TE Cavity Work at Cornell

Matthias Liepe

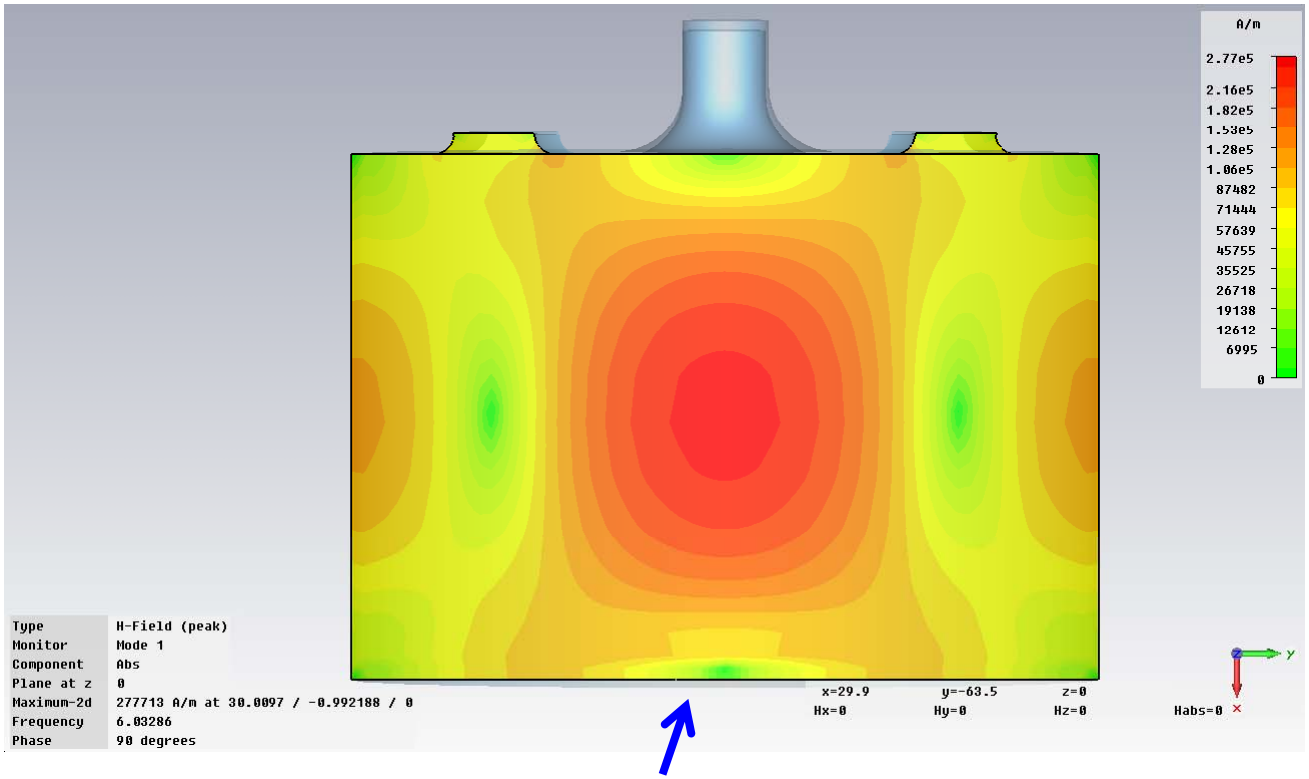
Yi Xie

Cornell University

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

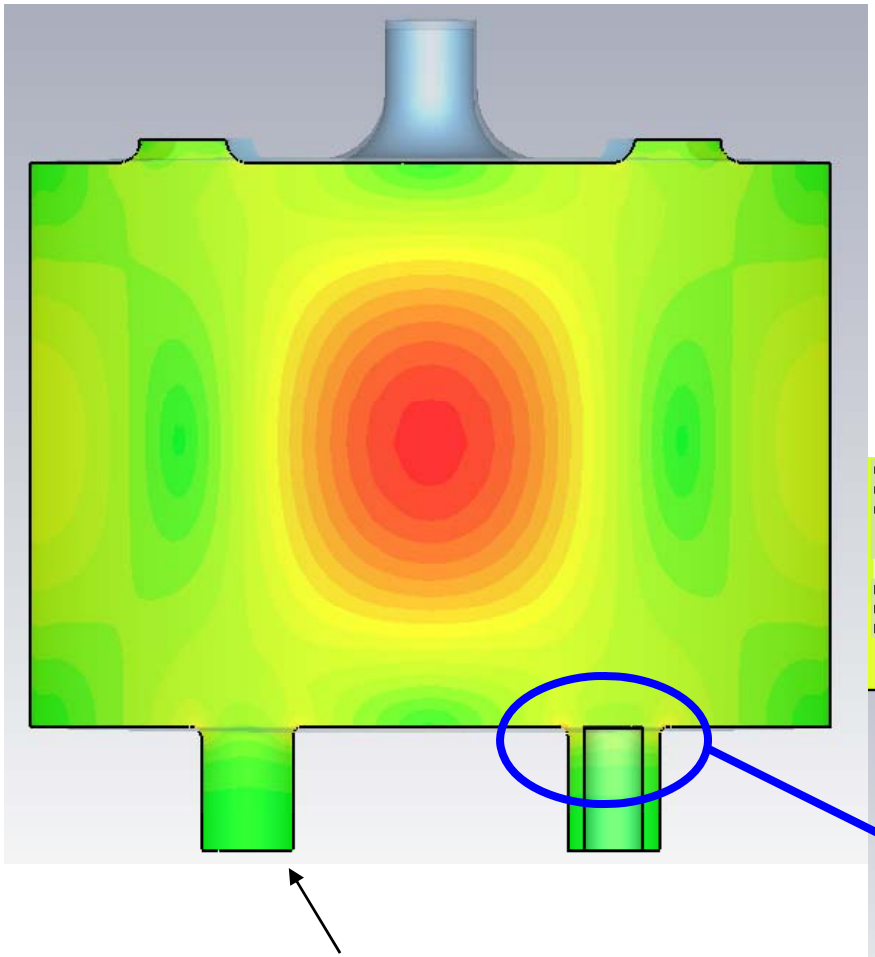
Pill-box TE cavity



Demountable sample bottom plate

TE011, f = 6 GHz $H_{max,\ sample}/H_{max,\ cavity} \sim 0.8$ sample radius = 3.5 cm

