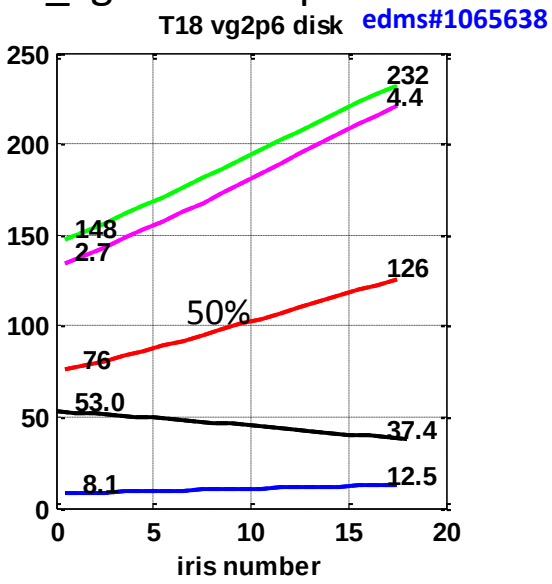
Summary of the test structure design

A. Grudiev

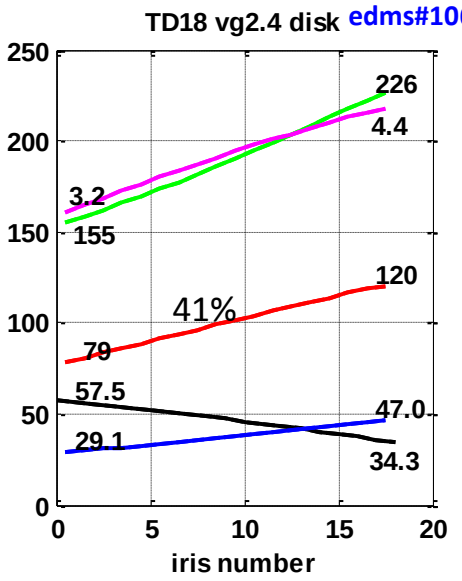
14/04/2010

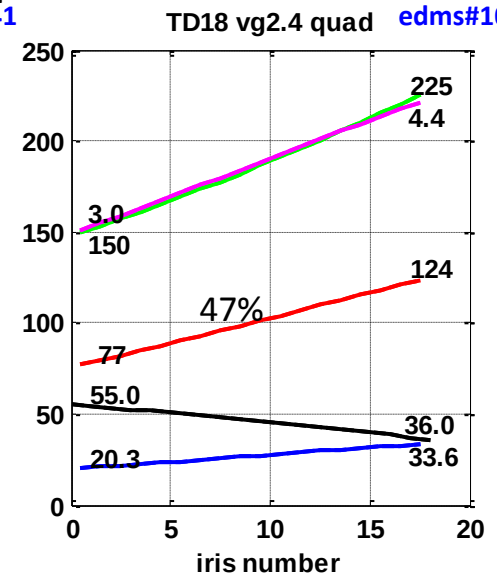
11.424 GHz, <100 MV/m>, 100 ns, reg. cells

