Fine Grooving of

Conductor Surfaces of

RF Input Coupler

To Suppress Multipactoring

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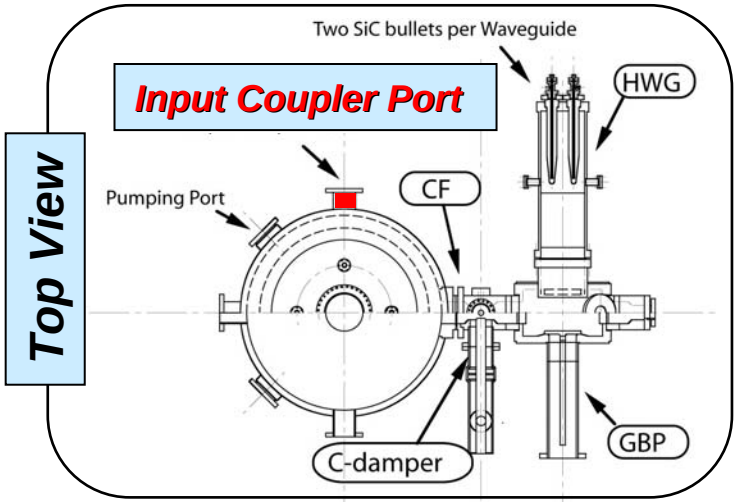
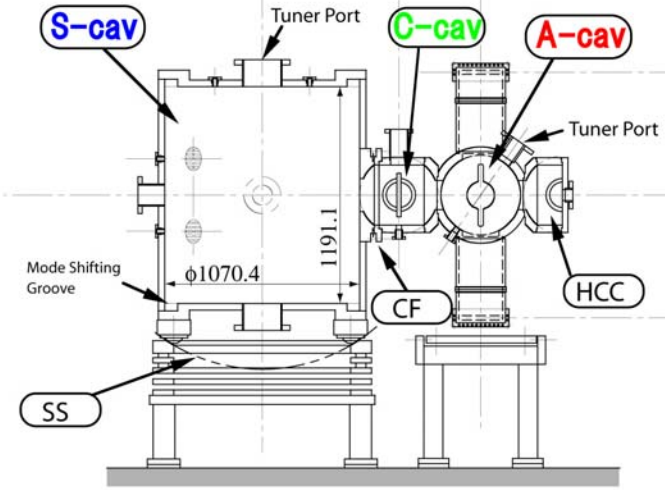
Accelerator Resonantly-coupled with Energy Storage

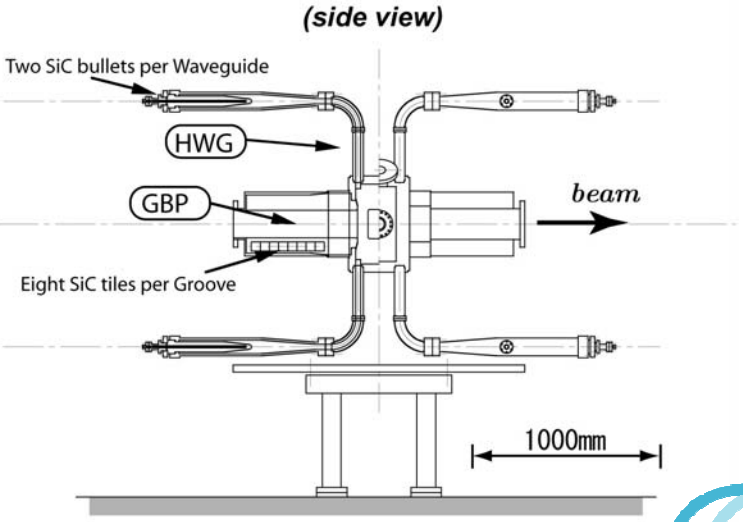
3-cavity system stabilized with the π/2-mode operation



consists of

- HOM-damped accelerating cavity (**A-cav**)
- Energy-storage cavity with TE_{013} (**S-cav**)
- Coupling cavity (**C-cav**)
  with a parasitic-mode damper