Pill-box TE cavity: Small Samples



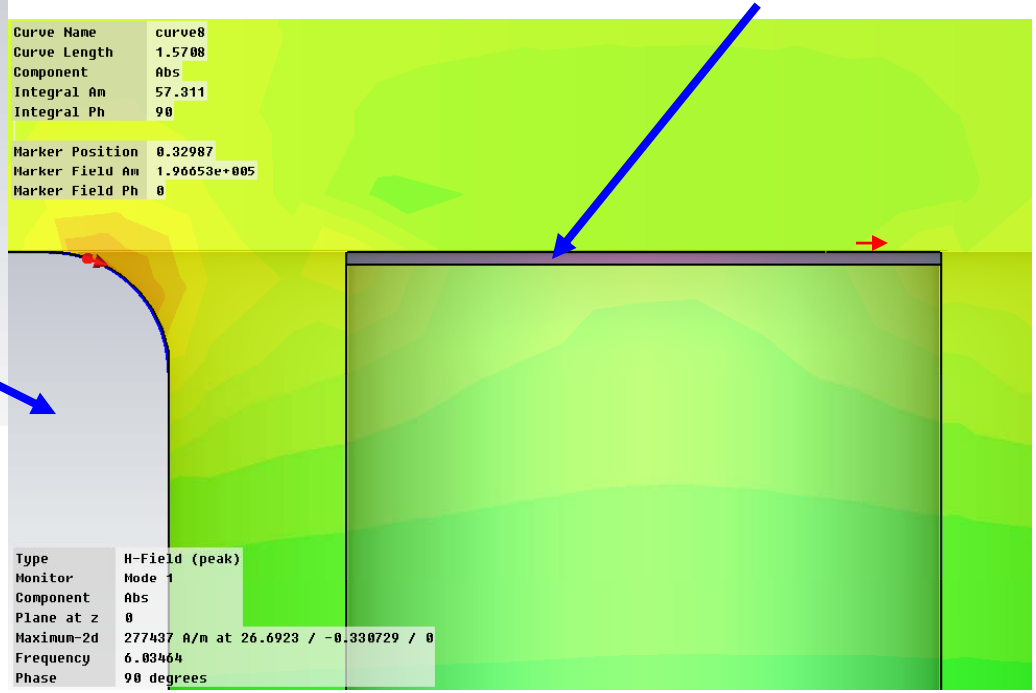
Additional port to keep symmetry

