

SNS $\beta=0.81$ Cavity

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**SNS, ORNL
Sang-ho Kim and Marc Doleans**

Comparison of Inter-cell coupling constant k with three different ways

1. In text book

$$k_t = \frac{(\omega_\pi^2 - \omega_0^2)}{(\omega_\pi^2 + \omega_0^2)} \text{ Under the assumption } \text{ of } k \ll 1$$

2. The equation quoted from IEEE trans. on Nuclear Sci. Vol 45, No 1, p114 (1998)

$$k_e = \frac{\omega_\pi^2 - \omega_0^2}{2\omega_0^2 - [1 - \cos(\pi / N)]\omega_\pi^2}$$

3. Using code;

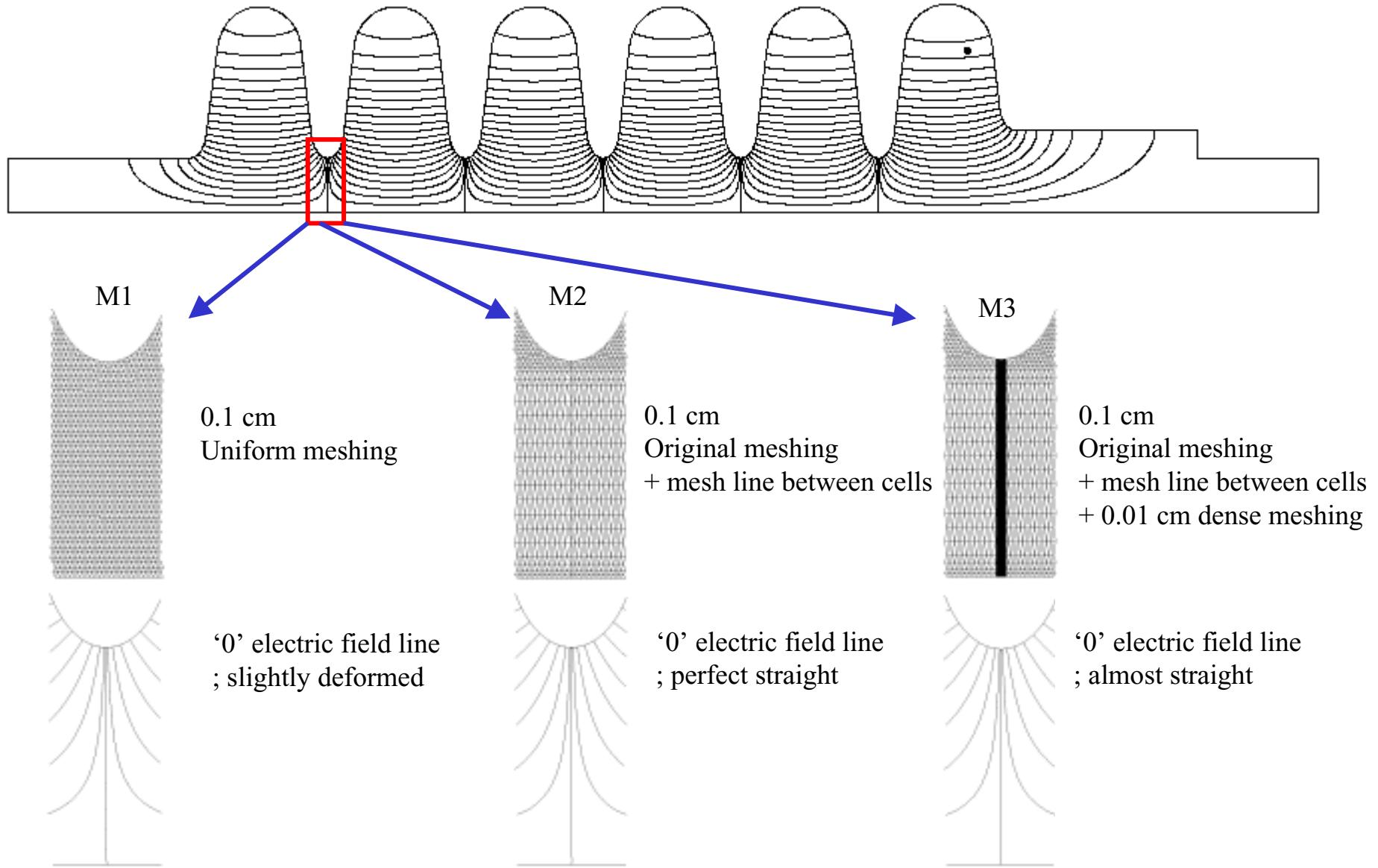
-by fitting a coupled-circuit model to the frequencies of the six modes
in the TM010 pass band for full (6-cell) cavity → SUPERFISH+DISPER
from LANL

-can be used as reference.

