



TE Cavity Work at Cornell

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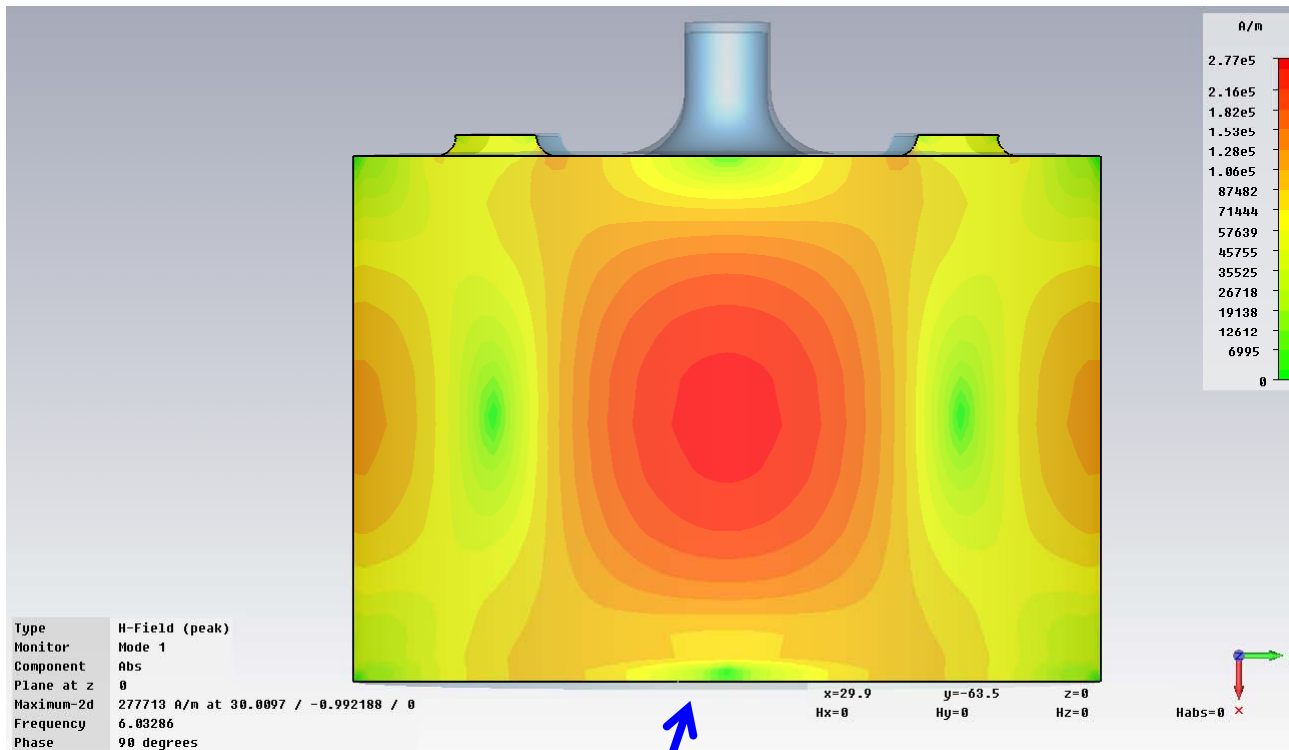


Goal and Approach

- **Goal of this work:**
 - Measure SRF performance of small material samples (mm to cm size) at high fields
- **Approach:**
 - Develop TE mode sample host cavities with high surface fields (100 – 250 mT)
 - Support different sample sizes, different rf frequencies