TE011, f = 6 GHz

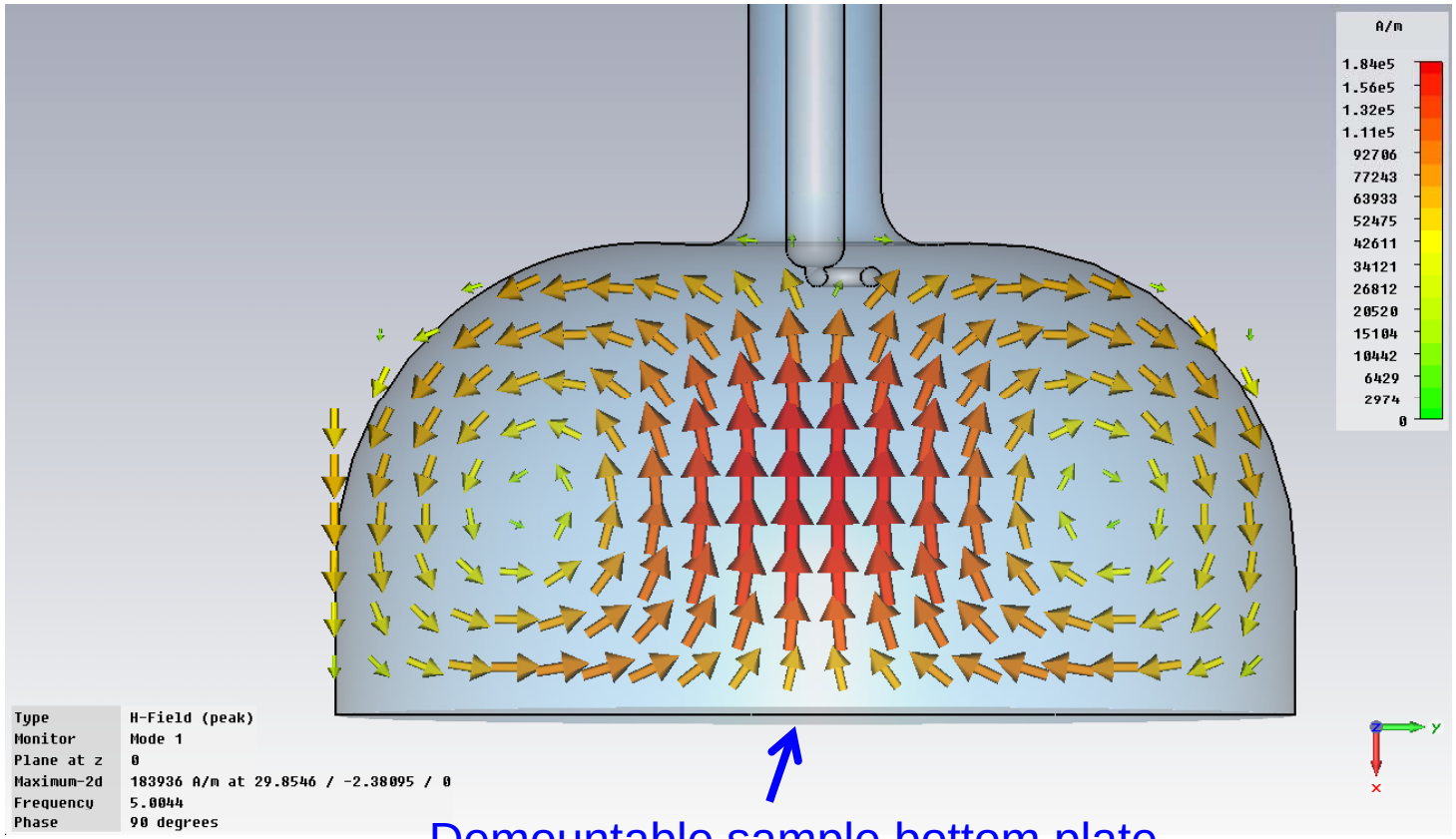
$H_{max,\ sample} / H_{max,\ cavity} \sim 0.64$