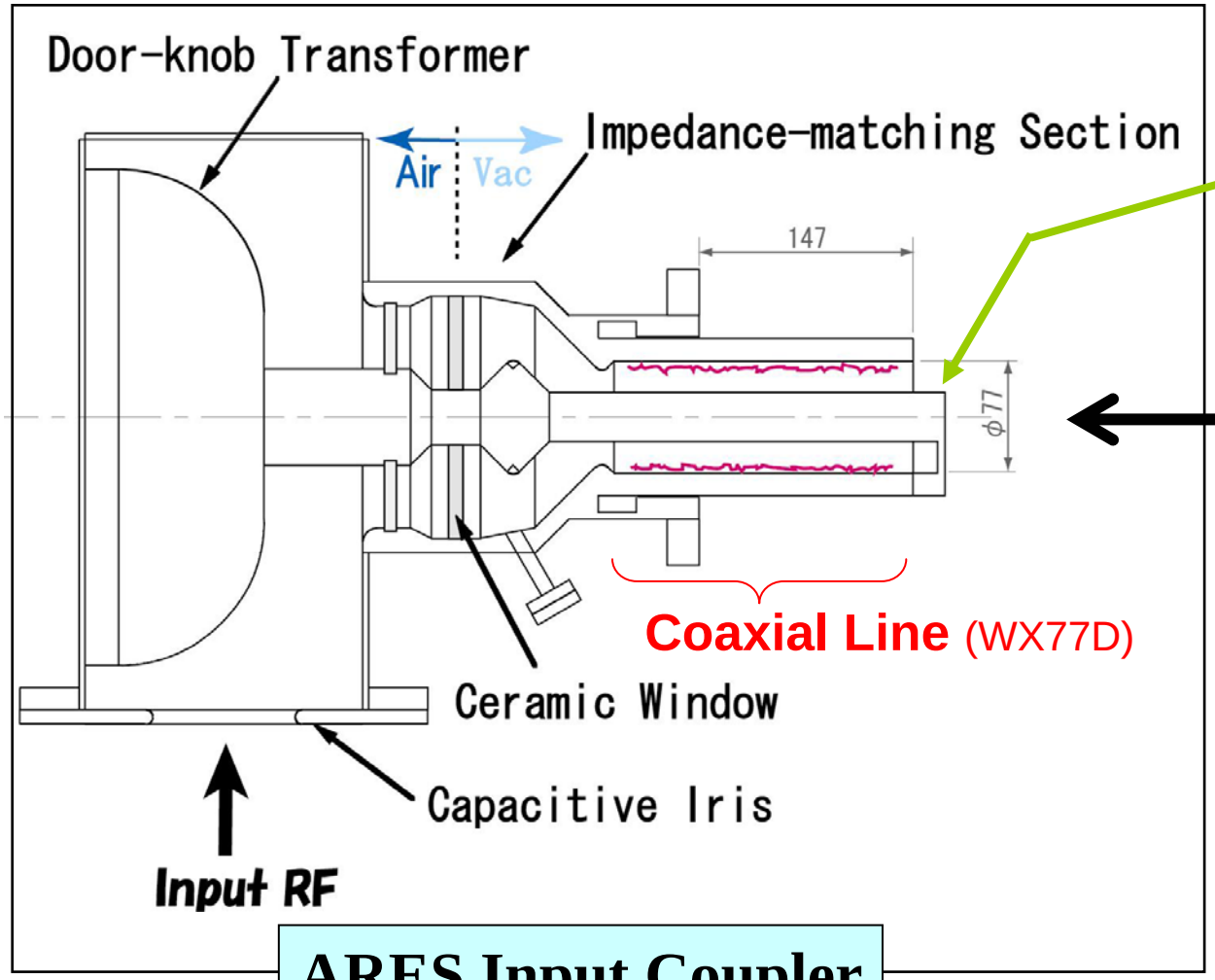




For the KEK B-factory:

KEKB uest for CPV kekb.jp

Two of the 32 ARES cavities had *multipactoring* problems in the coaxial line. (WX77D)