CLIC_vg1: undamped

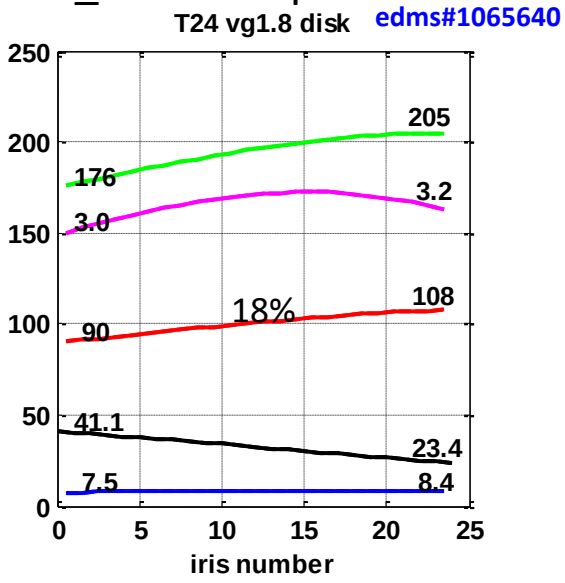


damped

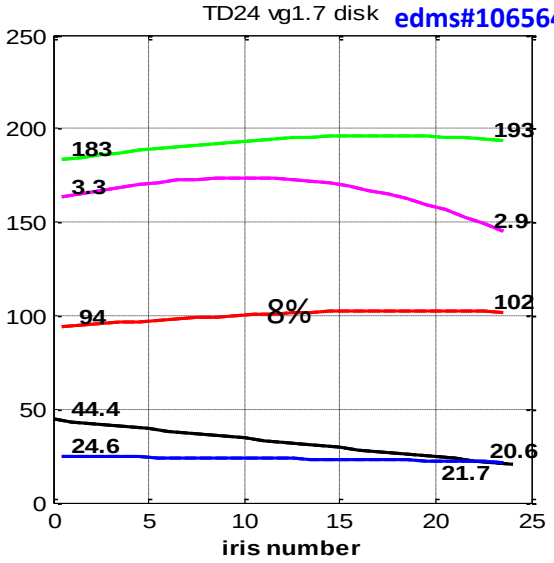


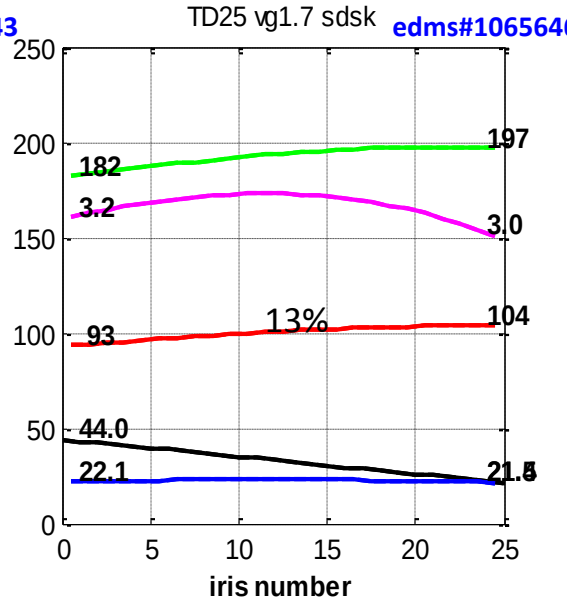


CLIC_G: undamped



damped

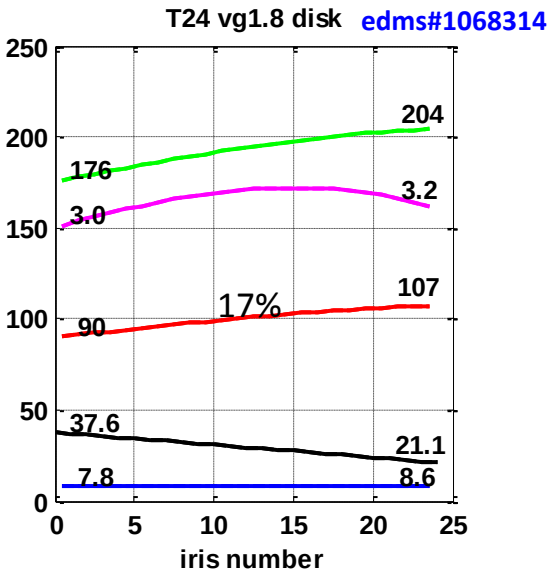




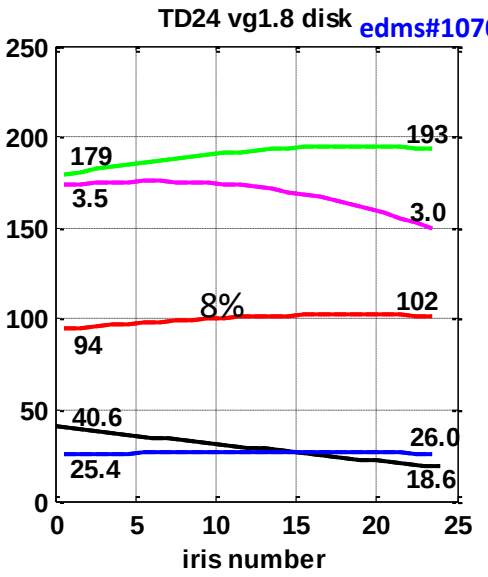
A. Grudiev, 14/04/2010

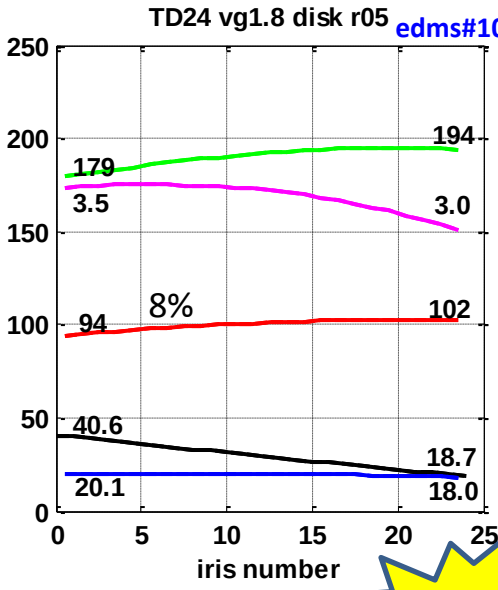
11.994 GHz, <100 MV/m>, 100 ns, reg. cells