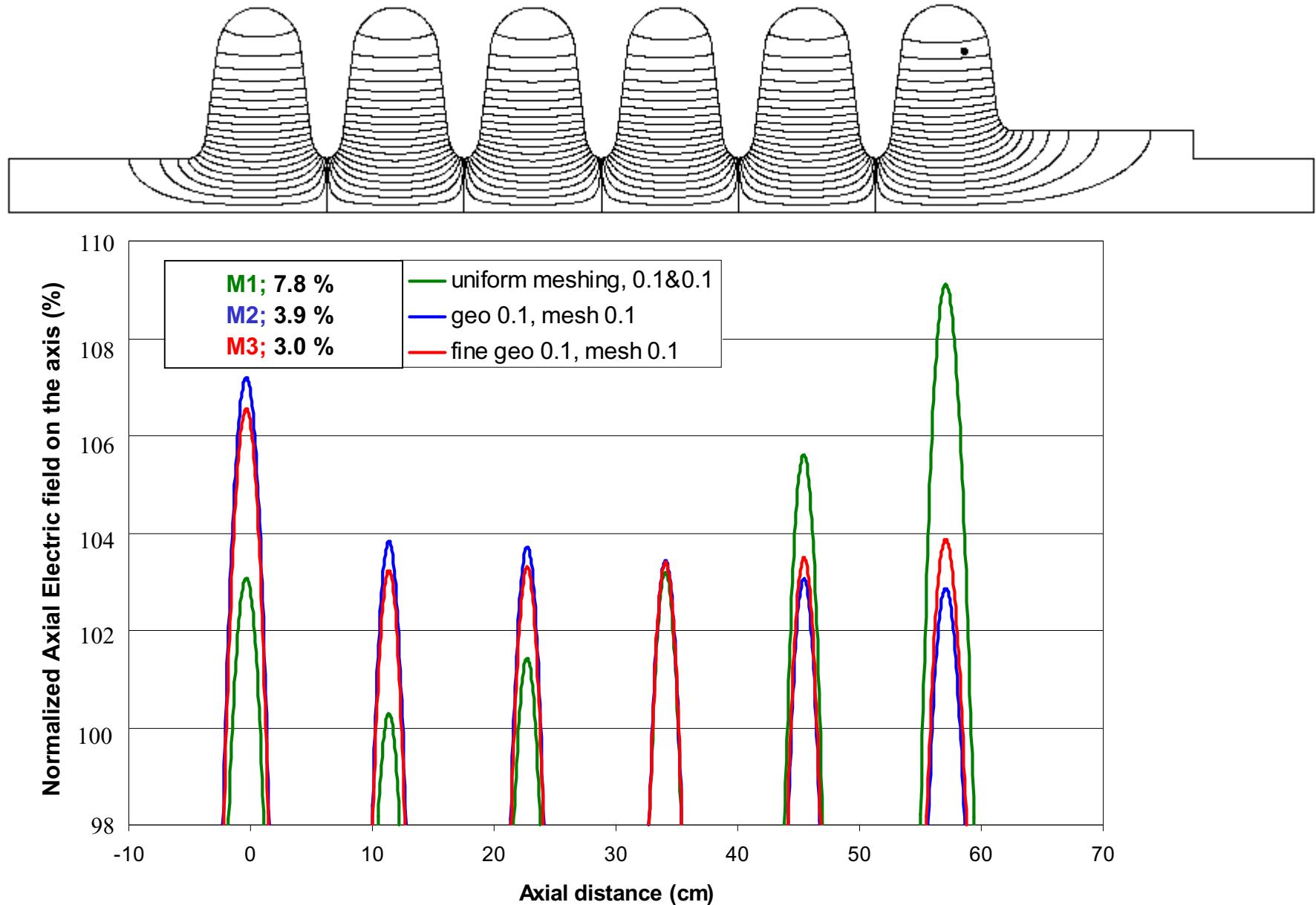
Results

	beta=0.61 cavity	beta=0.81 cavity I	beta=0.81 cavity II
1	1.52	1.52	1.46
2	1.67	1.67	1.6
3	1.62	1.61	1.54

Meshing Study for SUPERFISH (I)



Meshing Study for SUPERFISH (II)



Meshing Study for SUPERFISH (III)

	Mesning Scheme	Mesning (cm)	Frequency (MHz)	Field Flatness (%)
meshing 0.1 cm	M2	0.1 original	805.00217	3.9
		0.15 original	805.07365	2.9
	M3	0.1 original	804.99937	3
		0.15 original	805.06844	3
meshing 0.15 cm	M2	0.1 original	804.95651	3.6
		0.15 original	805.00188	4.3
	M3	0.1 original	804.92776	3.6
		0.15 original	804.99682	3