ARES Input Coupler

Coupling Loop

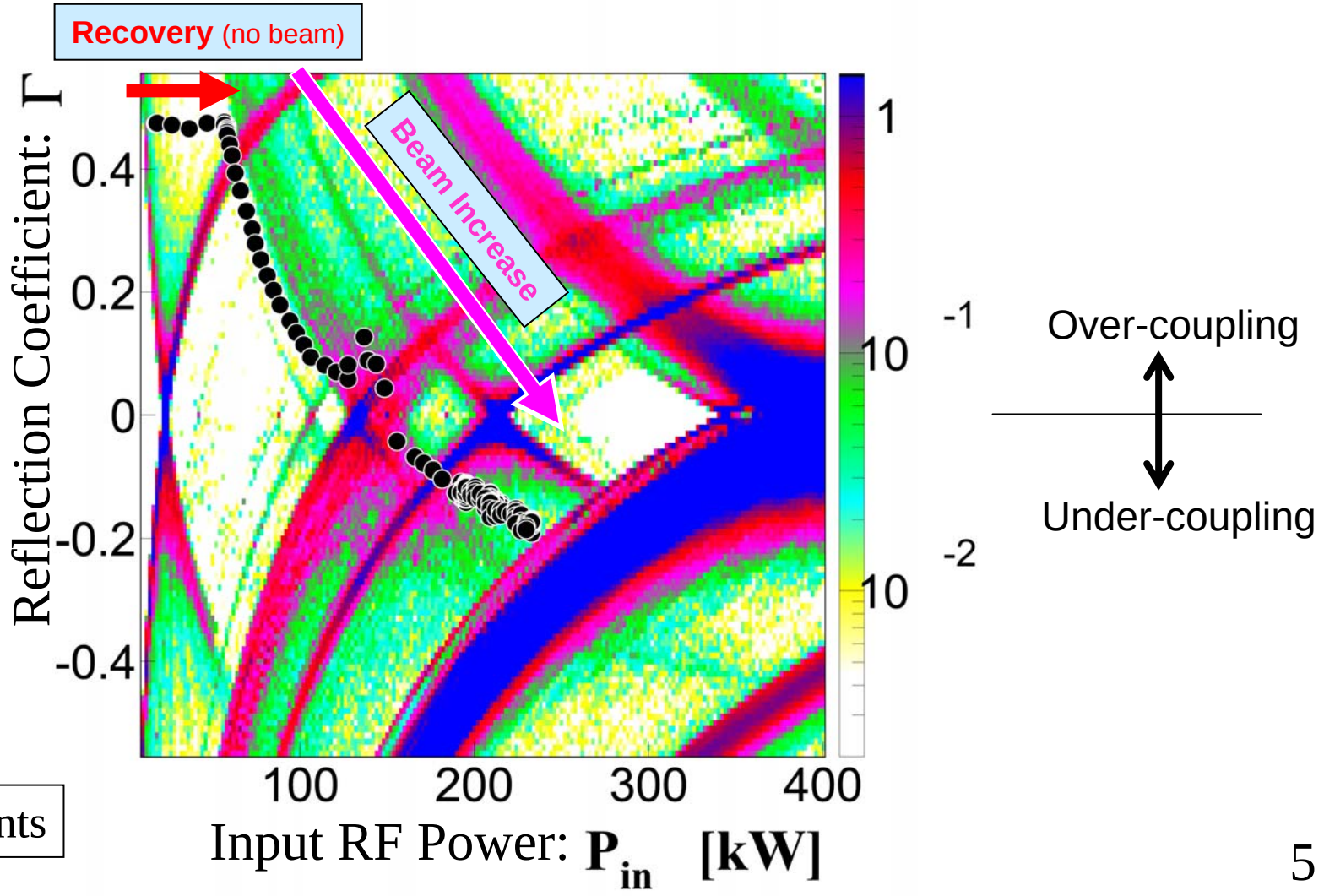
Example of
the TV-camera snapshots
of the multipactoring
in the coaxial line

