

Development of superconducting spoke cavity for electron accelerator in Japan

## **Multipactor simulation of 325MHz superconducting spoke cavity**

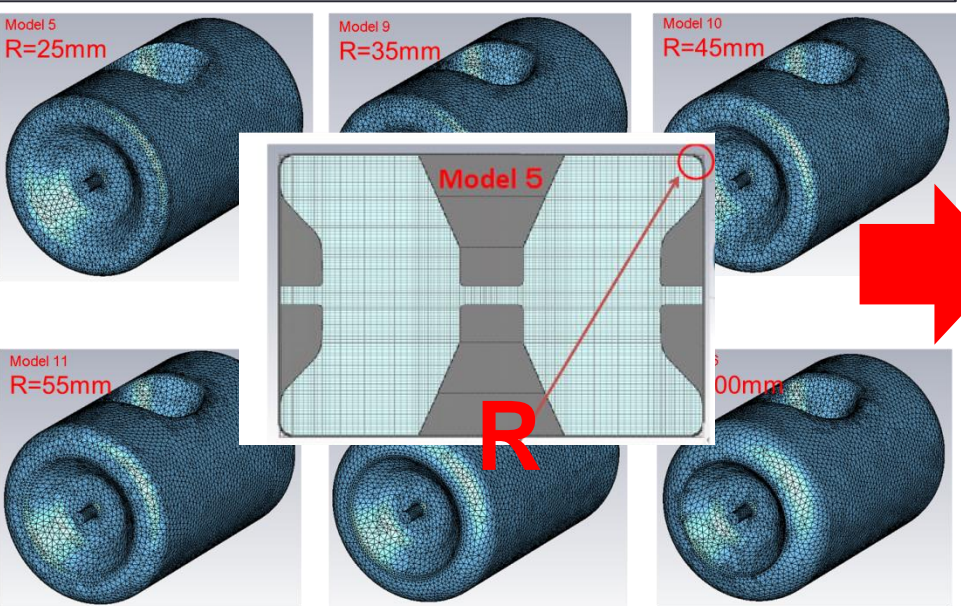
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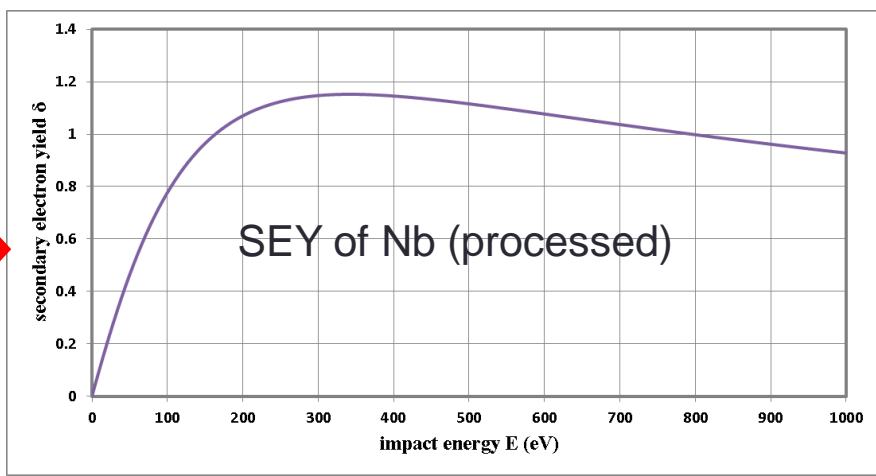
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**TESLA Technology Collaboration meeting,  
KEK, Tsukuba, Japan (2014)**

