Experimental Evaluation of Magnetic Field Effects on Breakdown Rates

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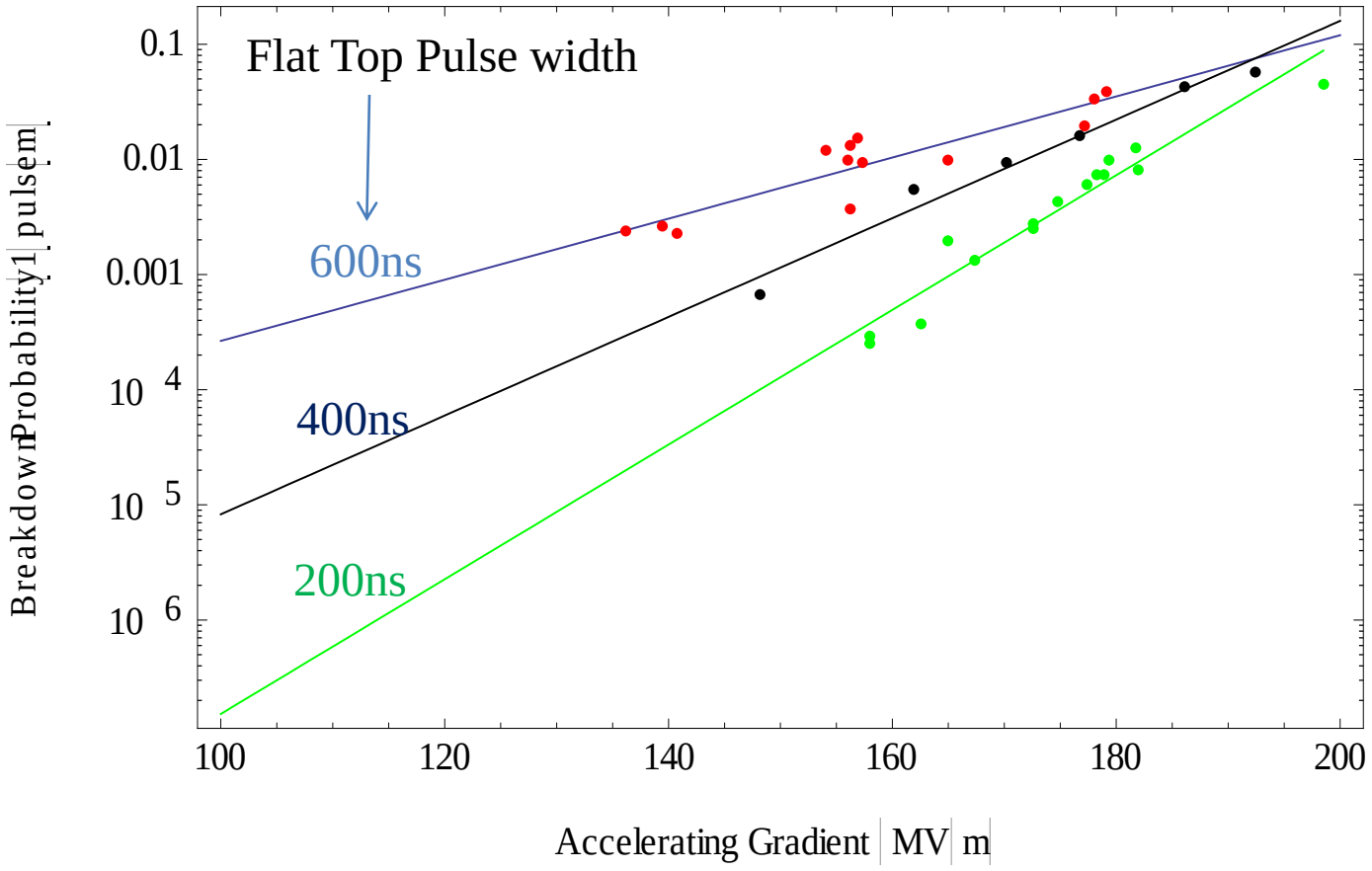
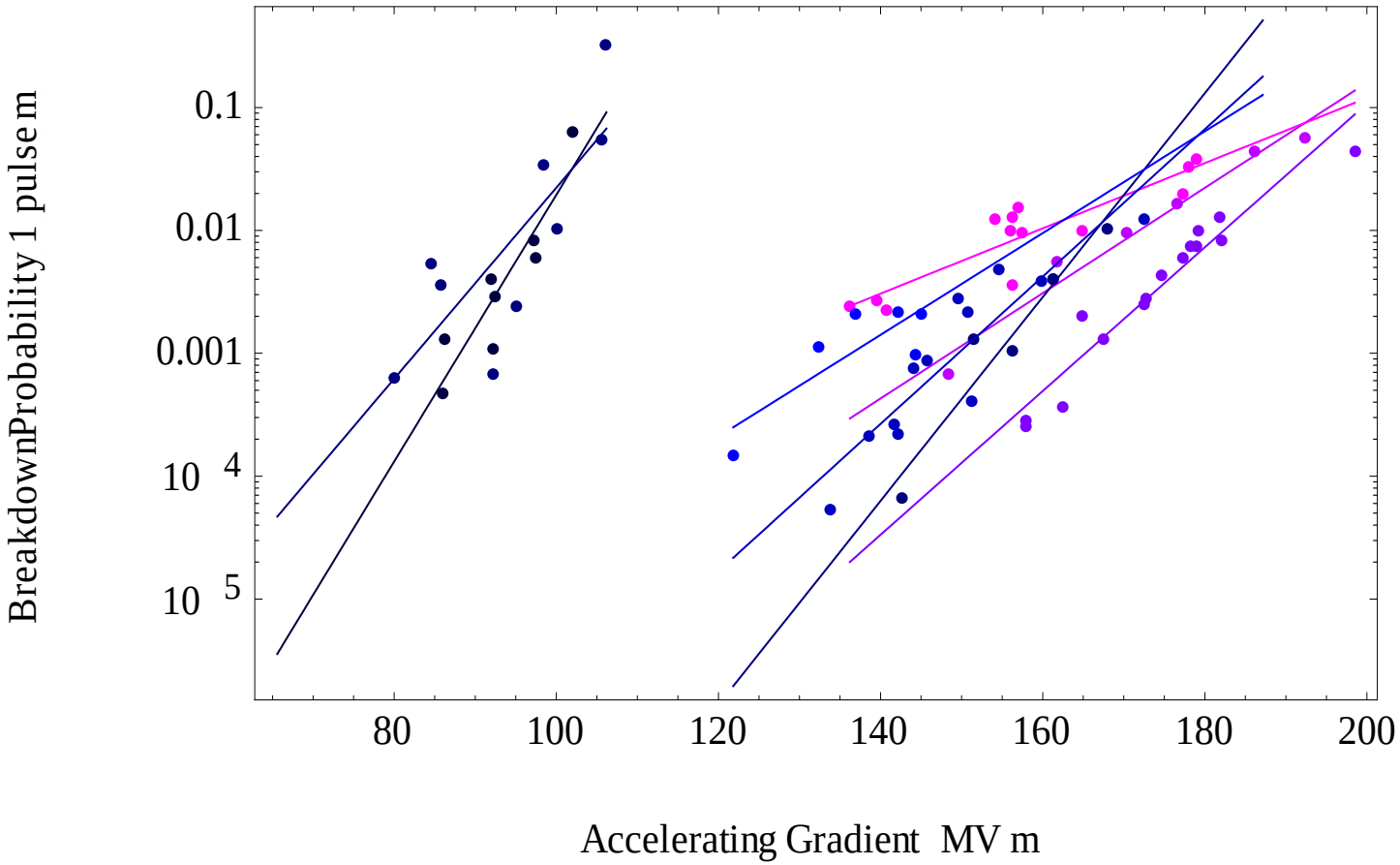
SLAC