Multipactoring Zone Map

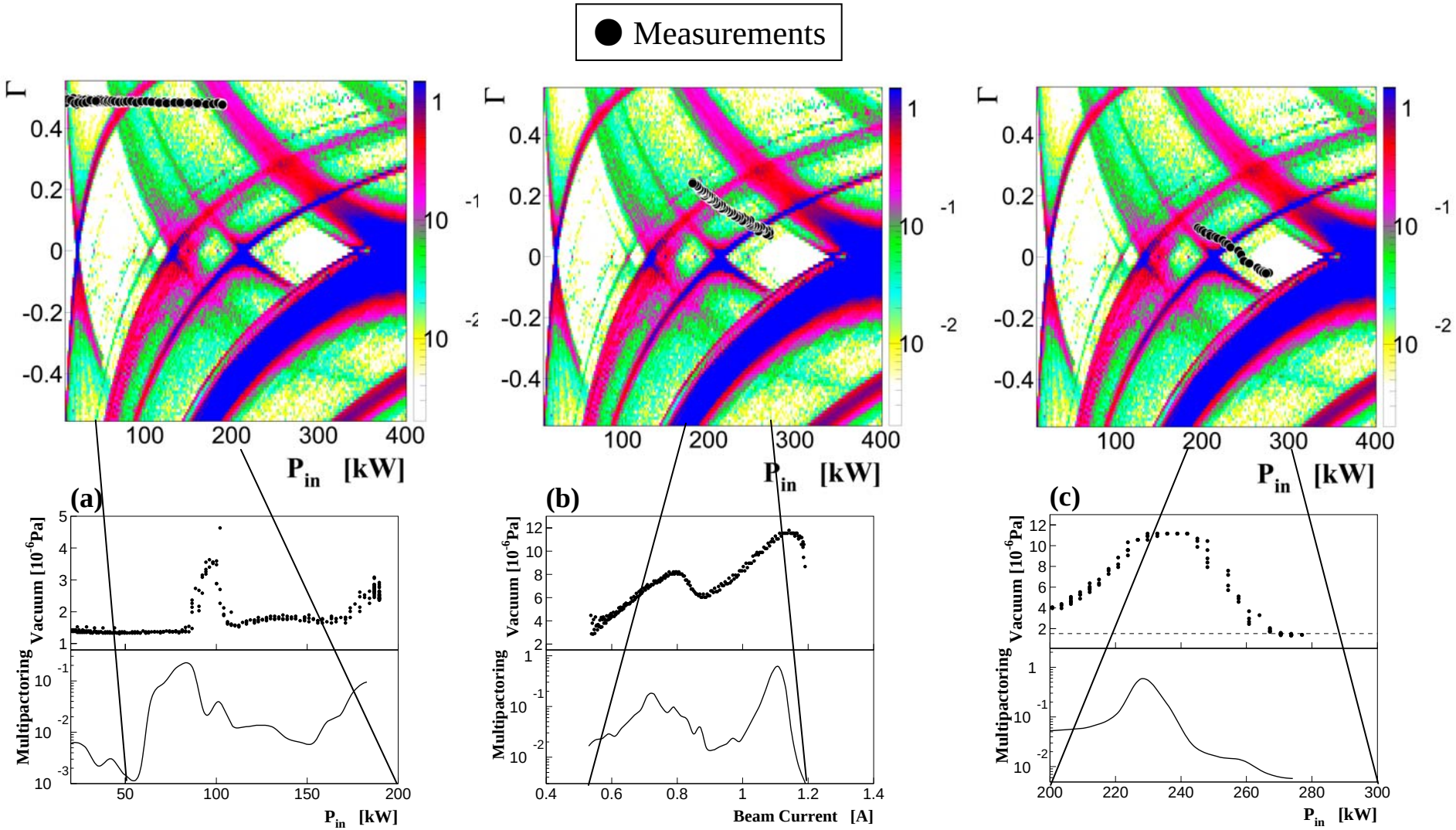
for the ARES Input Coupler with a regular coaxial line