Pill-box TE cavity



Demountable sample bottom plate

TE₀₁₁, f = 6 GHz

$H_{\max, \text{sample}} / H_{\max, \text{cavity}} \sim 0.8$

sample radius = 3.5 cm

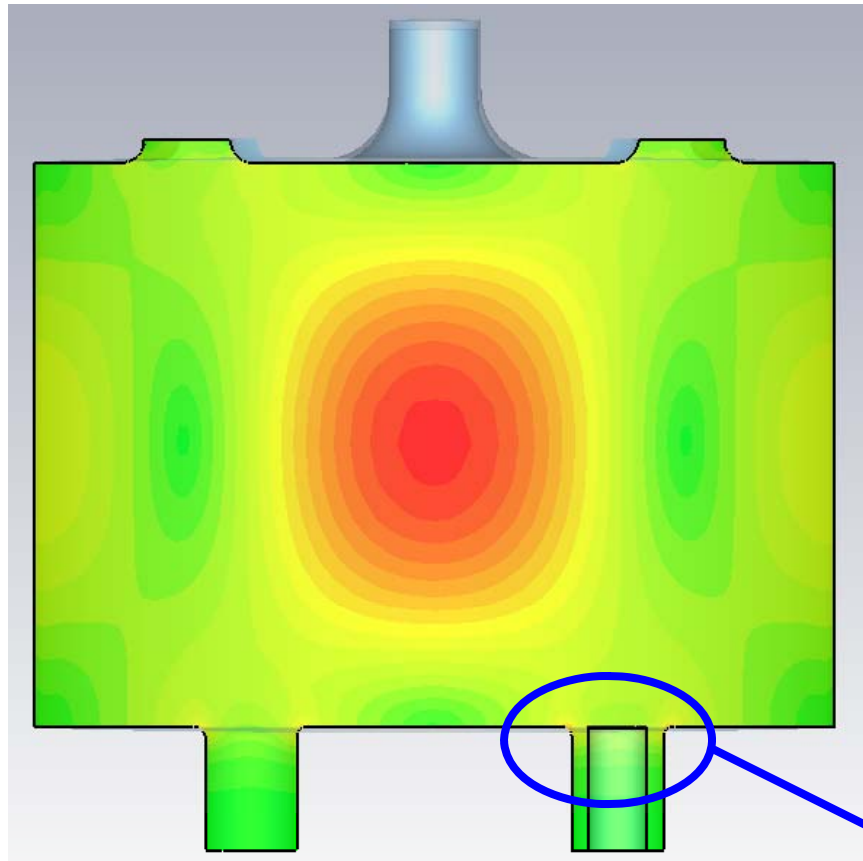


Pill-box TE cavity: Small Samples

TE₀₁₁, $f = 6$ GHz

$$H_{\max, \text{sample}} / H_{\max, \text{cavity}} \sim 0.64$$

sample radius = 0.25 cm



Additional port to keep symmetry

