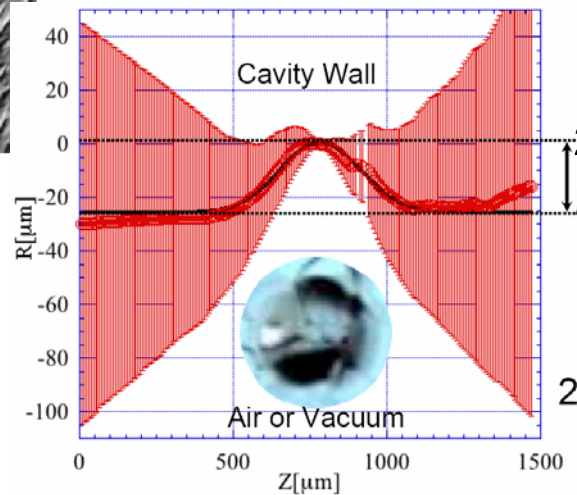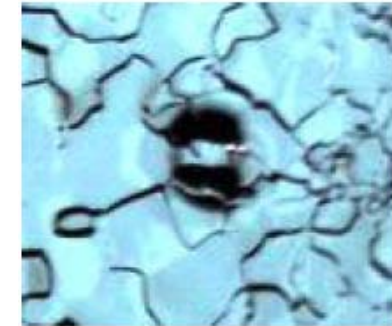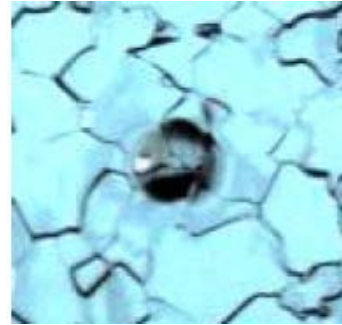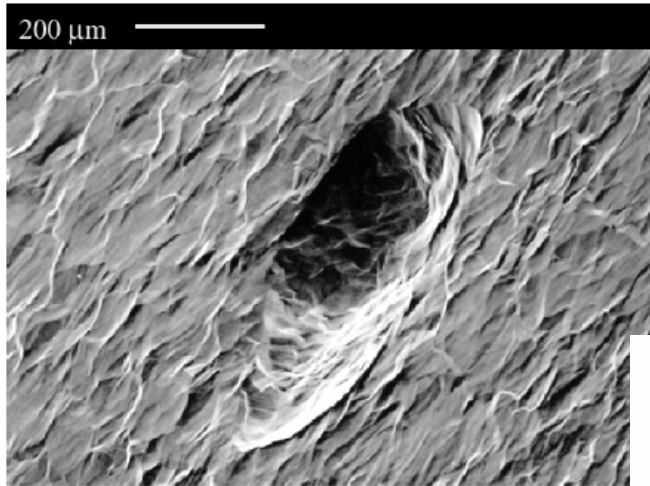# (10 min)
Field Enhancement Factors For Pits And Bumps
V. Shemelin and H. Padamsee

