

Dielectric Loaded HPRF Update

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IIT

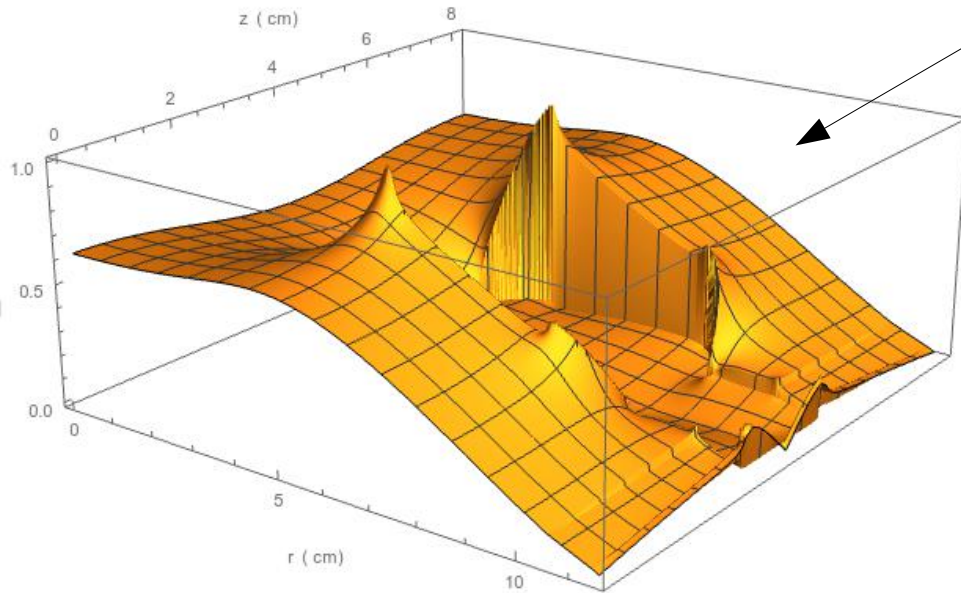
MAP Weekly Meeting

February 26, 2016

Since Last Update (1/29)

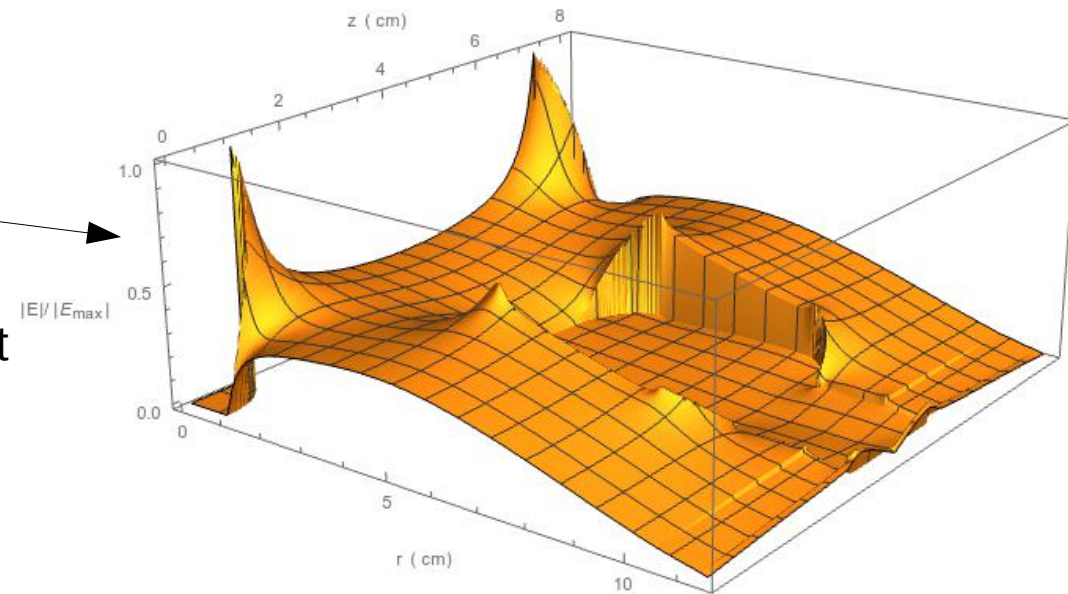
- 99.8% insert tested with electrodes
- TiN coating progress
- Plans for next round of tests