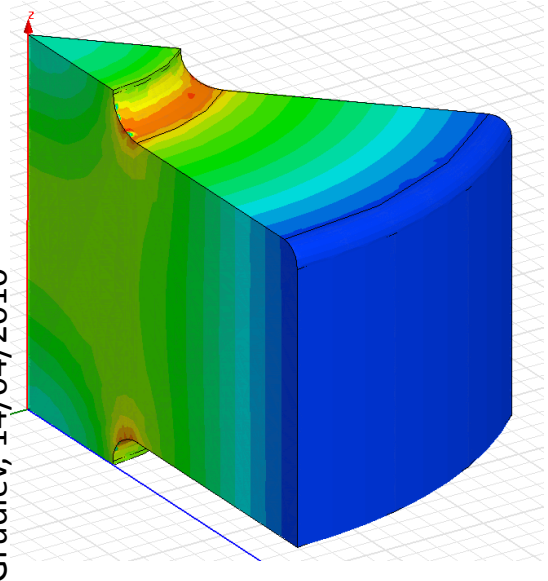
CLIC_G: undamped

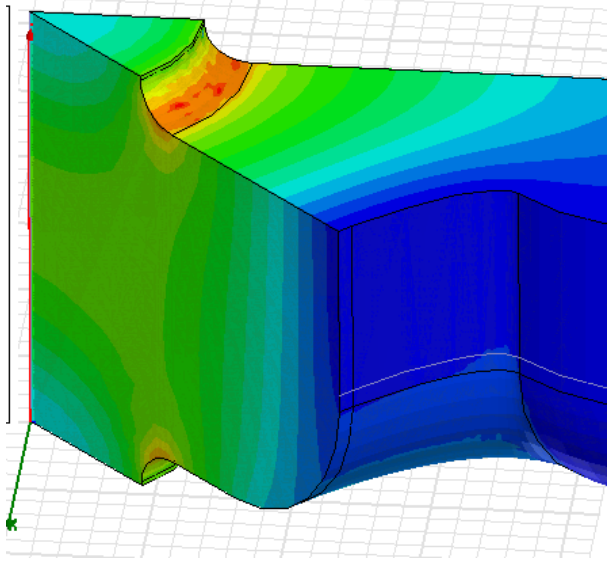


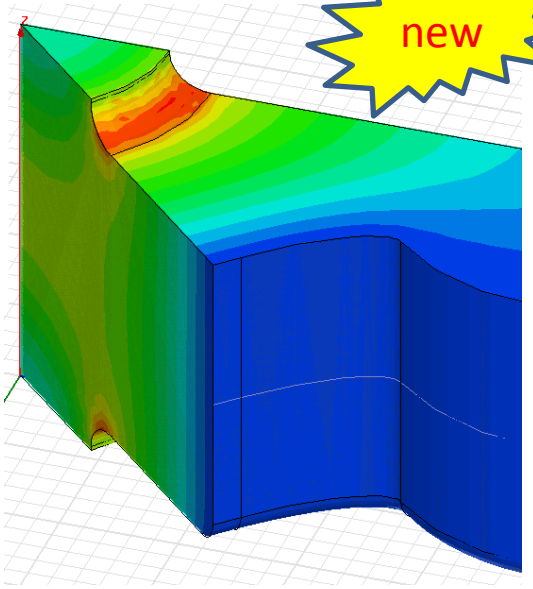
damped











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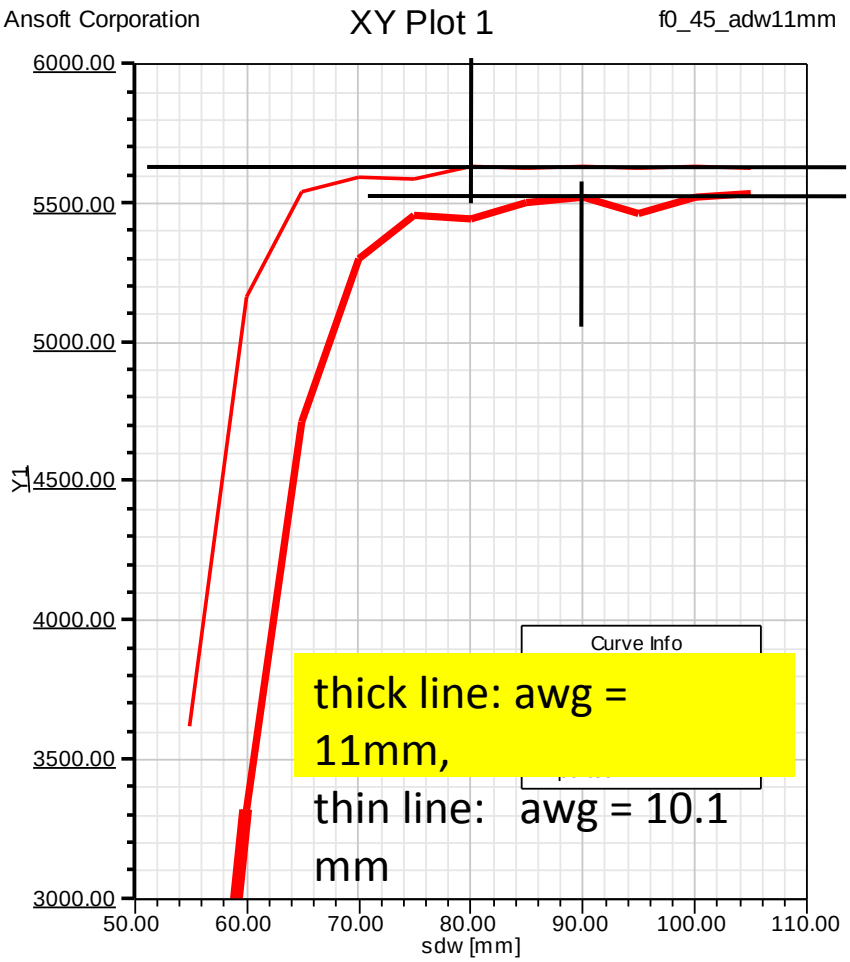
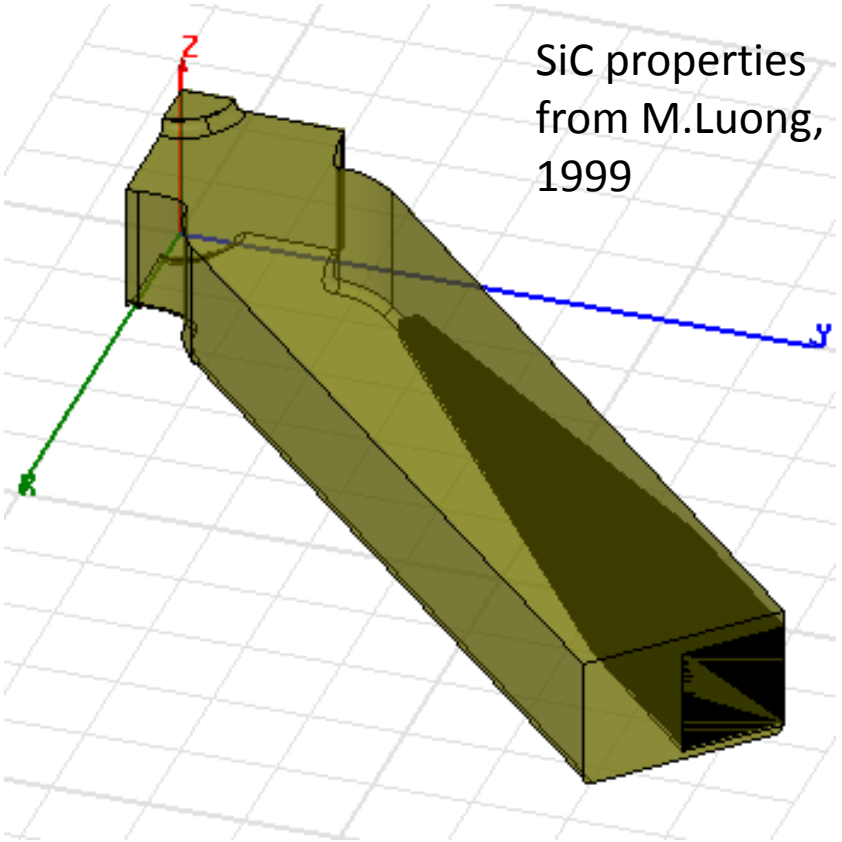
Preliminary Design of the Damping Load

Will be used for CLIC module prototype and for a structure prototype for high power testing with damping load inside (TD24_vg1.8_diskR05_SiC)





SiC properties from M.Luong, 1999

Tip size 1x1 mm
Tip length 20 mm or 30 mm
Base size 5.6 x 5 or 5.5 mm
Base length 10 mm
Waveguide width
awd = 10.1 mm or 11 mm