Examples of Pits and Bumps Found in Cavities that Cause Quench
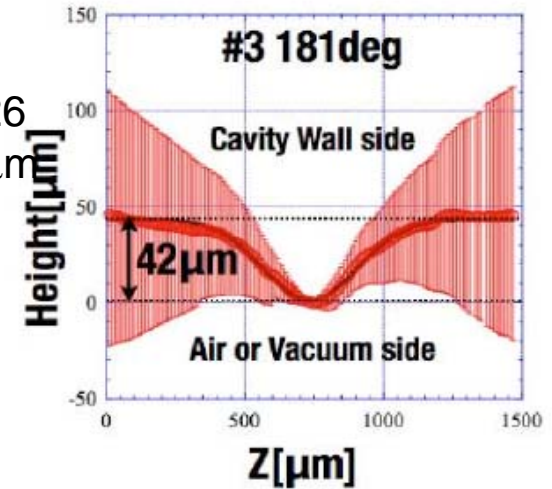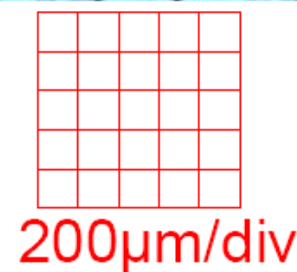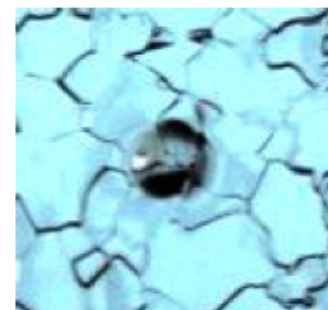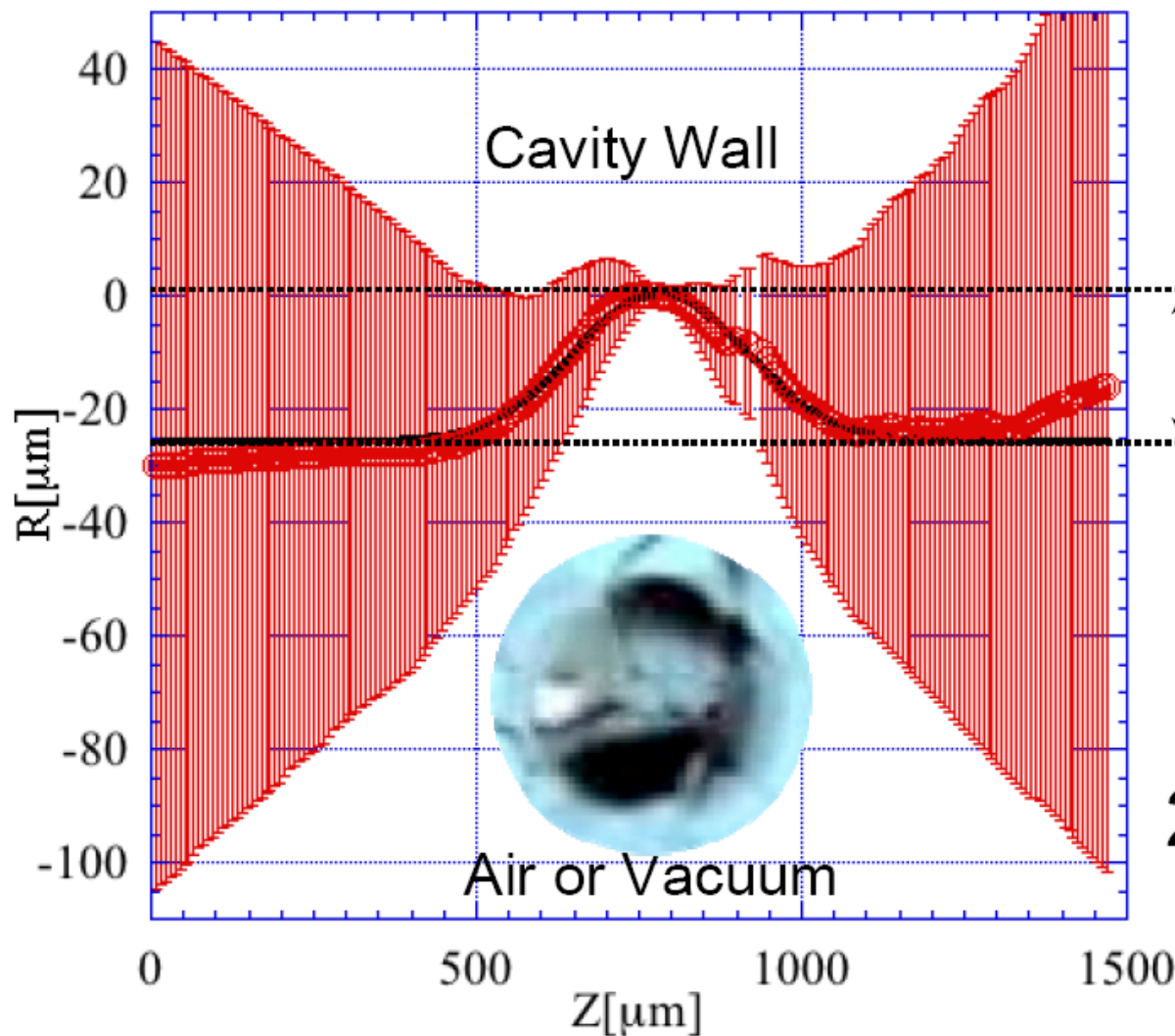