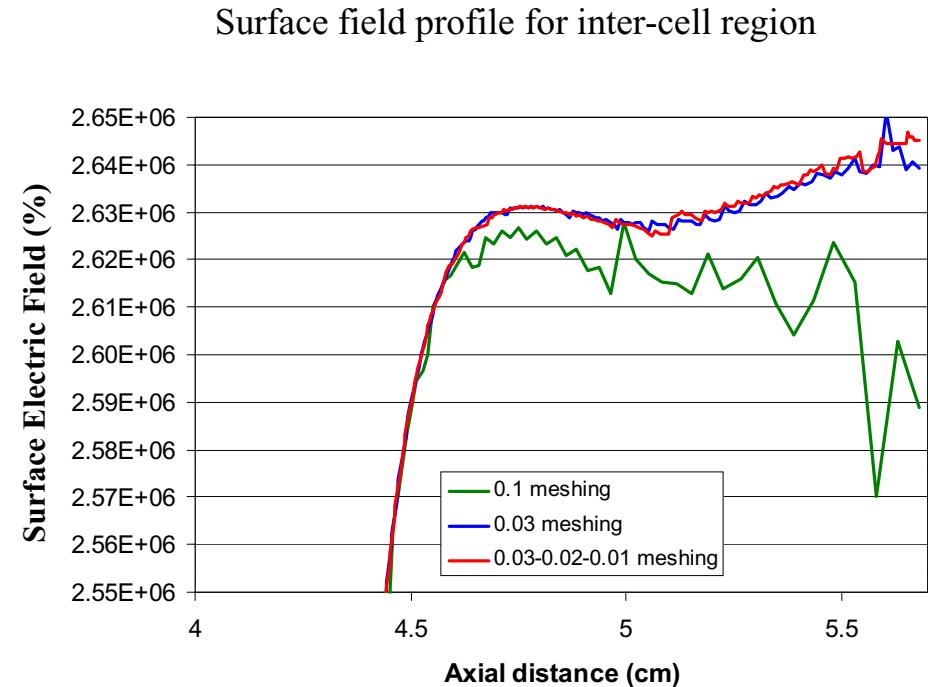
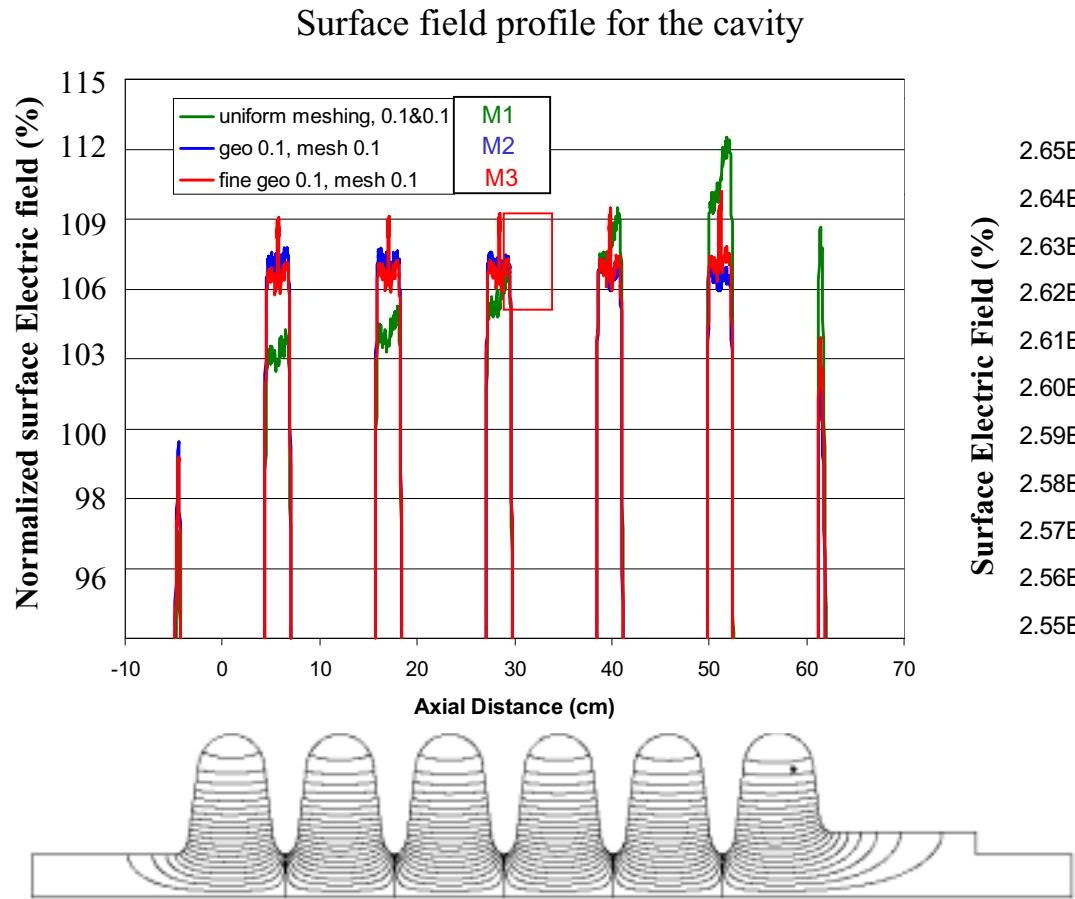
Inter-cell region meshing strongly affects field profiles

M1 meshing scheme lead to huge Field Flatness variation 2% ~ 15%

M2 and M3 schemes give stable results (< 1% variation)

M3 allows a more realistic simulation

Meshing Study for SUPERFISH (IV)



Results from M2 & M3 meshing show that the peak surface fields of end- and mid- cells are almost same.