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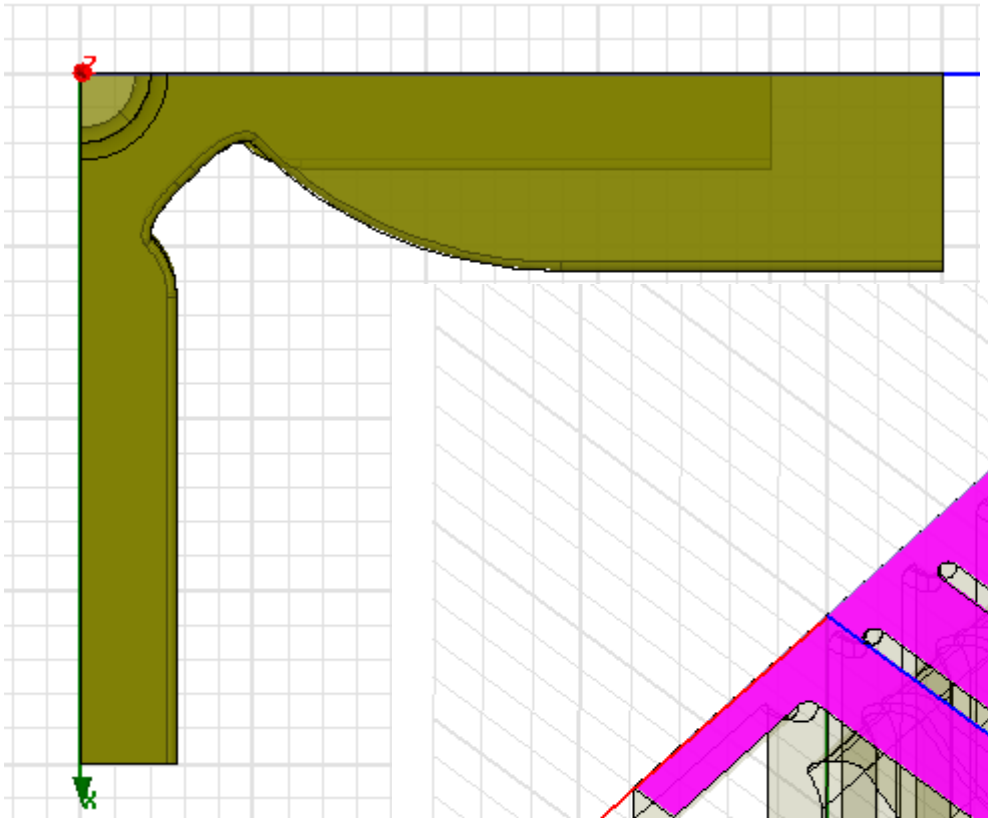
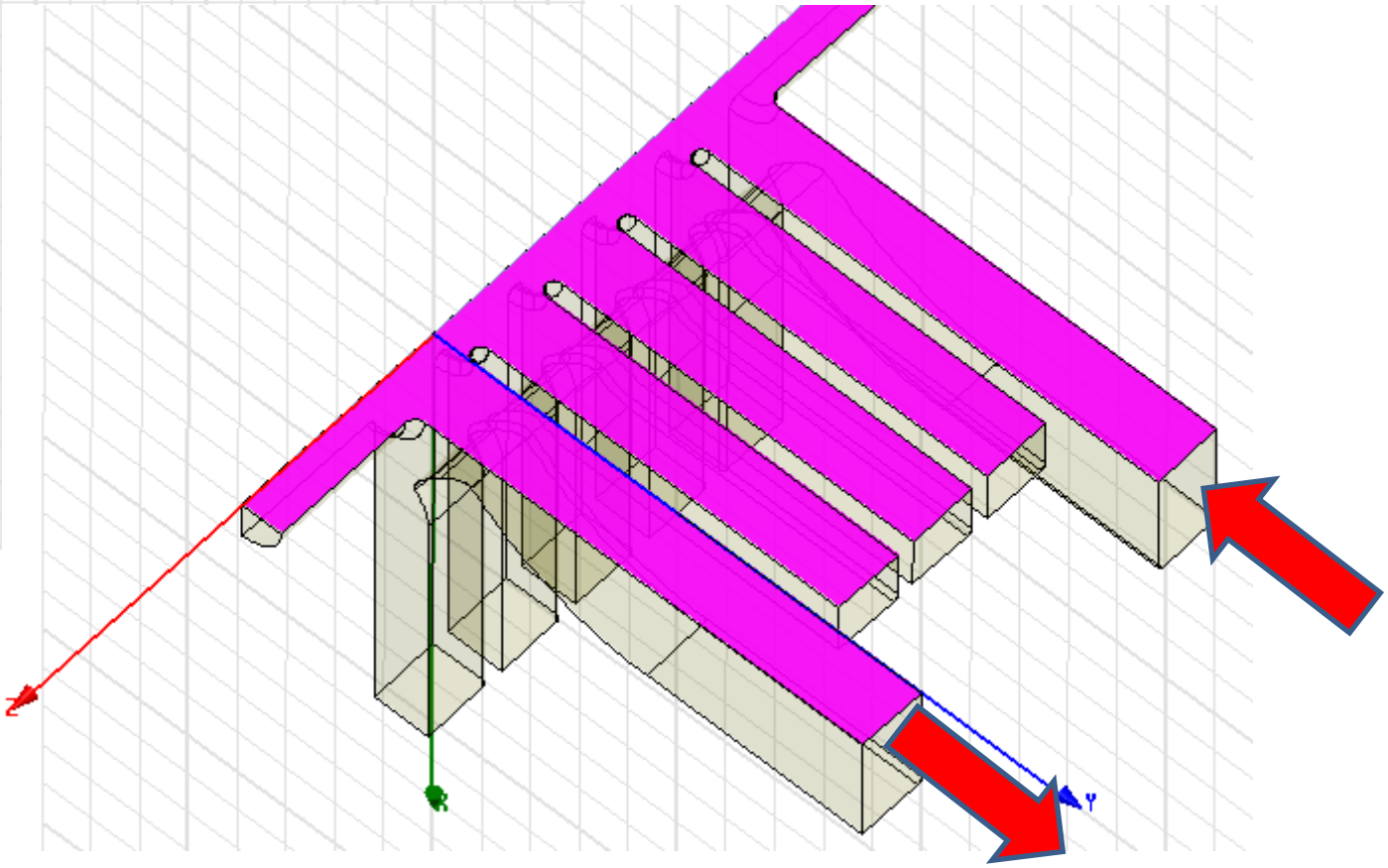
Design of the damped compact coupler