Electrode Results – I



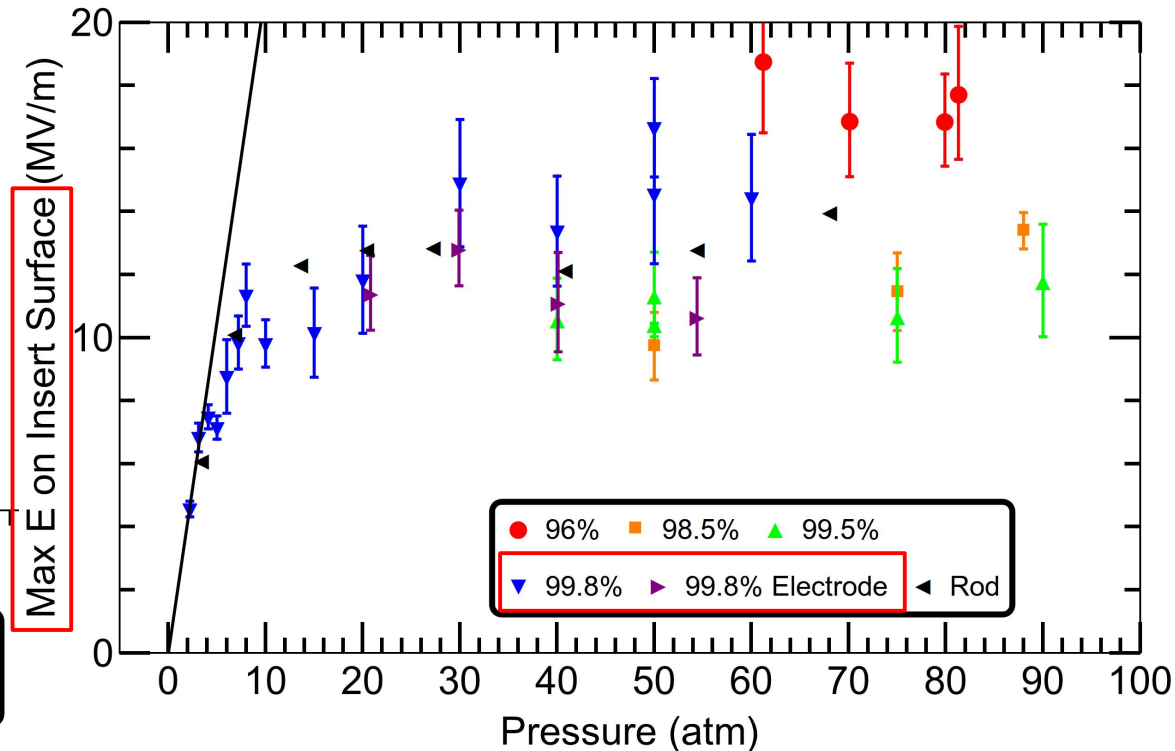
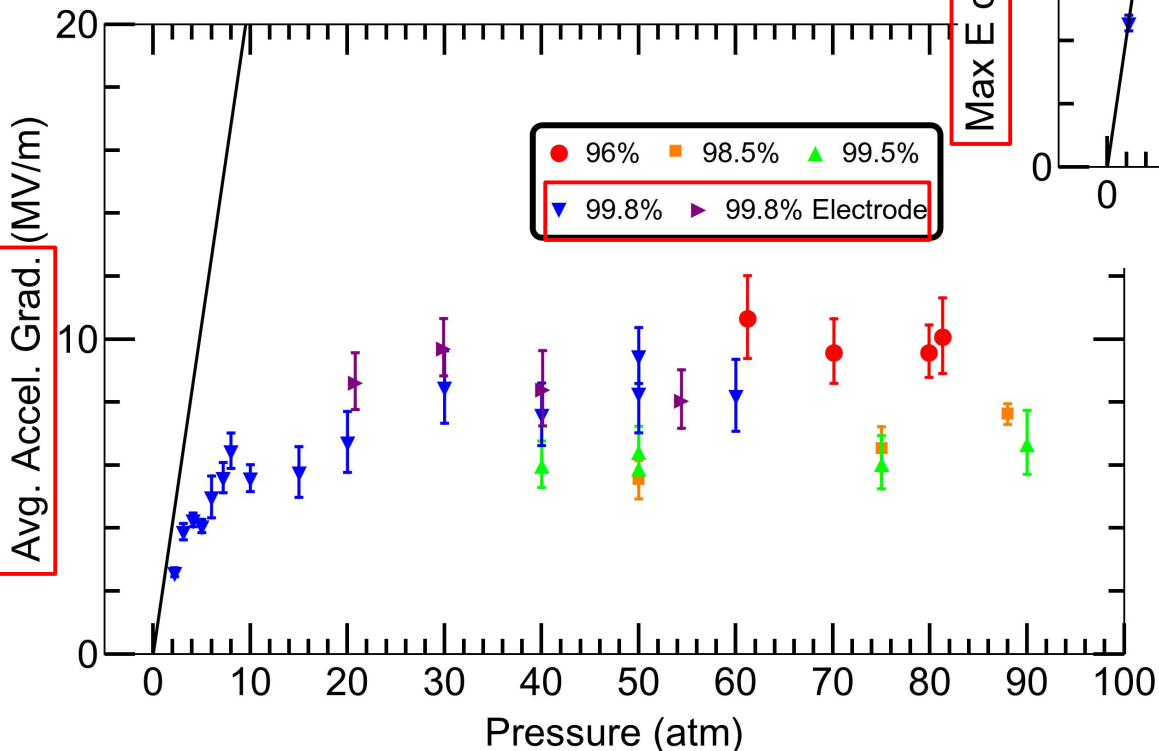
- Without electrode
 - Max. E on surface of alumina
 - Observe breakdown at 10-15 MV/m
 - Max. E on alumina 1.76x average on axis gradient
 - Not ideal for cooling channel