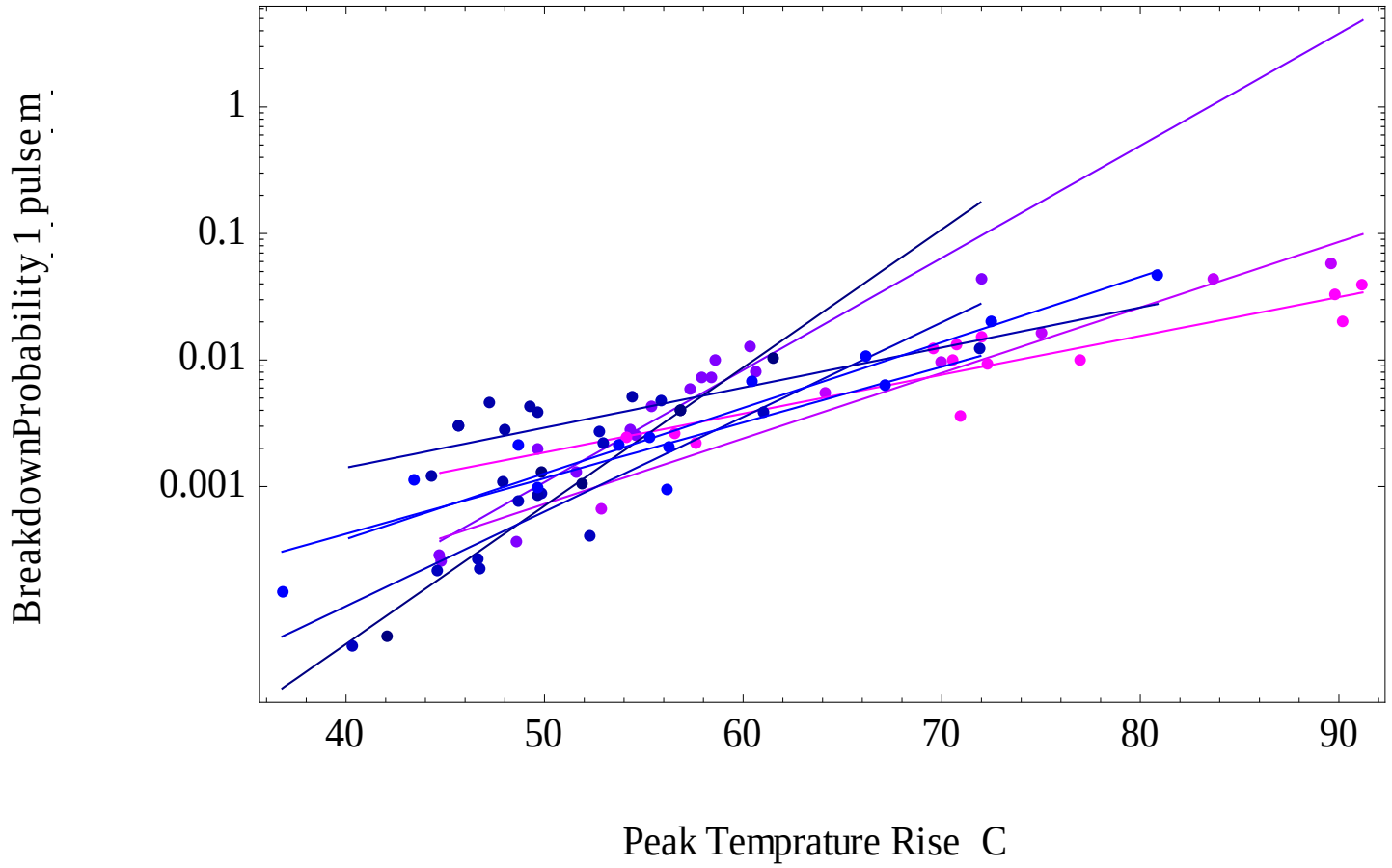
Breakdown Probability for a Standing Wave Accelerator Structure with a/λ=0.1