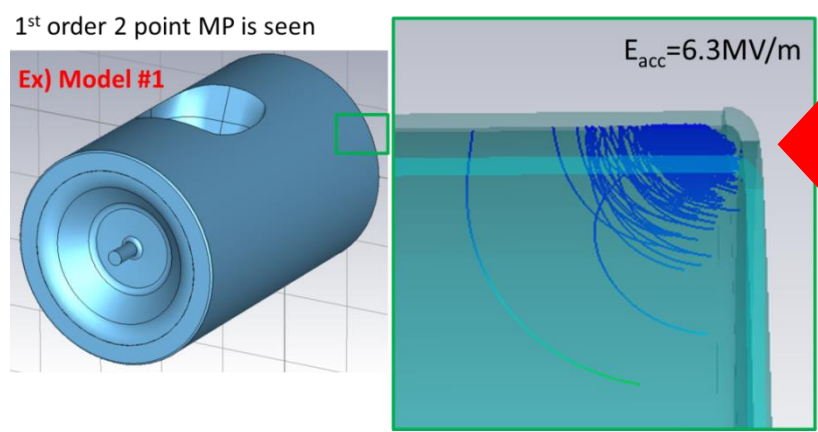
### Make several models with equivalent performances



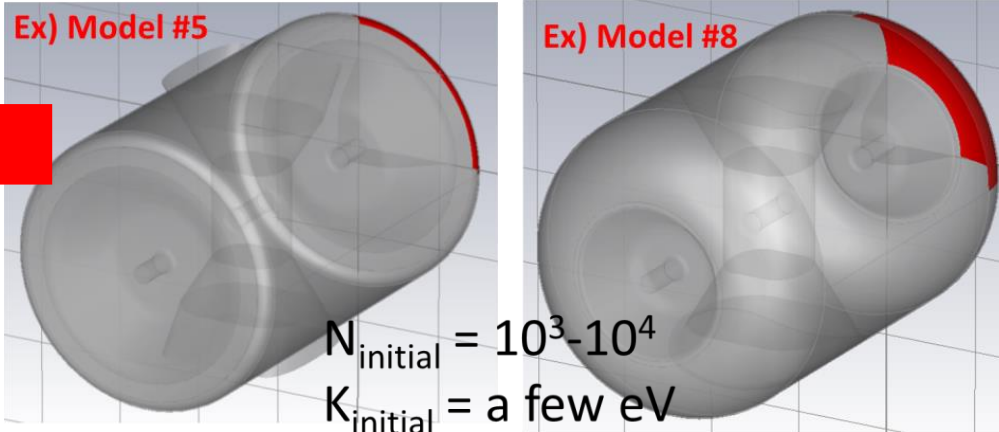
### Set secondary emission yield (SEY) of the cavity wall