Will be used for CLIC module prototype and for a structure prototype for high power testing with damped compact coupler (TD26_vg1.8_diskR05_CC)



Beyond CLIC_G

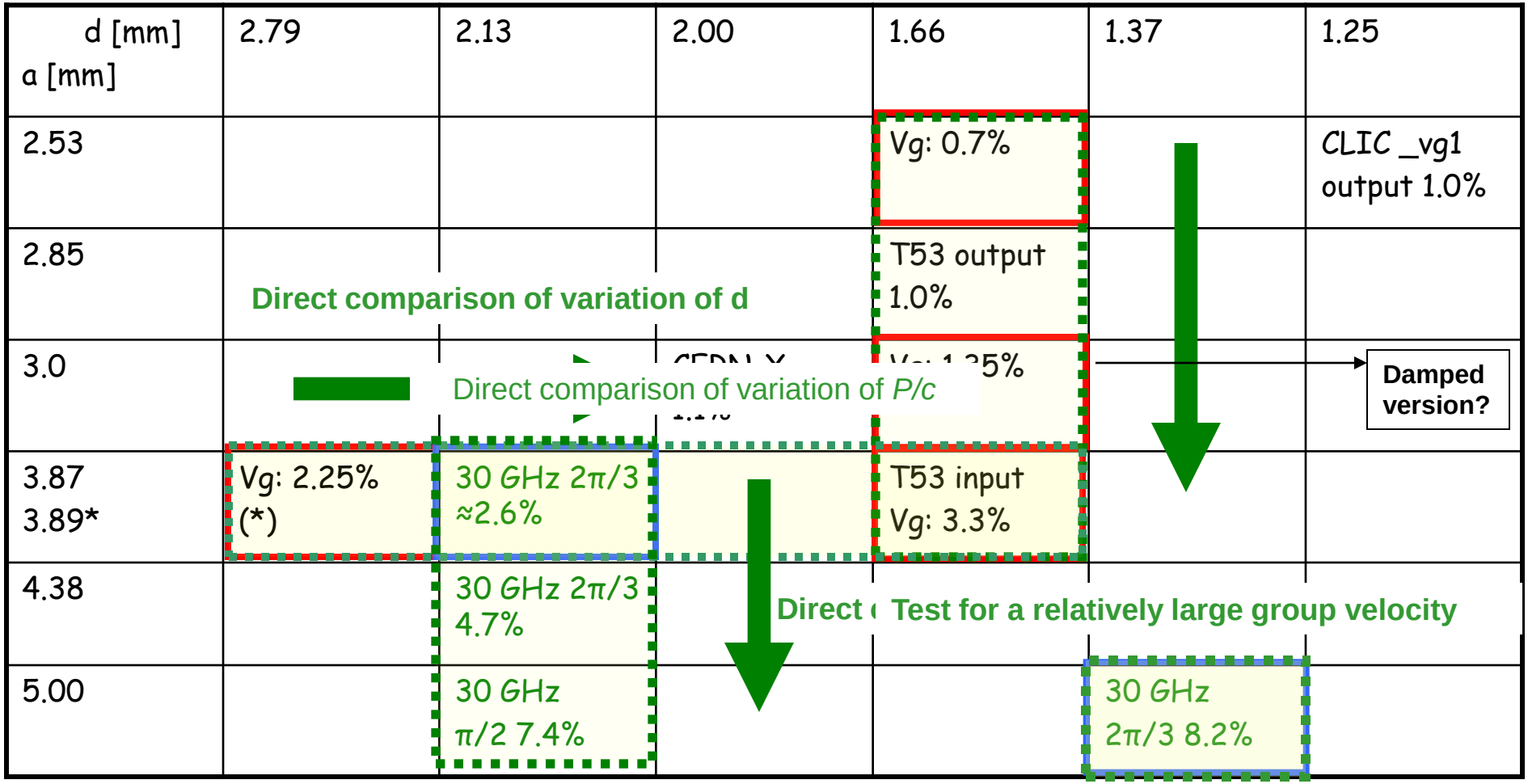
- A structure with a degree of tapering lower than TD18_vg2.6_disk (41%) and TD24_vg1.8_diskR05 (8%) is an interesting option
- For example, ~ 20-25 %
- It could also have bigger average aperture if CLIC main beam bunch charge can be increased accordingly.
- A detailed optimization of the parameters and rf design will be done this year

The test matrix (all structures in disks)