from the model in

T. Abe et al., Phys. Rev. ST Accel. Beams **9**, *062002 (2006)*

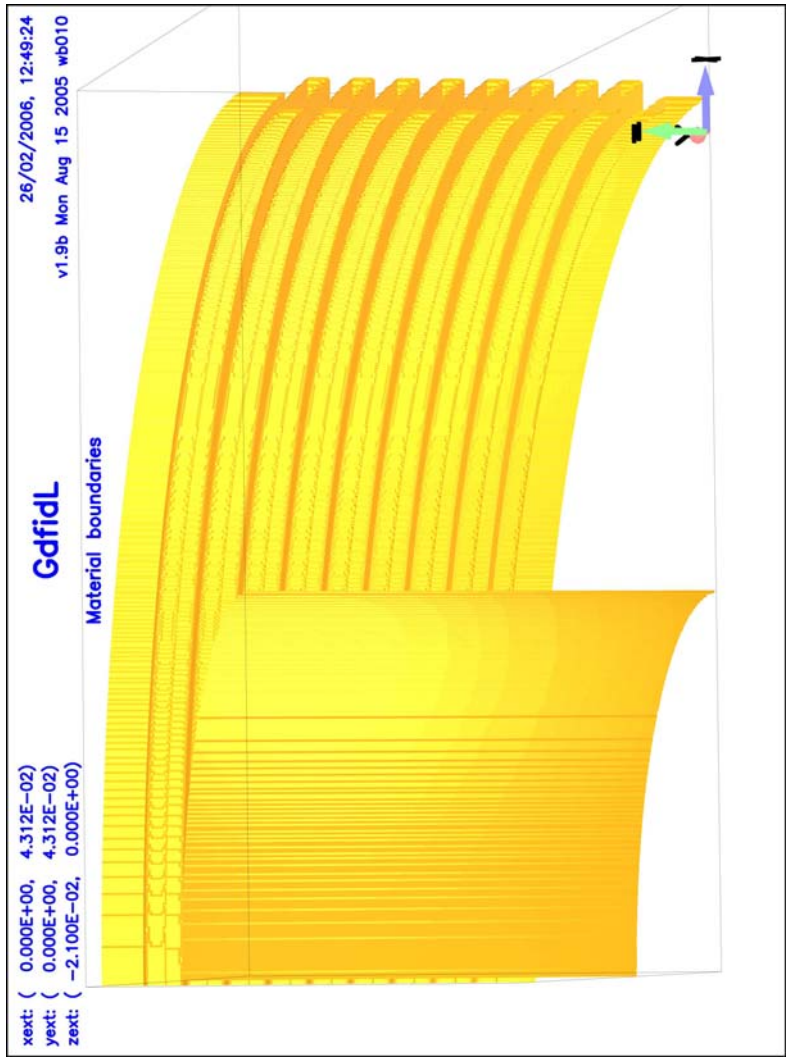


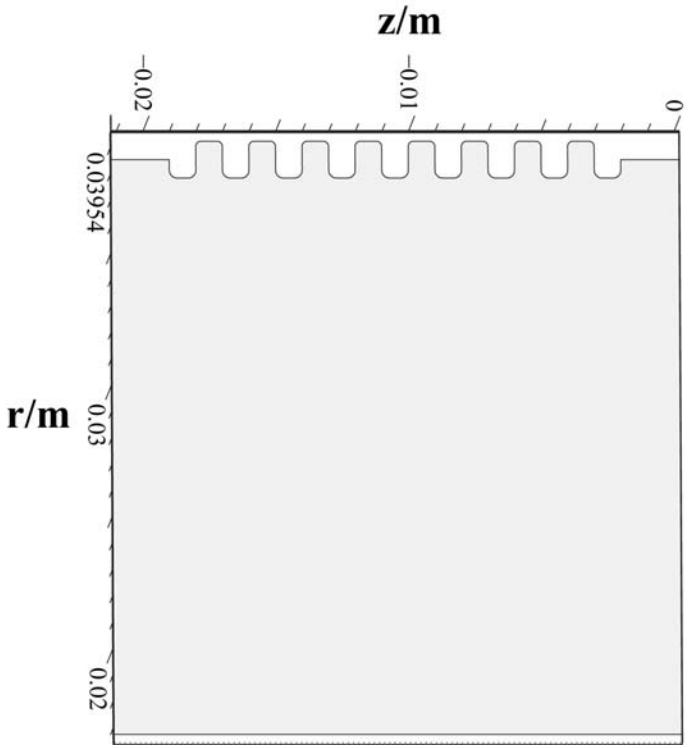