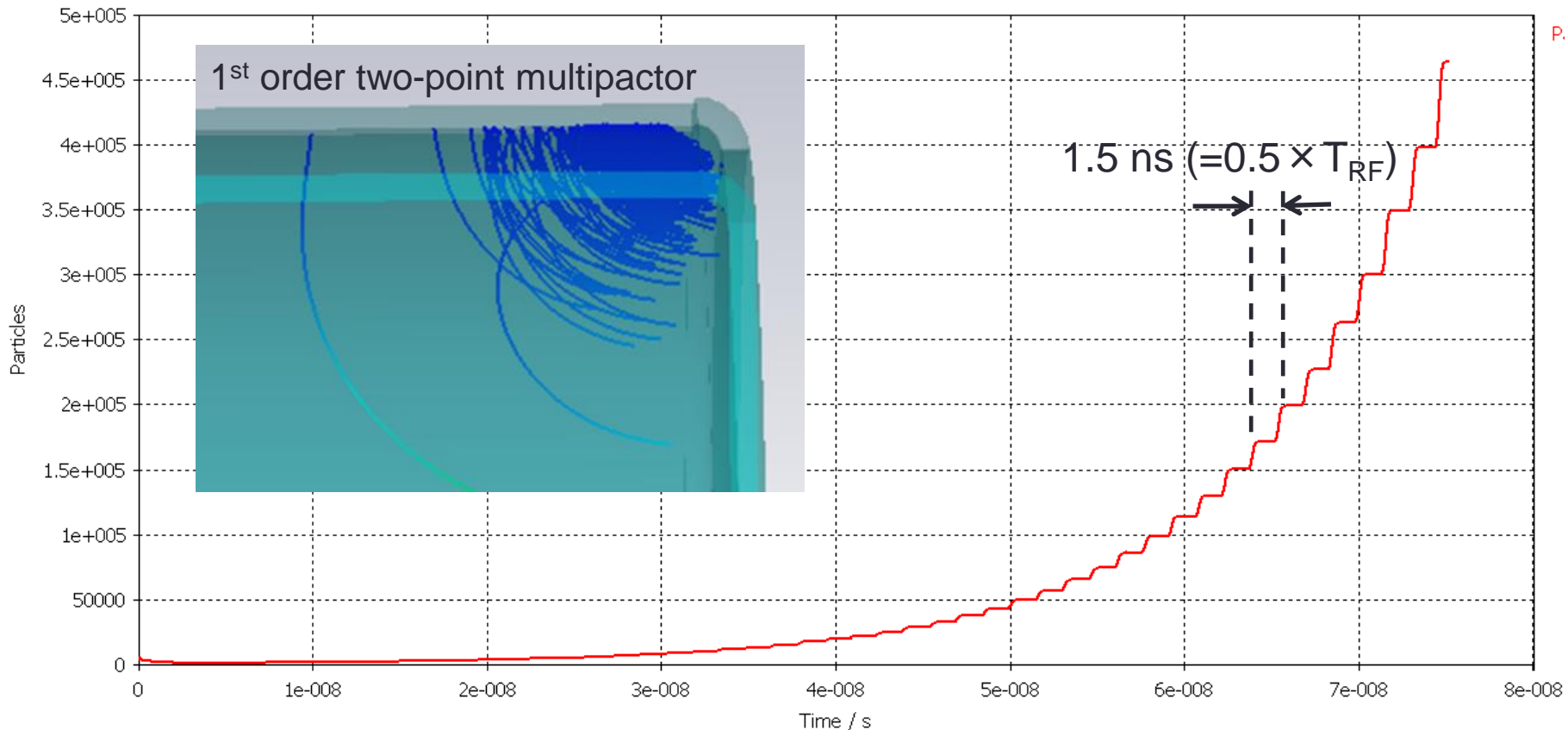
### Simulate multipactor



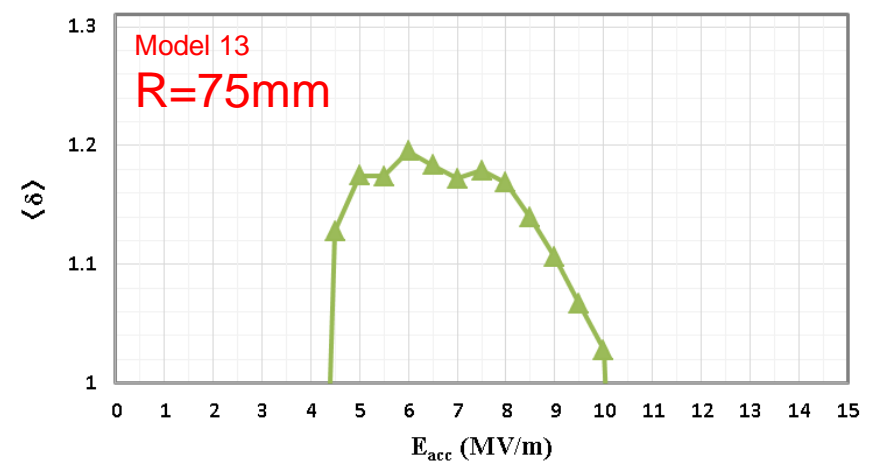
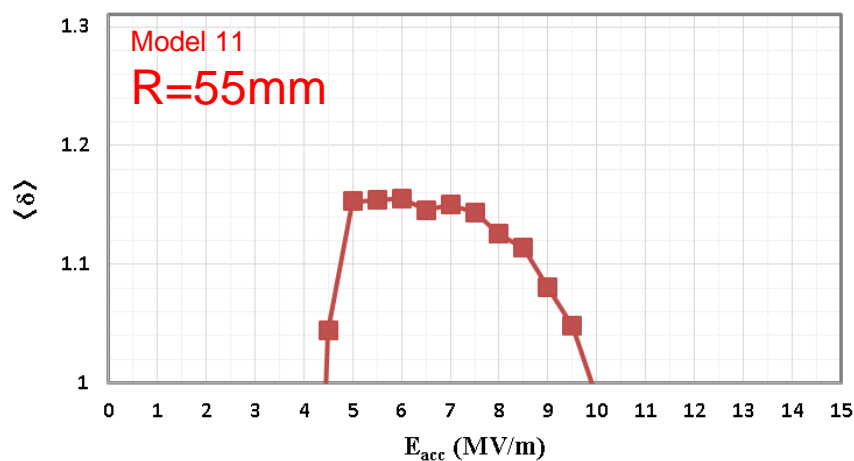
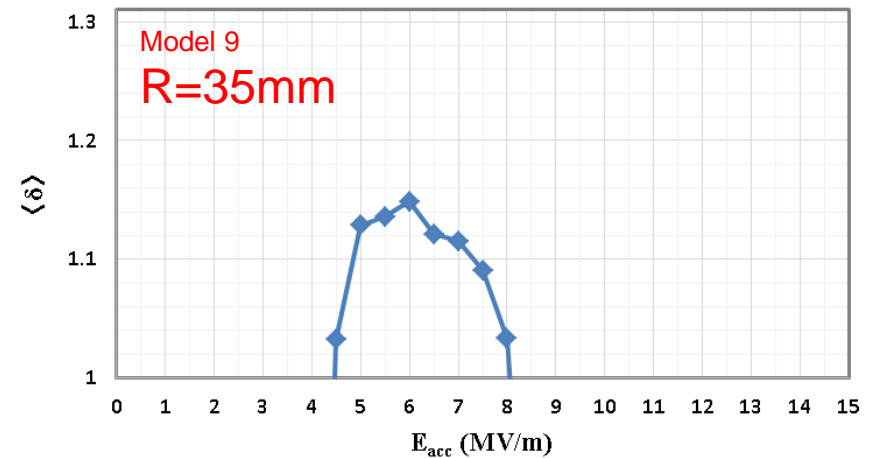
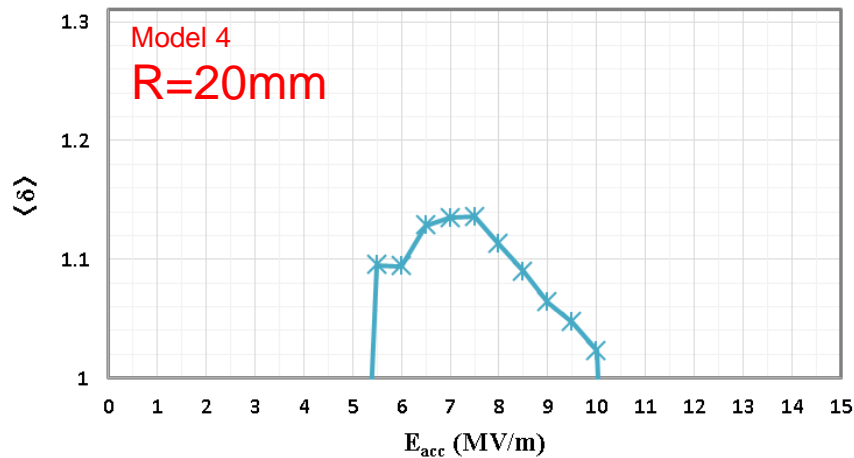
### Set Initial electrons (with symmetry in mind)



Multipactor signals: Trajectories, exponential growth of particle number, averaged SEY larger than 1  
 Type of multipactor: period of particle number growth