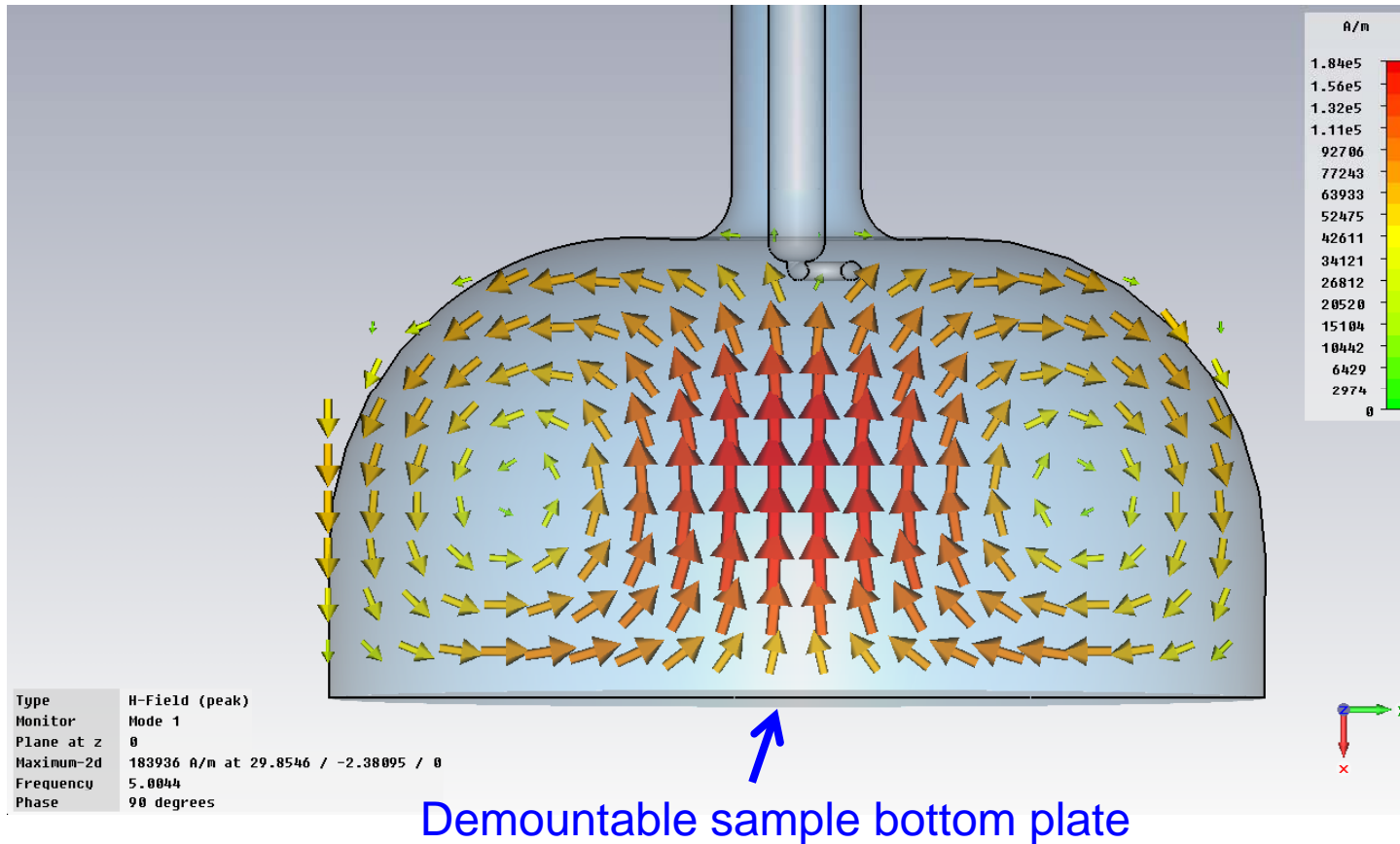
small round sample plate

Curve Name	curve8
Curve Length	1.5708
Component	Abs
Integral Am	57.311
Integral Ph	90
Marker Position	0.32987
Marker Field Am	1.96653e+005
Marker Field Ph	0

Type	H-Field (peak)
Monitor	Mode 1
Component	Abs
Plane at z	0
Maximum-2d	277437 A/m at 26.6923 / -0.330729 / 0
Frequency	6.03464
Phase	90 degrees