R. Zennaro 2008

In red: 11.4 GHz new structures (C10)

In blue: 30 GHz new structures (scaled values for *a* and *d*) (C30)



(*) not very different from input vg1 (*d*=2.79; *a*=4.06)

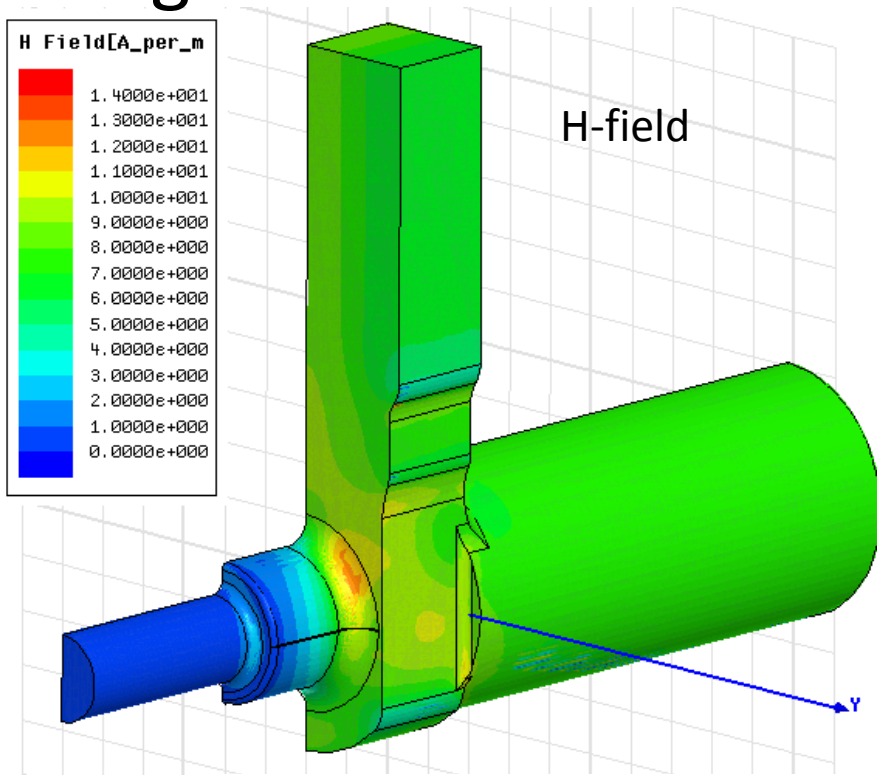
C10 family

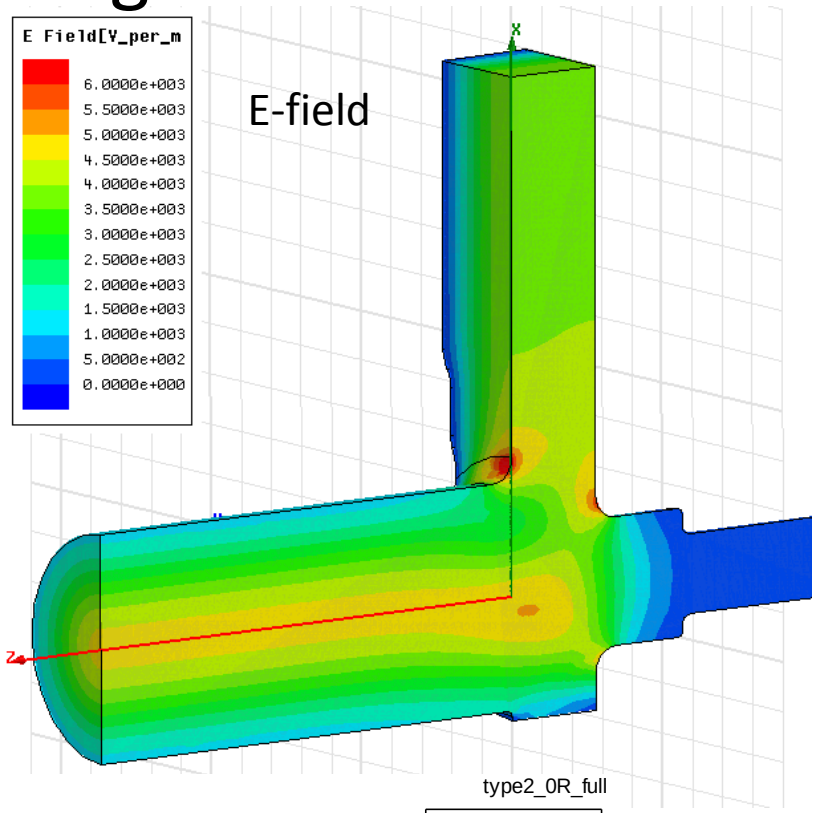
- Aperture scan (un-damped cells)
  - C10_vg1.35
  - C10_vg0.7