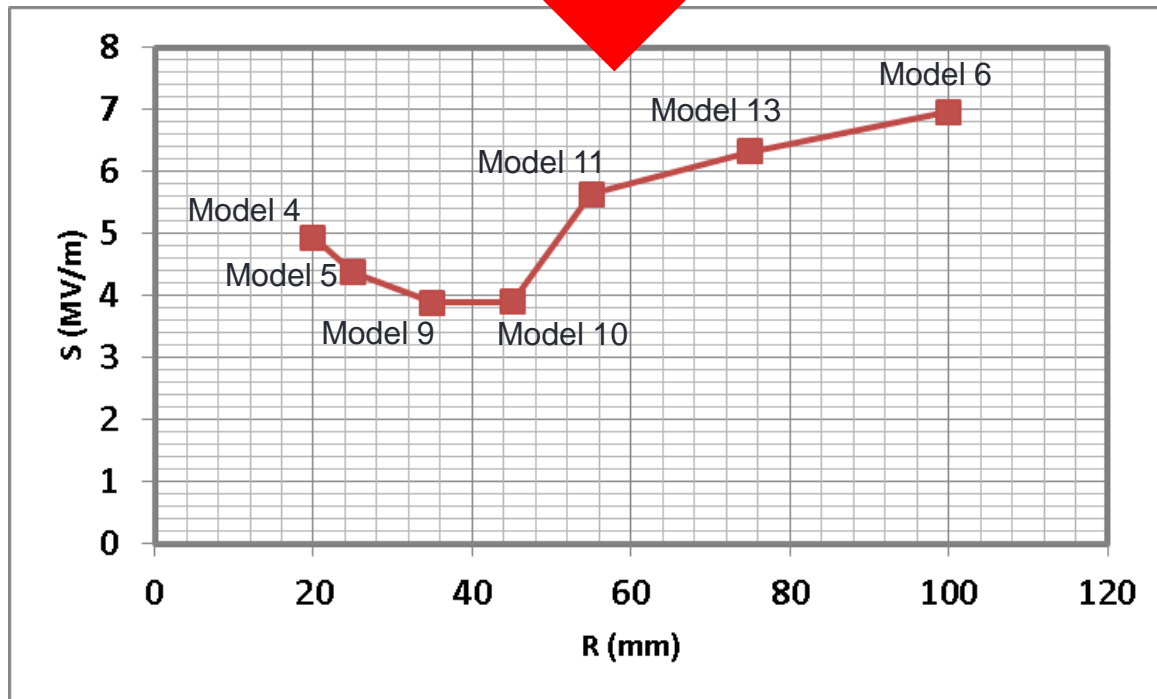
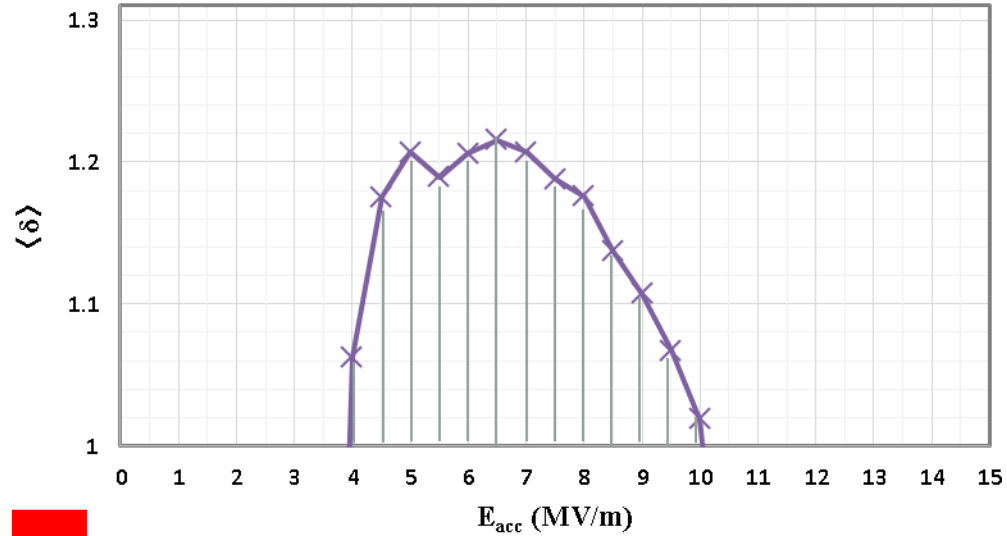


$$\langle \delta \rangle = \frac{\text{total number of secondary electrons}}{\text{number of electron-wall collision}} > 1$$



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For a comparison of models,  
calculate area below  $\langle \delta \rangle$ - $E_{\text{acc}}$  curve  
(summation of trapezoids).



## Summary

- We compared several models with different corner radii.
- $R=35-45\text{mm}$  seems to be a better choice.
- Radius of spoke base should also be optimized.