Pit with sharp edges

Reported in Thesis of J. Knobloch (1997)

Quenched at 93 mT

Eacc =21 MV/m

Pit found by KEK optical inspection in AES #1cavity

Quench at ~ 18 MV/m

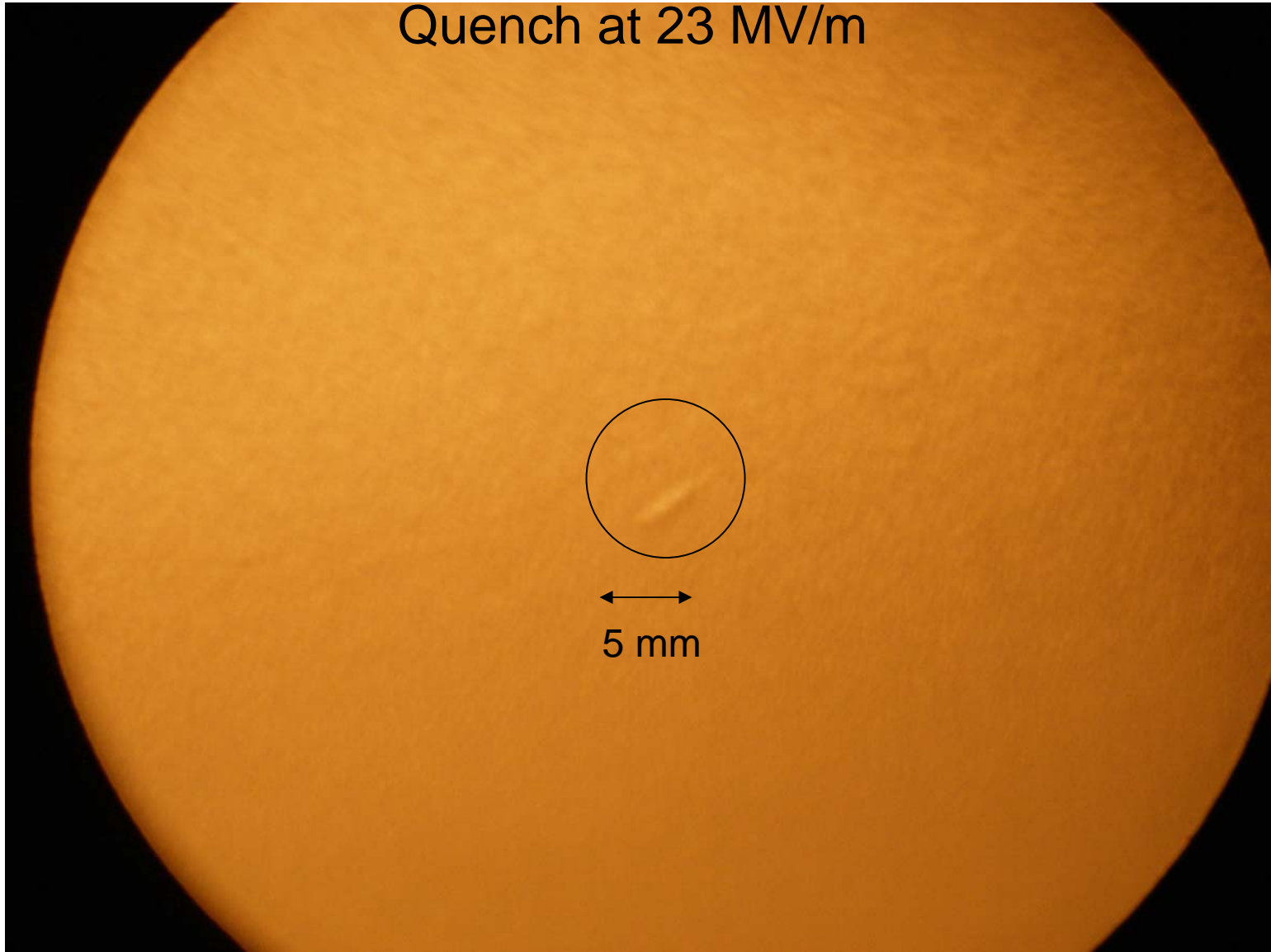Bump found in AES#1

Height of spot at #7 cell 325deg

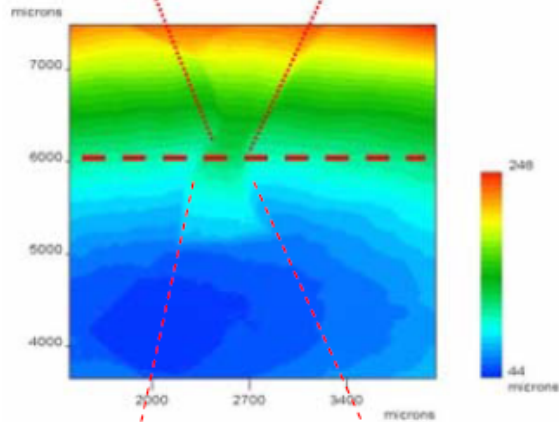R[μm] axis: 40, 20, 0, -20, -40, -60, -80, -100