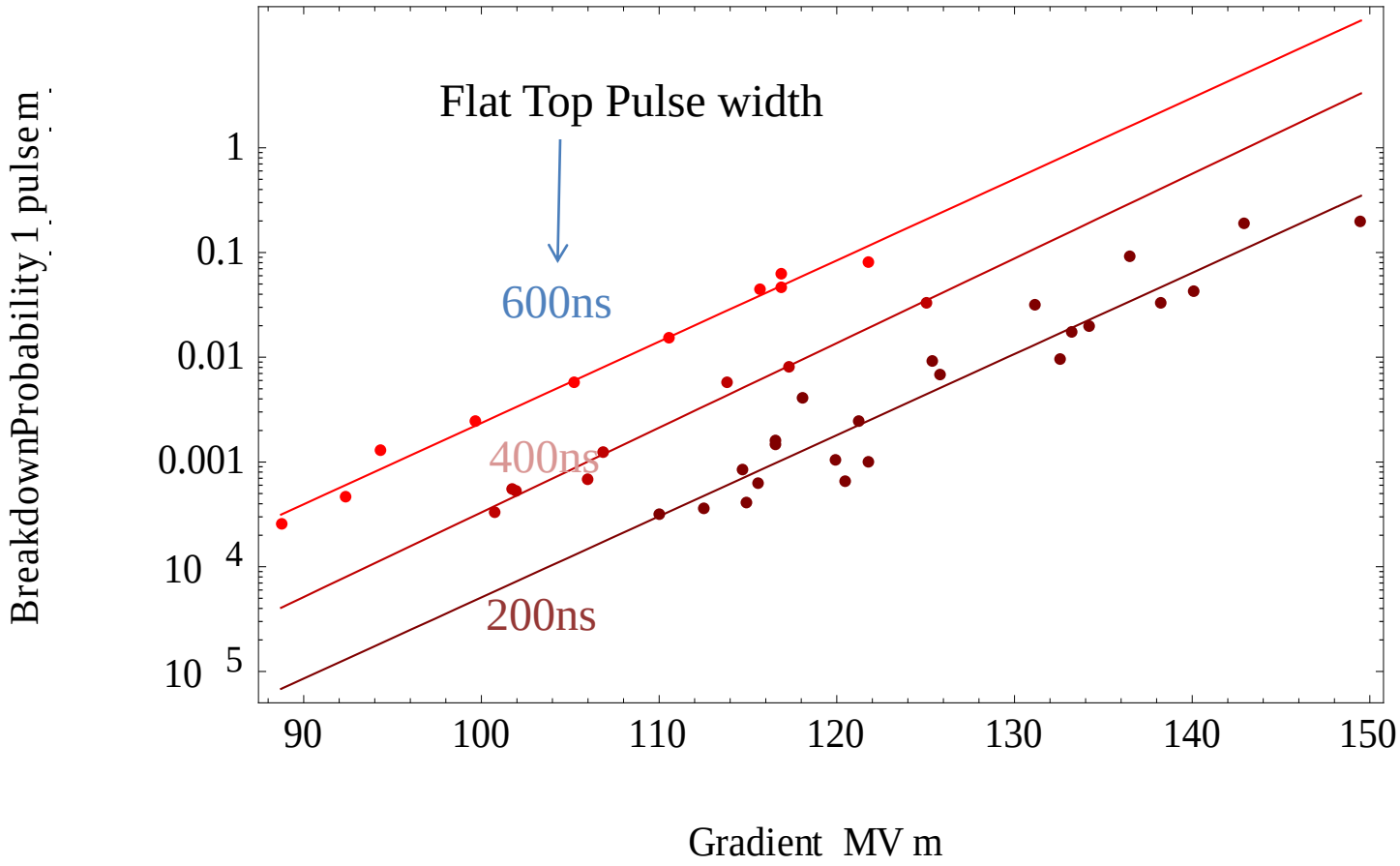
Breakdown Probability for a Standing Wave Accelerator Structure with different a/λ