High gradient TE cavity, type A



TE₀₁₁, $f = 5$ GHz

$$H_{\text{max, sample}} / H_{\text{max, cavity}} \sim 1.4$$

sample radius = 5 cm

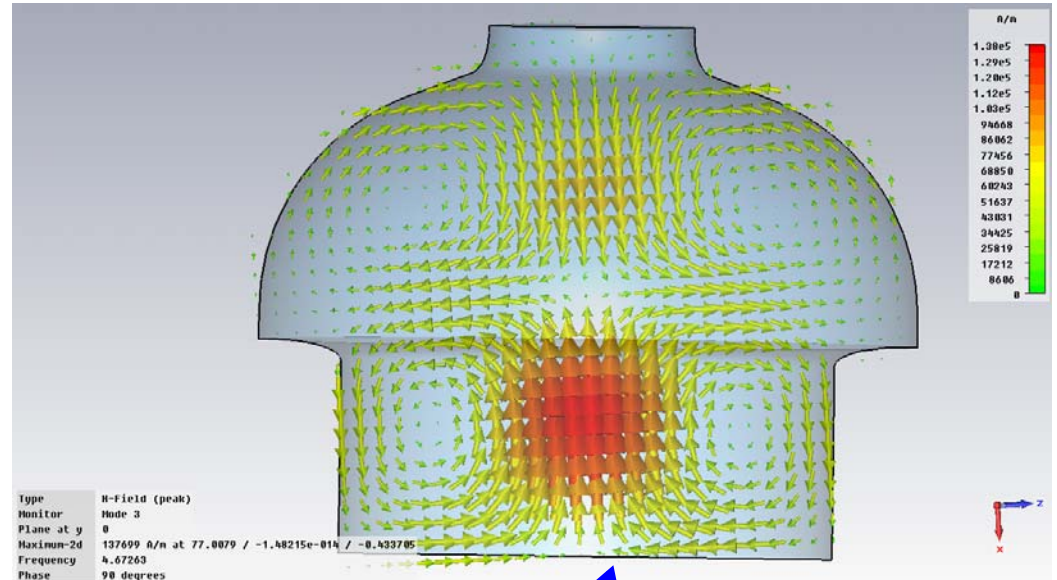


High gradient TE cavity, type B

TE012, $f = 4.78$ GHz

$H_{\text{max, sample}} / H_{\text{max, cavity}} \sim 1.24$

sample radius = 5 cm

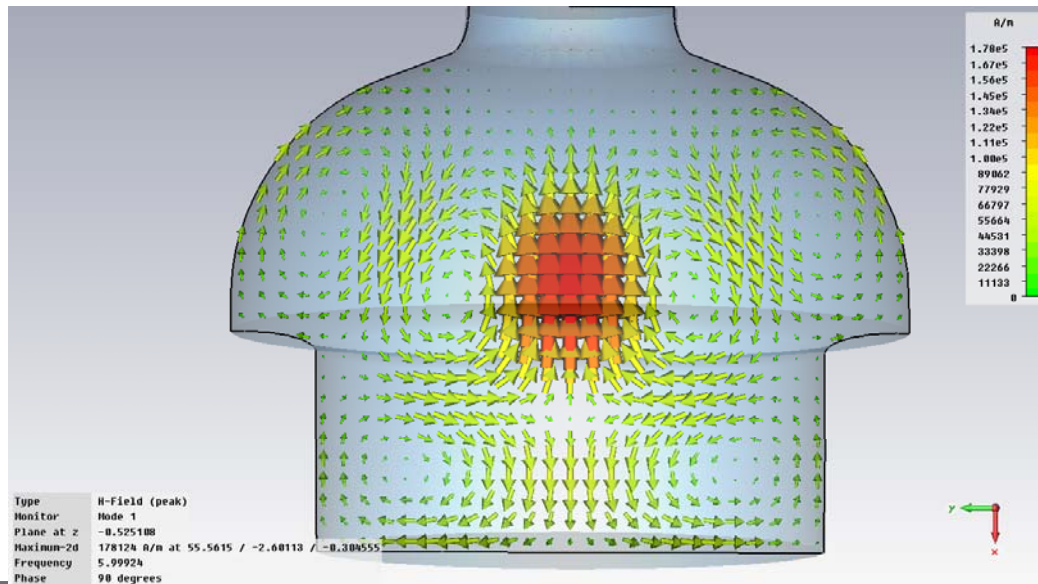


Demountable sample bottom plate

TE013, $f = 6.16$ GHz

$H_{\text{max, sample}} / H_{\text{max, cavity}} \sim 1.57$

sample radius = 5 cm





Current status and future plans

- **Current status:**
 - Fabrication of small sample pill-box cavity
 - Design of higher gradient flat sample plate TE cavities
- **Test plans and schedule:**
 - Run 3D multipacting simulations
 - Pillbox cavity ready for first test in April
 - New high gradient TE cavities ready for first tests in June / July
 - Collaboration: Send us your samples!