- Different damping geometry (damped cells with iris geometry from C10_vg1.35)
  - CD10_WDS
    - different materials are on hold
  - CD10_Choke (edms#1071742)
    - different choke gap will be investigated

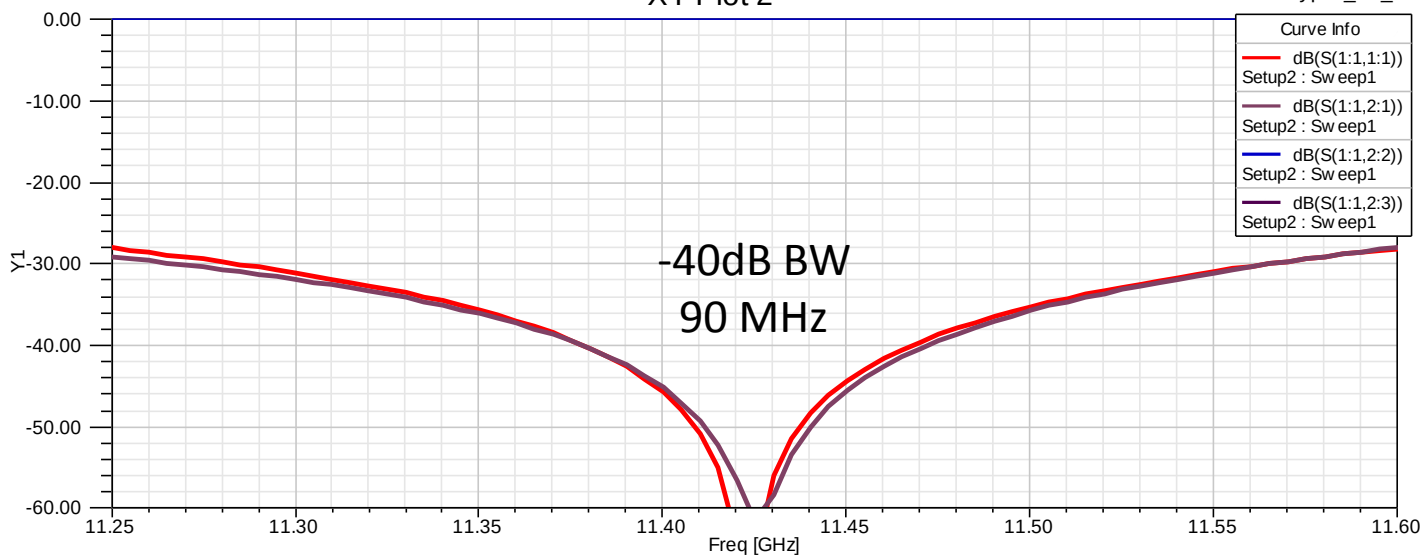
C10 family is still a valid approach because it is simpler and cheaper than a full scale tapered structure prototype.
The main problem is lower priority so it goes very slow, much slower than tapered structures. (C10-paradox !)

Single-feed mode launcher Design for C10 structures





Ansoft LLC



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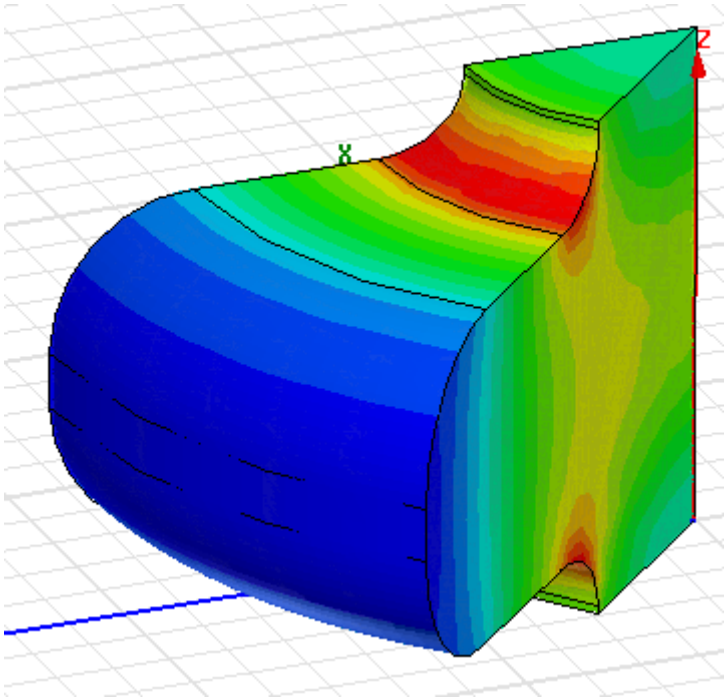
Quadrants/halves family

HALVES

Here T18_vg2.6_quad design is used. It has no slots.



QUADs with SLOTS

T18_vg2.6_Qslot design is used. It is the T18_vg2.6_quad but 4 slots of 0.2 mm rounded with 0.2mm radius are introduced. Corresponding frequency up-shift is ~1 MHz, well within tuning range.