Z[μm] axis: 0, 500, 1000, 1500

Cavity Wall

Air or Vacuum

26μm

200μm/div

28μm from gradient data assuming gaussian.

Black curve is a fitted gaussian.
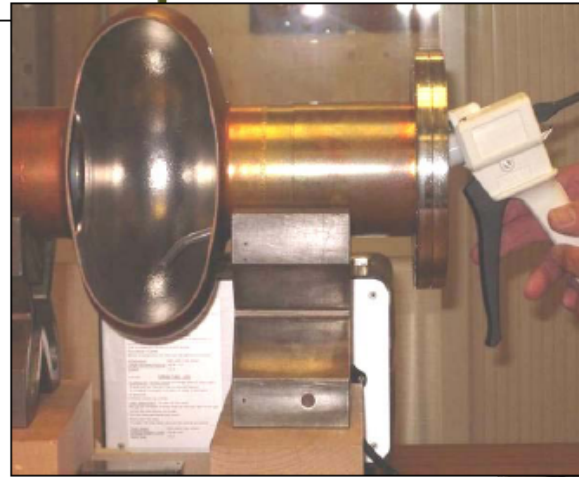
AccLab BmSci ICR KyotoUniversity

Bump found with 2nd Sound and Questar Inspection on 1-cell Cavity # 3 Niowave, Quench at 23 MV/m