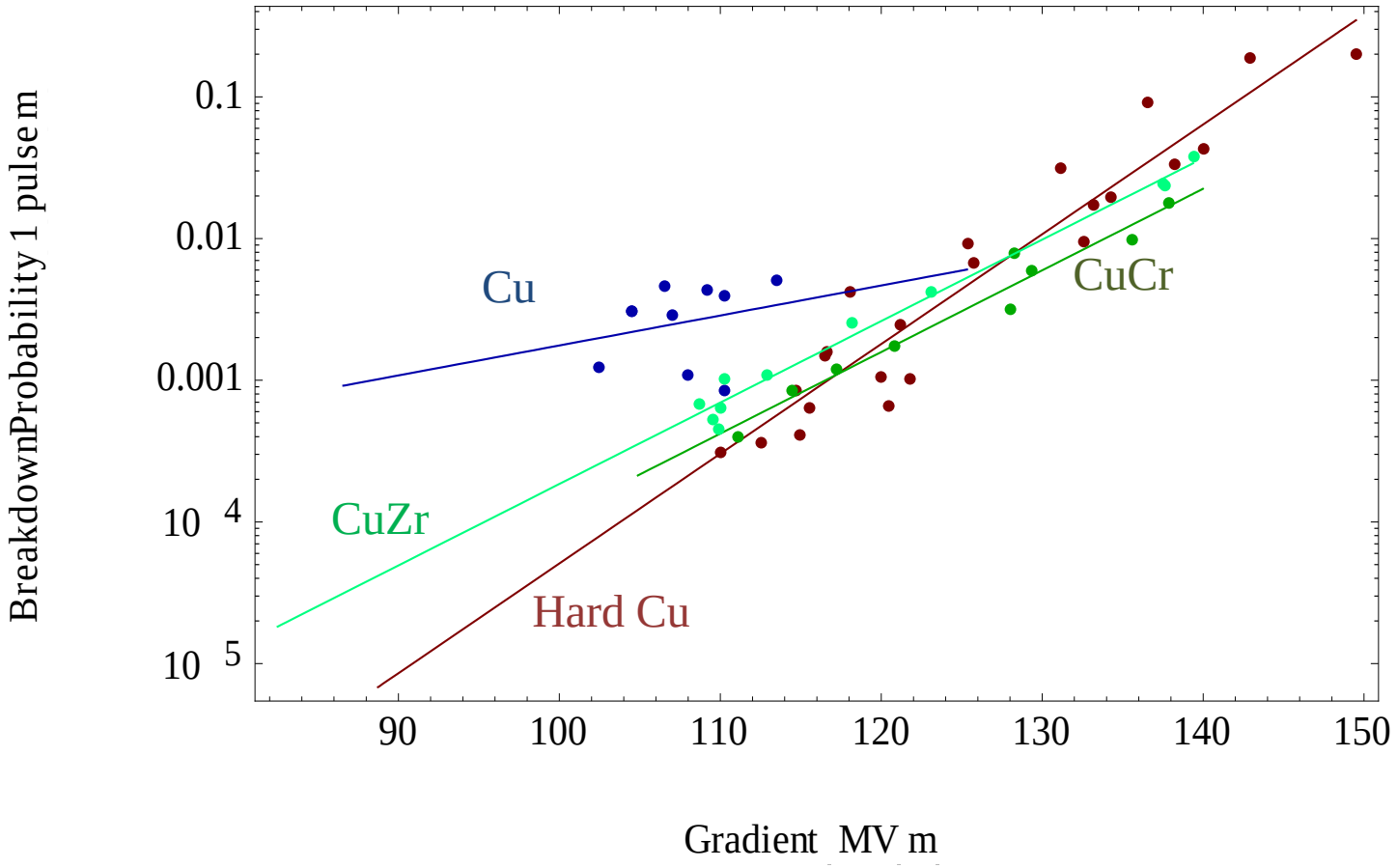
Breakdown Probability for a Standing Wave Accelerator Structure with different a/λ