Good Reproduction Power for the Data



Fine Grooving of the Surface

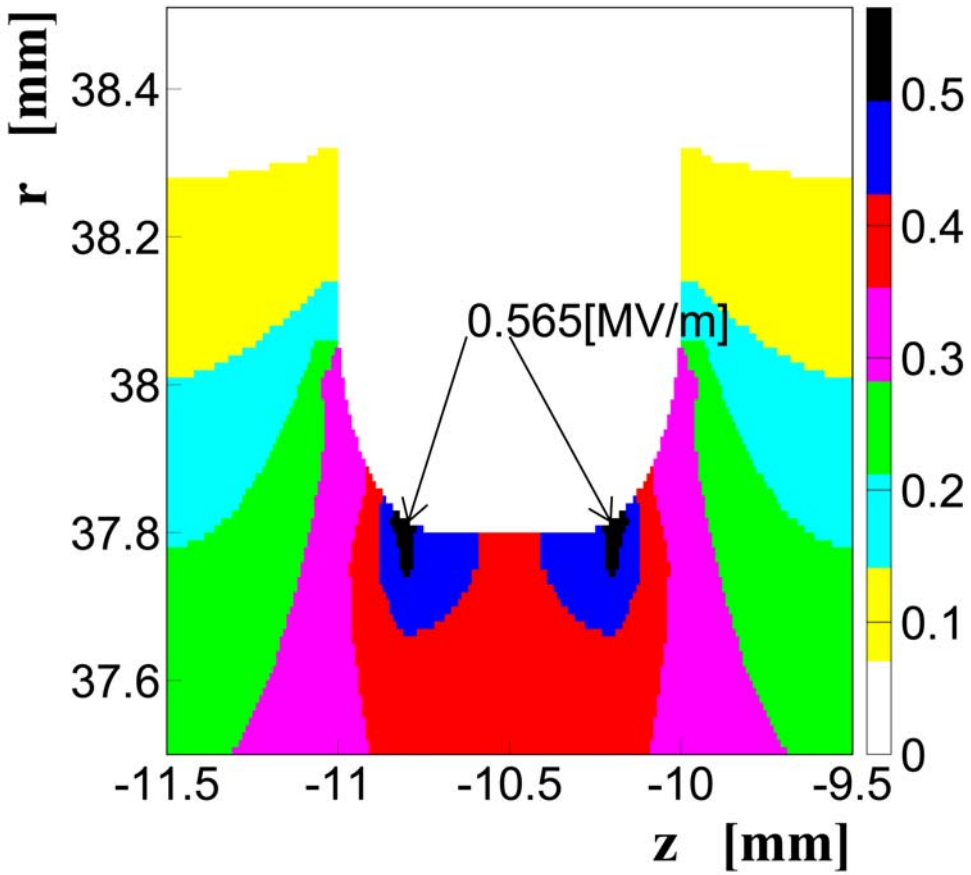
The *Quasi*-TEM is simulated by **GdfidL**.