5 mm
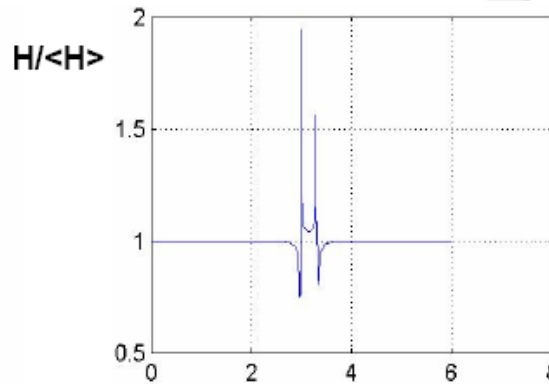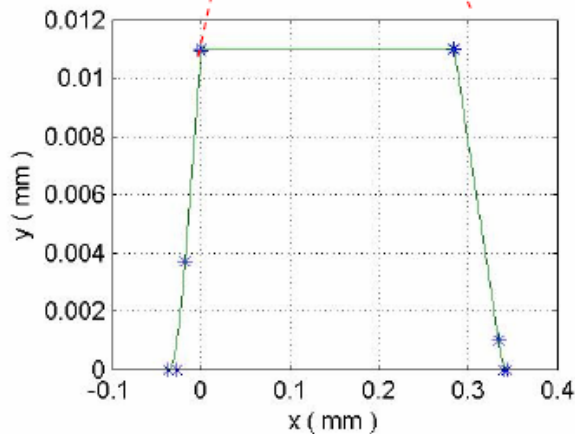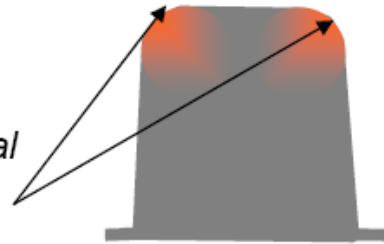
Replica @ the quench site…

Size of the defect ~
→ 550 µm
x ↑ 15 µm

Normal cond.

Quench Field unknown !

SURFACE MORPHOLOGY AT THE QUENCH SITE
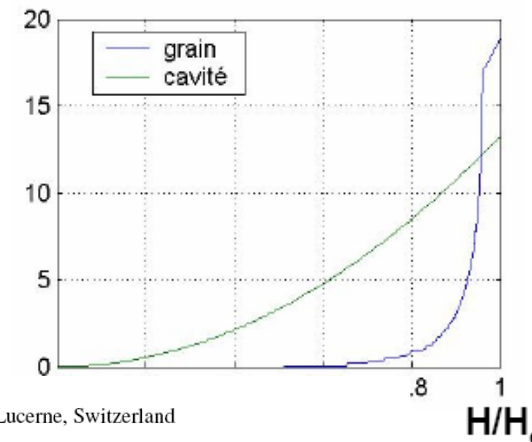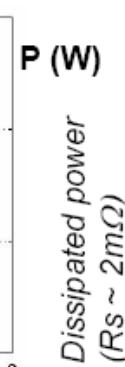
Proceedings of EPAC 2004, Lucerne, Switzerland

S. Berry[#], C. Antoine and M. Desmons, CEA/DSM/DAPNIA, Gif-sur-Yvette, France

Calculations of Field Enhancement for Pits
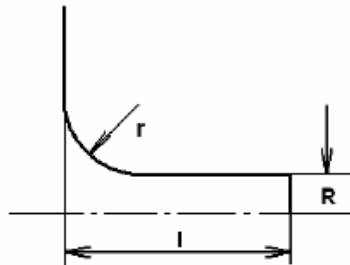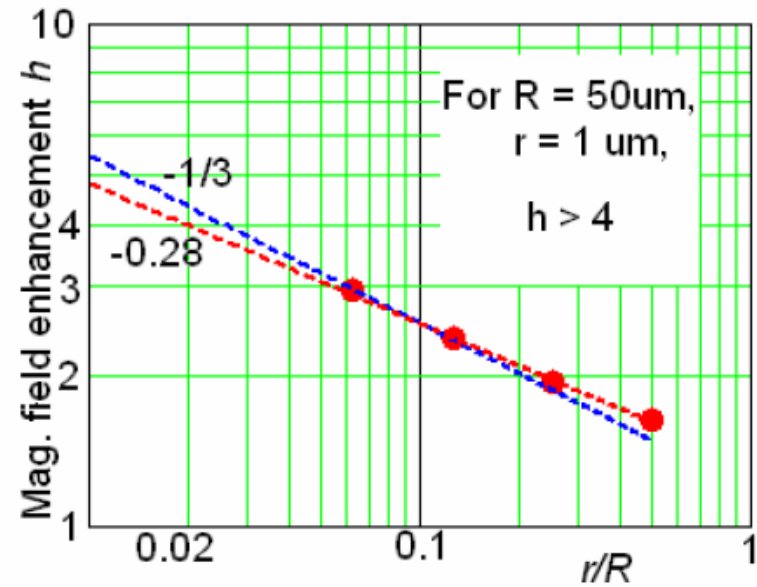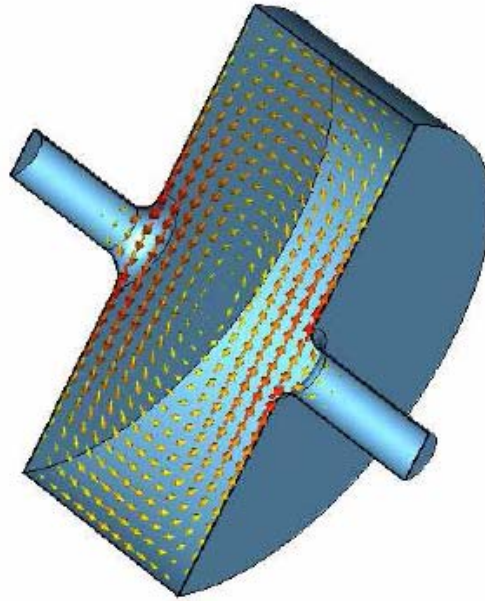
Field Enhancements for Bumps

