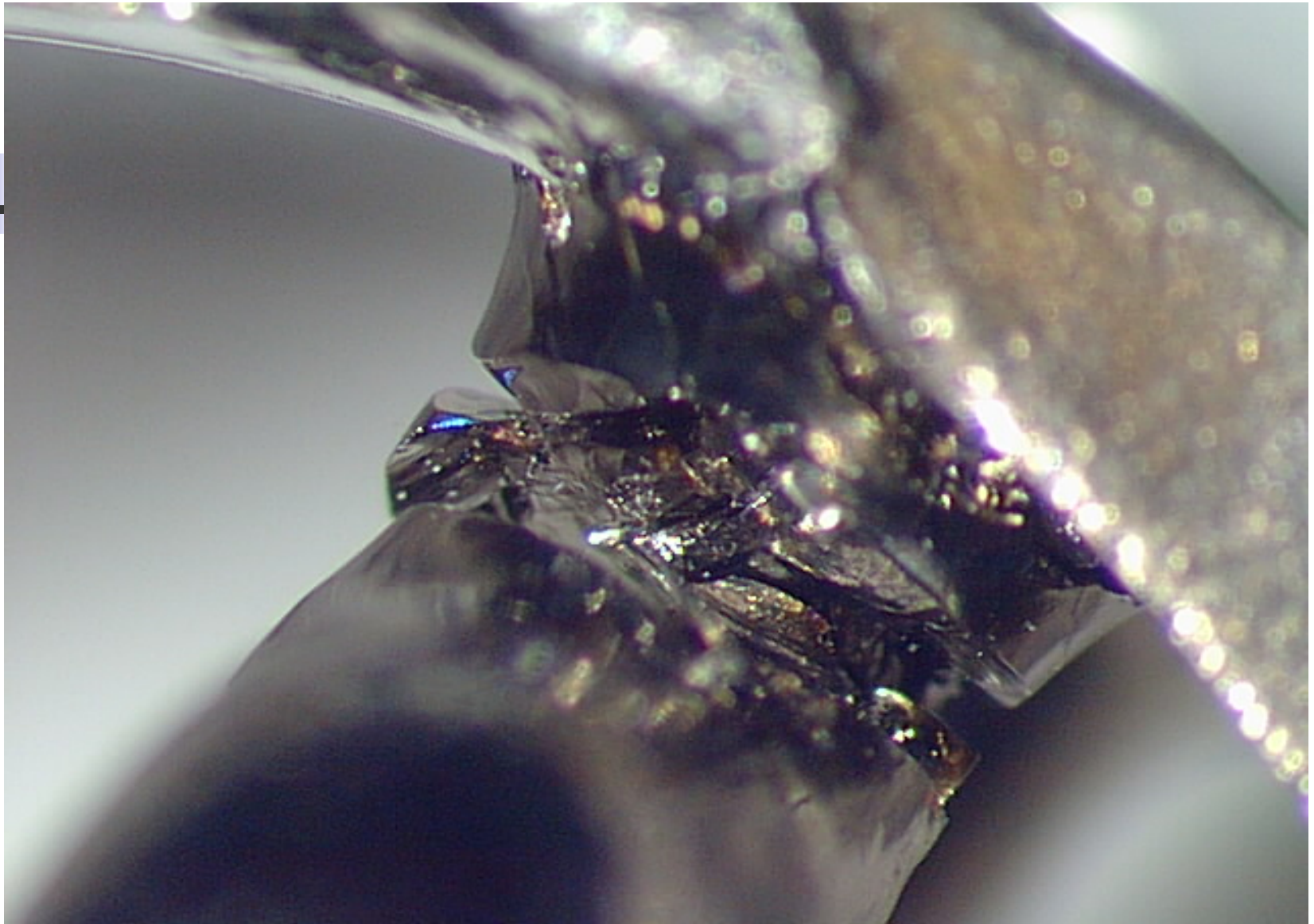
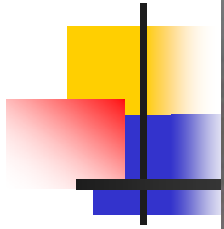
- **OBJECTIVE**

FNAL to fabricate four cavities

Jlab to fabricate four cavities

- **STATUS**

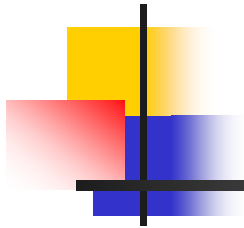
FNAL -- cavity No. 1 (prototype) completed December 2005 -- HOM tuning membrane failed during processing -- cavity No. 2 incorporating improved HOM design completed January 2006 -- both inboard Formteil legs fractured during vertical testing -- FE analysis indicates failures probably due to high thermal stresses induced by overheating of the Formteil when power was applied.