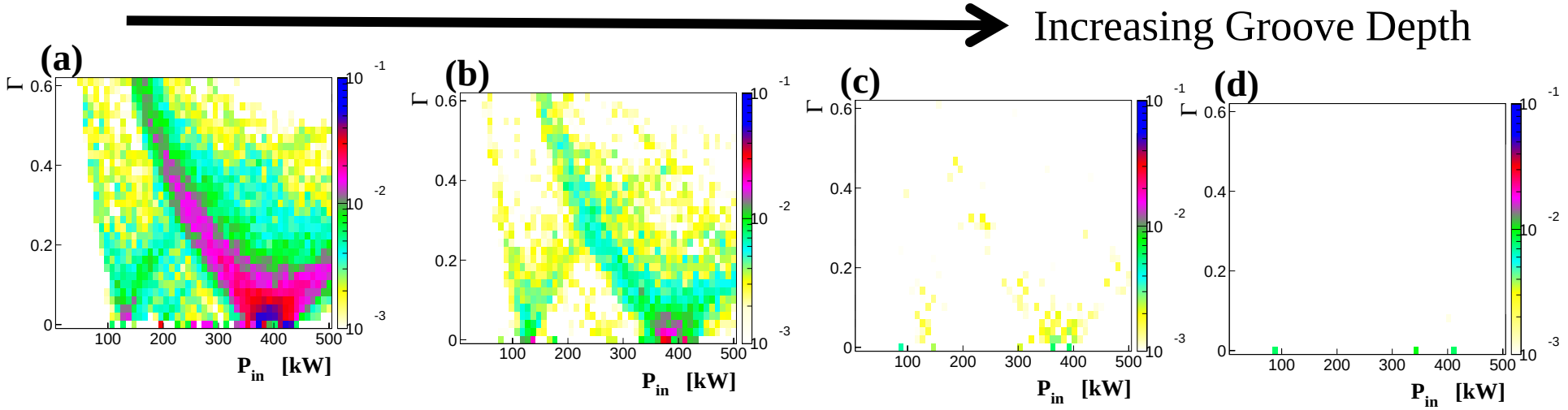
Body of Revolution

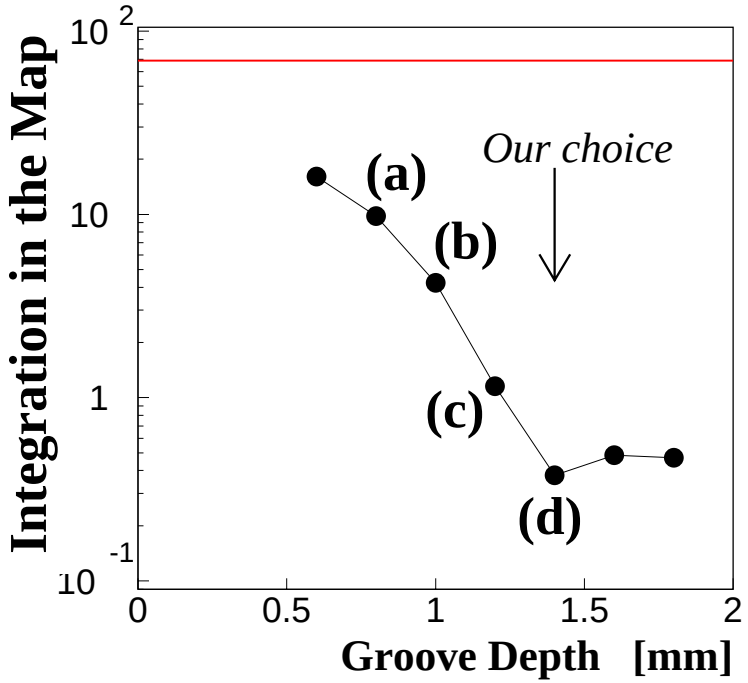
Electric Field (peak) at the Groove



The max. 0.565[MV/m] is lower than that on the inner conductor of the coaxial line with no groove (=0.717[MV/m]).