- With electrode
 - Max. E on tip of electrode
 - 2.5x average on axis gradient
 - Field on alumina 1.32x average on axis gradient
 - Better, still not ideal



Electrode Results – II

- Pillbox: max. E on alumina 1.76x avg. on axis gradient
- Electrode: max. E on alumina 1.32x avg. on axis gradient



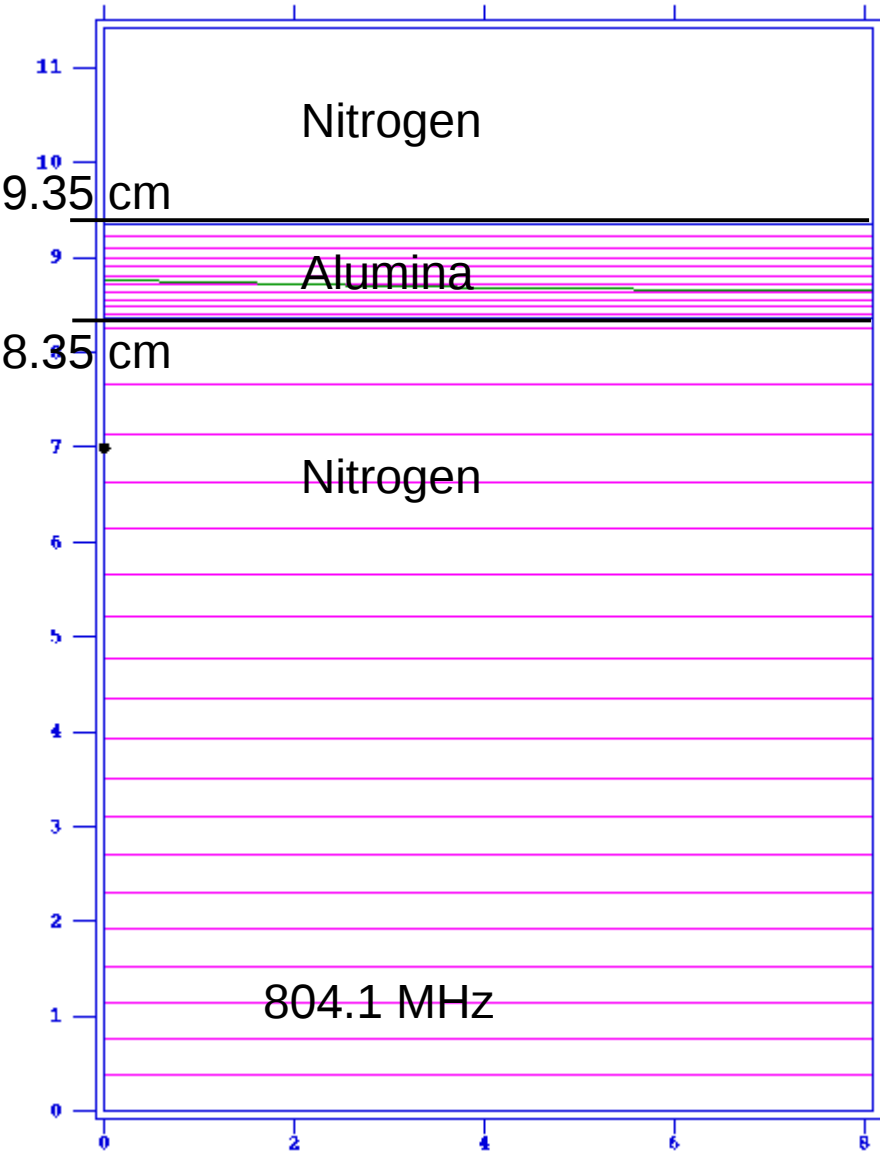
- Ratio of average accelerating gradients for electrode to non-electrode:
 - 20 atm, 1.29
 - 30 atm, 1.15
 - 40 atm, 1.11

TiN Coating

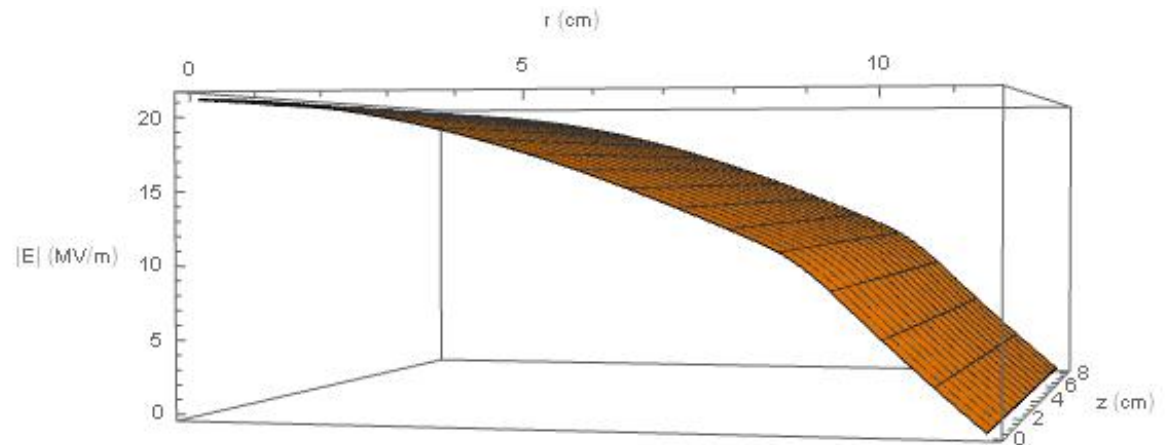
- Unsatisfactory results from original vendor
- Pursuing options for coating to be done at Fermilab or Berkeley

Future Plans

HPRF Cavity, 50 atm N2, 99.5% Alumina Tube F = 804.09



- Goal:
 - Demonstrate 20 MV/m accelerating gradient with dielectric loaded HPRF cavity
- 99.5% alumina
- $1/L \int E_z dz = 21.3 \text{ MV/m}$
- Max E field on alumina = 11.6 MV/m
- Quoted for 3 different diameter tubes
- Working on engineering specifics
 - RF contact, sealing, ...



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