Breakdown Probability for a Standing Wave Accelerator Structure with a/λ=0.22



Breakdown Probability for a Standing Wave Accelerator Structure with a/λ=0.22, Pulse length=200ns



Experimental Evaluation of Magnetic Field role in Breakdown Rate

These experiments and several others have led us to behavior that Magnetic field plays an important role in determine the gradient limit

Is is a local or a global effect

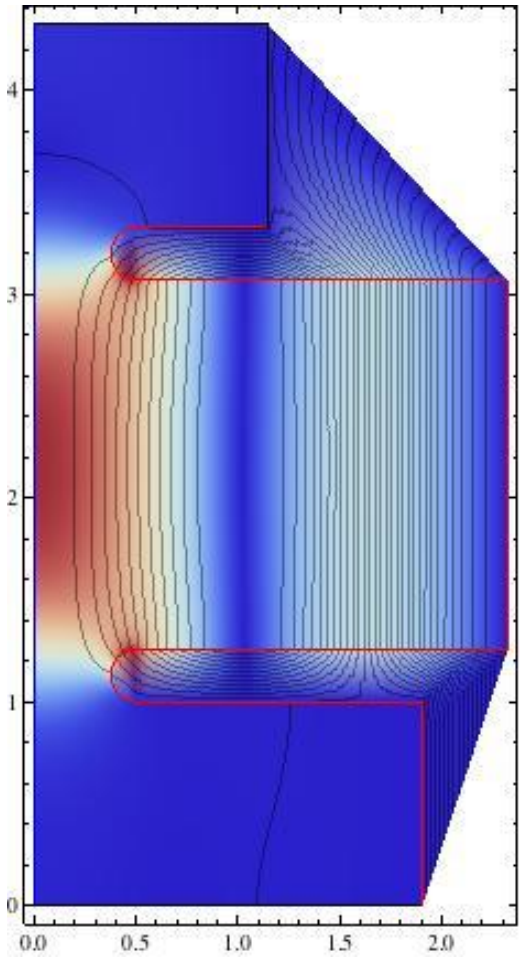
For this reason we suggested a waveguide test (see Valery Dolgashev's talk)

We also suggested(two years ago) a new apparatus that mixes the electric and magnetic fields using the TE_{01} and TM_{11} modes

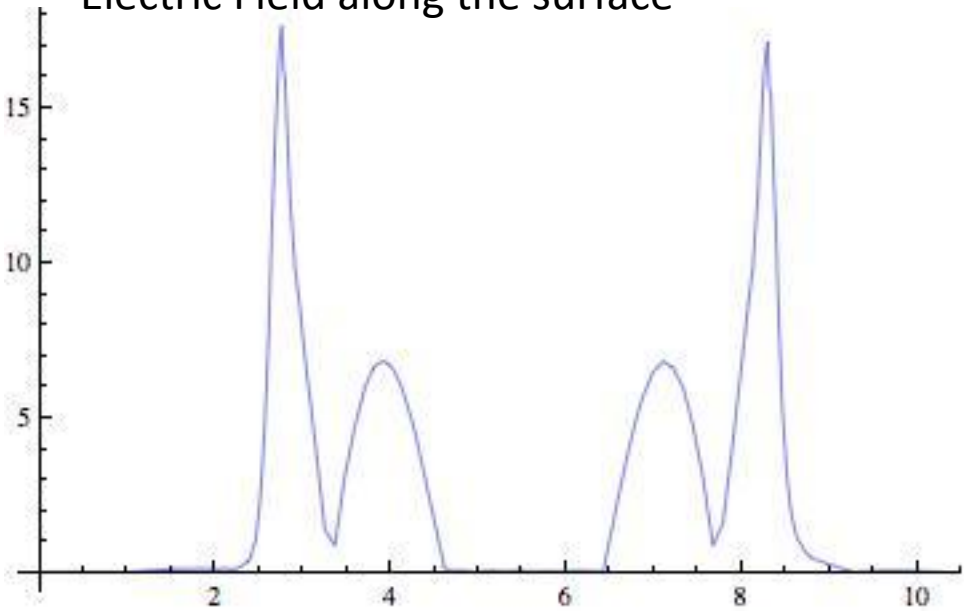
Here we suggest a simpler variation on this using the TE01 and the TM02 modes

A standing wave accelerator cell with iris dimensions similar to standing wave accelerator structure