sample radius = 0.25 cm

small round sample plate



High gradient TE cavity, type A



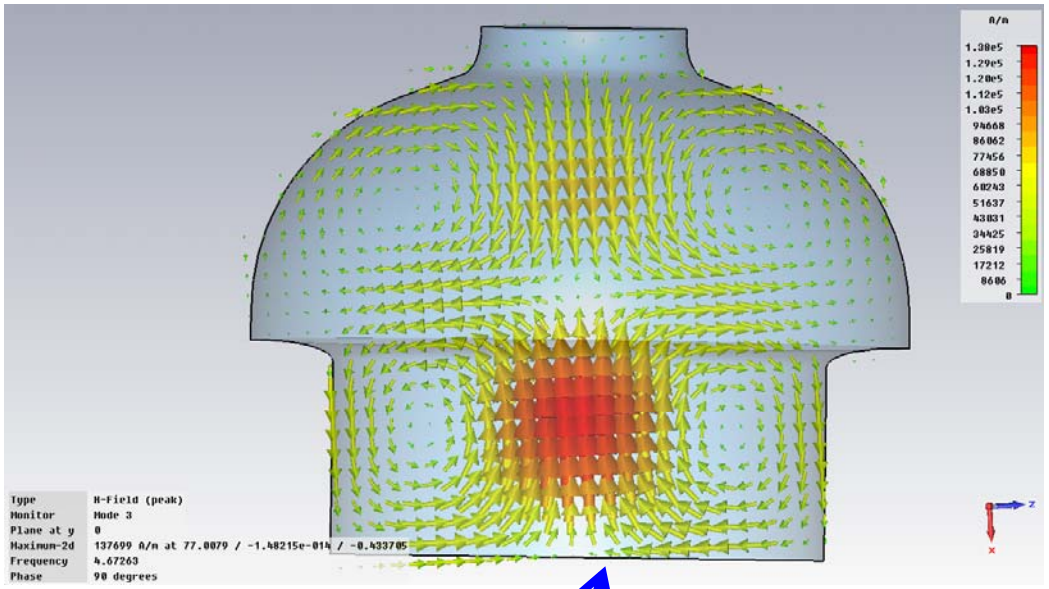
TE011, f = 5 GHz $H_{max,\ sample}/H_{max,\ cavity} \sim 1.4$ sample radius = 5 cm

High gradient TE cavity, type B

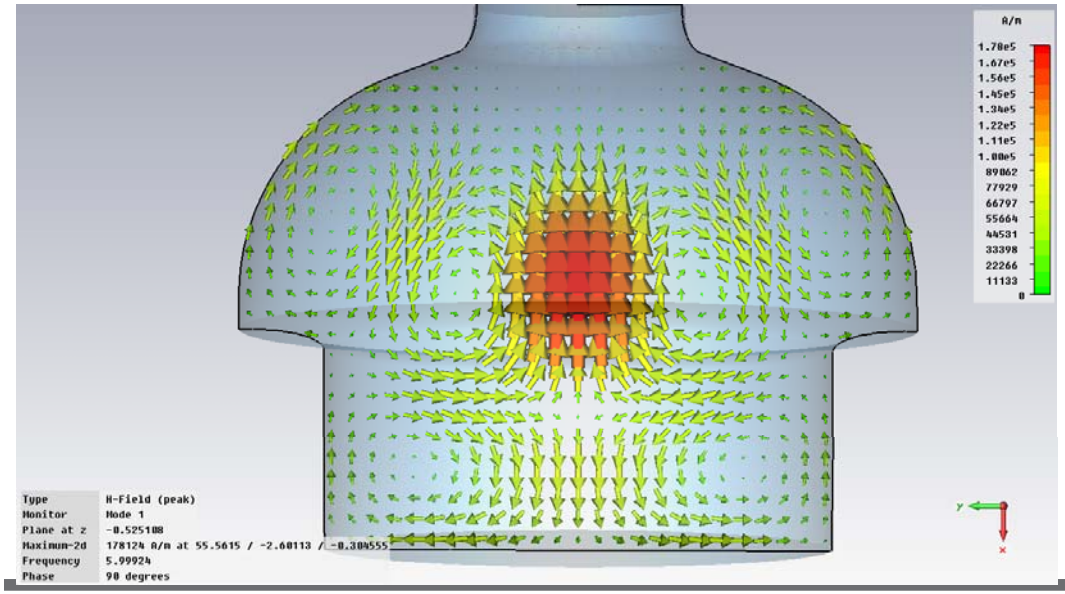
TE012, f = 4.78 GHz

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

sample radius = 5 cm



Demountable sample bottom plate



TE013, f = 6.16 GHz

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

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!