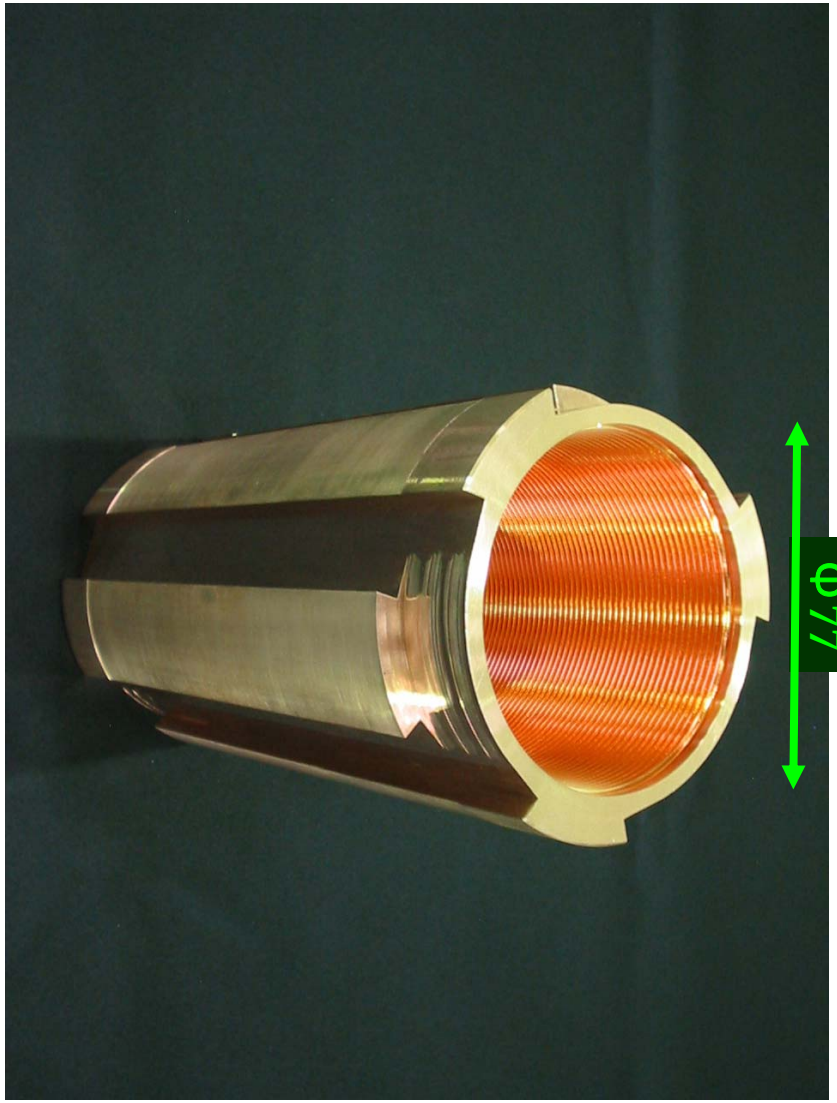
Suppression against Multipactoring

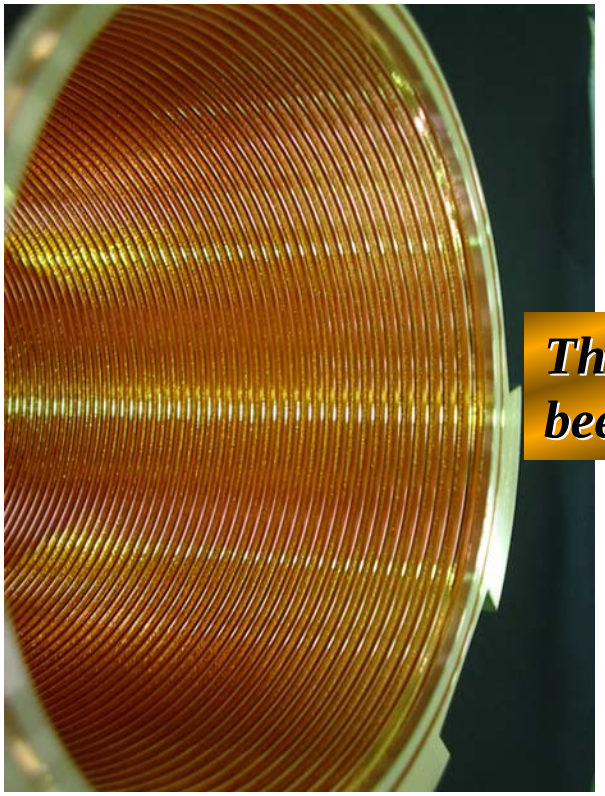




Fixed
- Groove width: 1mm
- Groove pitch: 2mm

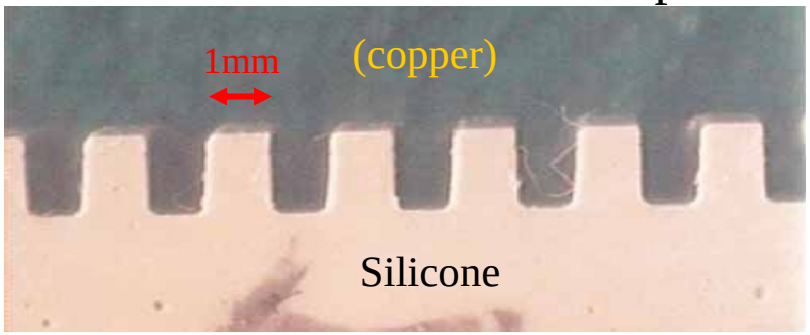
1st Prototype





The inner surface bas been electropolished.

Replica



Summary

- We have performed a multipactoring simulation study for a grooved coaxial line based on the method in
  T. Abe et al., Phys. Rev. ST Accel. Beams ***9****, 062002 (2006)*

  →***Very effective against multipactoring.***

- We have constructed a first prototype of input coupler with a grooved coaxial line.

  →***High power test to be performed soon***