Feed with TM_{01} mode converter

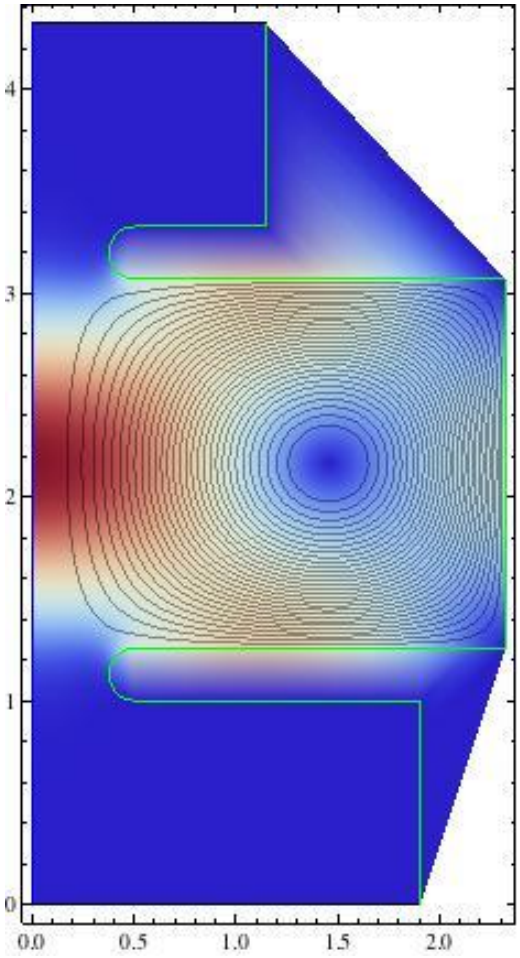


Electric Field along the surface



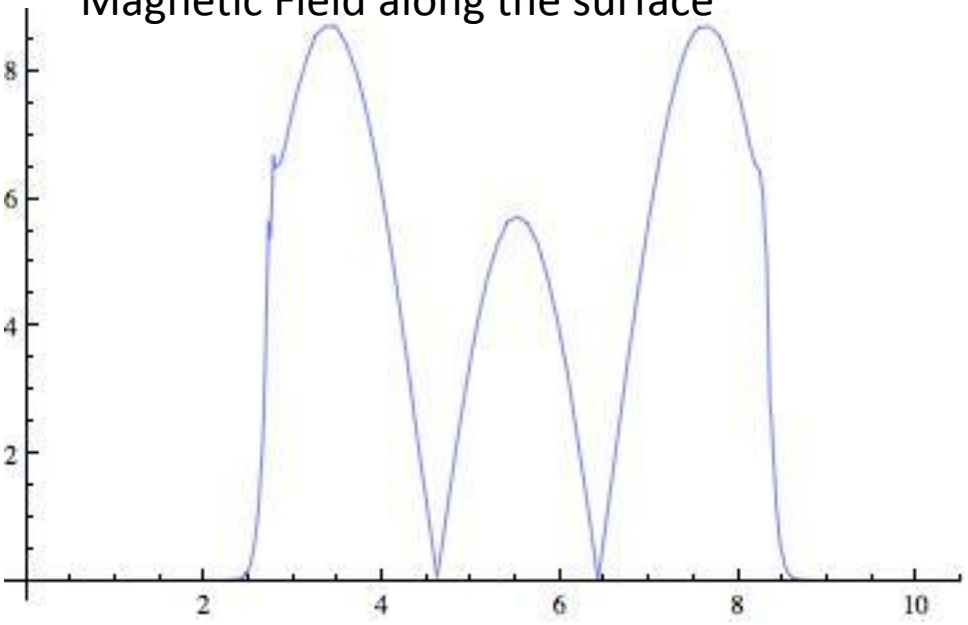
TM_{02} Mode with resonance frequency 11.443GHz

A standing wave accelerator cell with iris dimensions similar to standing wave accelerator structure



Feed with TE_{01} mode converter

Magnetic Field along the surface



TE_{01} Mode with resonance frequency 11.4244GHz