Saclay: Calculations of Field Enhancement for Bumps

Demagnetization factor

$$D_a = \frac{1}{1-m^2}\left\{1 - \frac{m}{\sqrt{1-m^2}}\arccos m\right\}$$

$m = a/c$

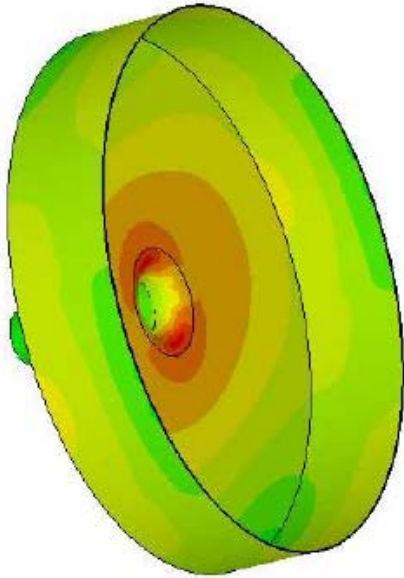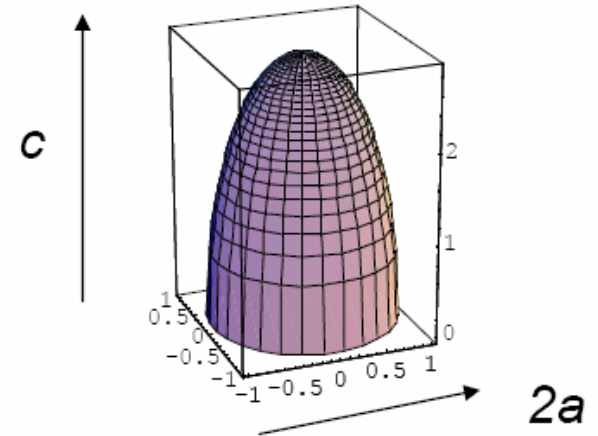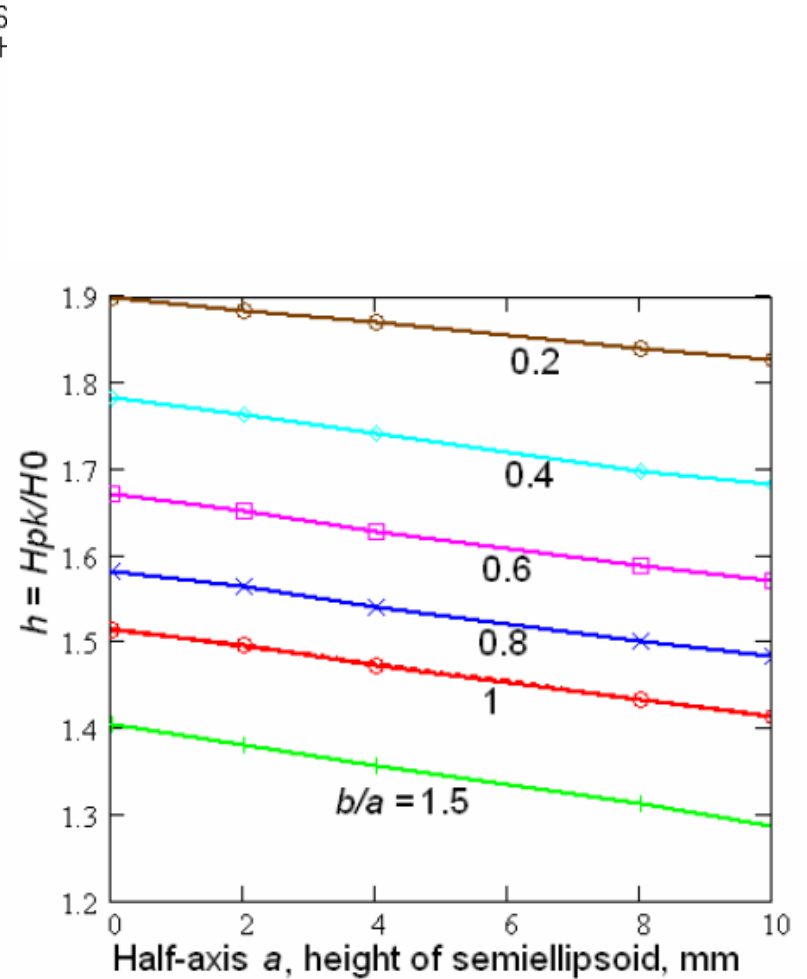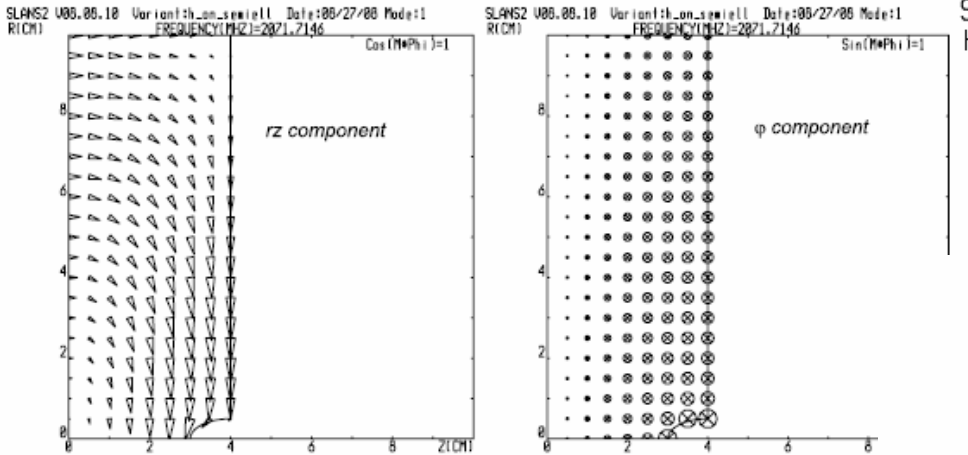| parameter	Small grain material a)	out of welding seam b)	Welding seam	Bulge 50µm high, 200µm Φ
Ra	1-2 µm	4-8 µm	40-80 µm	
C	~ 300	~ 90-100	~ 350	
C/A	~ 0,085	~ 0,024	~ 0,085	~ 0.5
β=1/(D)	1,065	1,028	1,4 *	1.9 !!!!
Φ grains	70 µm	1-2 mm	0,5-1 cm	

Cornell

Figure 11. Magnetic field enhancement at the semiellipsoidal protrusion on a plane.

End