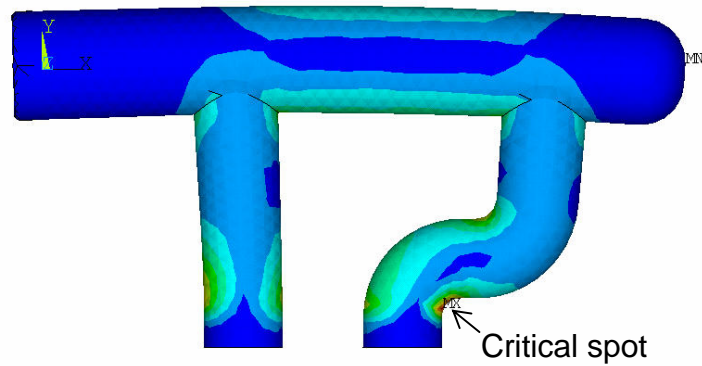


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- FE model indicates maximum thermal stresses at same location where fractures occurred -- multipacting between Formteil and HOM housing is possible cause of overheating.
- Second FEA model under development simulating EB weld of Formteil to HOM housing will evaluate residual stresses arising during cooldown following welding.
- New HOM design with modified Formteil geometry to alleviate multipacting and provide better heat sinking (thicker legs) is in progress.



von Mises equivalent stress (MPa) @ 50W



NODAL SOLUTION
STEP=1
SUB =10
TIME=50
SEQV (AVG)
PowerGraphics
EFACET=1
AVRES=Mat
DMX =.434E-04
SMN =185160
SMX =.110E+09
185160
.123E+08
.245E+08
.367E+08
.488E+08
.610E+08
.731E+08
.853E+08
.975E+08
.110E+09

Note: Displacements are exaggerated



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- Work on center sections of cavities No. 7 & 8 will continue at Sciaky -- these two cavities will not be completed until a new HOM design is approved.
- Cavities No. 1 & 2 will be repaired.
- STATUS

Jlab -- cavity No. 3 was completed and arrived at Fermilab on August 22 for testing (RF power will be restricted to avoid excessive heating of Formteil) -- work on cavities No. 4 - 6 is on hold until a new HOM design is approved.



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- **SCHEDULE**

Completion date for cavities 4 - 8 and repair of cavities 1 & 2 is unknown at this time -- A new HOM design will entail rebuilding all the end tubes.



1.3 GHz Cavity Fabrication: FY06

- **OBJECTIVES**

Jlab is fabricating two Tesla cavities (asymmetric end tubes) from fine grain niobium and two ILC cavities (symmetric end tubes) from large grain niobium.

AES is fabricating four Tesla cavities from fine grain niobium.

- **STATUS**

AES -- end groups complete -- problem with niobium sheets (anisotropic material) for half cells has been resolved -- hydroforming of end half cells is complete -- hydroforming of mid half cells in progress this week -- estimated delivery date for four cavities is January 2007.



1.3 GHz Cavity Fabrication





1.3 GHz Cavity Fabrication

- **STATUS**

- JLab -- work is progressing on the two ILC cavities (symmetric end tubes) -- estimated completion date is October 2006 -- material for two Tesla cavities (asymmetric end tubes) has been shipped to Jlab -- estimated completion date for the two Tesla cavities is unknown at this time.

- PO issued for six ILC cavities -- sole sourced to AES -- additional PO issued to solicit bids for eight ILC cavities -- positive responses will be assessed based on technical merit, cost and projected schedule -- all these cavities will be fabricated from fine grain niobium supplied by the vendors.